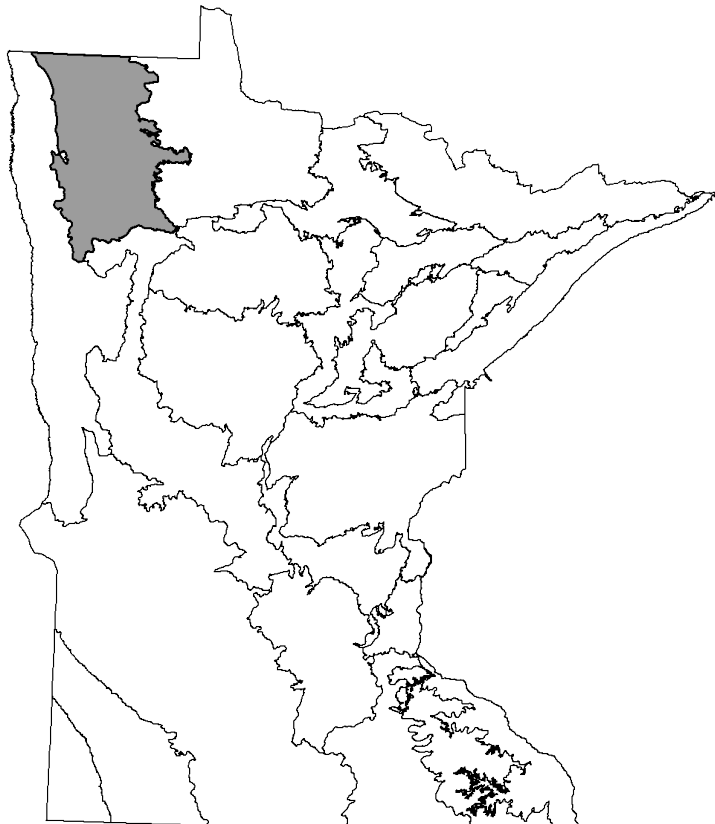


# ASPEN PARKLANDS

## Subsection Forest Resource Management Plan

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### Final Plan Fiscal Year (FY) 2012-2021



Minnesota Department of Natural Resources  
June 2011



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## Executive Summary

This Subsection Forest Resource Management Plan (SFRMP) includes management direction, strategies, and goals for vegetation management on state lands administered by the Department of Natural Resources (DNR), Division of Forestry and Section of Wildlife in the Aspen Parklands (AP) Subsection. The AP landscape covers approximately 2.9 million acres in northwestern Minnesota. State lands comprise approximately 355,000 acres or 12% of the land ownership in the subsection. Approximately 95,000 acres (27%) of the state lands are considered forest and woodlands. These were the primary vegetation types considered for the resource management objectives in this plan.

The AP SFRMP has taken into consideration all appropriate legislative requirements and DNR directions. In addition, this plan has considered and coordinated with vegetation management plans of other land managers: The Nature Conservancy, Minnesota Forest Resource Council – Northern Landscape Committee, and Agassiz National Wildlife Refuge. The strategies and desired future conditions contained in this plan are consistent with the goals of the other land managers in the subsection.

Primary elements of the AP SFRMP include analysis of existing forest conditions, development of desired future forest composition (DFFCs), and a stand exam list which identifies stands to be field visited during the 10-year plan implementation period to determine specific stand treatments. The AP SFRMP recommends the following:

1. Move toward a balanced age-class distribution for even-aged managed cover types that contain sufficient acreage to achieve a balanced age-class;
2. Implement strategies to increase wildlife habitat for identified species;
3. Identify and maintain old forests;
4. Increase the acres of young forest in the subsection;
5. Provide a sustainable supply of forest products;
6. Increase overall timber productivity, consistent with other strategies;
7. Convert a portion of the aspen/balm of Gilead cover types to openlands and brushlands;
8. Convert a portion of the aspen/balm of Gilead to the Oak cover type;
9. Identify and manage a portion of the aspen/balm of Gilead, lowland black spruce, and tamarack cover types as extended rotation forest;
10. Designate and manage forest patches;
11. Limit or mitigate visual impact of management activities;
12. Follow site-level guidelines for riparian areas to assist with protection of water quality in the subsection;
13. Identify and maintain existing cultural resources;
14. Identify and protect important plant and animal species; and,
15. Consider natural disturbance regimes to manage timber harvesting on a sustainable basis.

Vegetation management will provide a broad range of habitats that meet the needs of game and nongame species, while providing for the specific habitat needs of individual species when appropriate. A goal for the plan is to provide healthy, self-sustaining populations of all native plant, fish and wildlife species and a few desirable introduced species. Specific strategies will be implemented that reduce the negative impacts caused by wildlife species on forest vegetation.

Old forest will be maintained on a small percentage of state lands in the subsection. The long-term effective extended rotation forest percentage goals for the even-aged managed cover types are listed below:

- Aspen/balm of Gilead – 3%;
- Lowland black spruce – 11-16%; and,
- Tamarack – 5%.

Old forest conditions will also be provided in uneven-aged managed cover types, ecologically important lowland conifers (EILC), and around designated old-growth stands.

The plan calls for more traditional forest management on approximately 58% of timberlands in the subsection. For example, 28,559 acres of the aspen/balm of Gilead forest is to be eventually managed between 45 to 65 years of age. A shorter rotation, between 35 and 45 years of age, will be used on another 16,577 acres of the aspen/balm of Gilead cover type group during the first 10-years of plan implementation.

An overarching goal of the plan is to enhance open landscapes, primarily brush and grass cover types, but also young forest. To meet this long-term goal, some aspen/balm of Gilead stands (15,478 total acres) will be managed or converted to other non-forested cover types over the first two decades of the plan. Some of the young forest habitat, further discussed below, will also contribute to this open landscape goal. This is especially true for 24,595 acres or 29% of aspen/balm of Gilead cover type acreage that will eventually be managed on a 20 year or less rotation.

Over the long-term, the plan is to maintain approximately 54,000 acres (78%) of the remaining aspen/balm of Gilead cover type as young forest under 30 years of age. Of these 54,000 acres, almost 30,000 acres will be generated from stands managed on at least a 20 year rotation up to stands managed on a rotation of 65 years of age.

An increase in the acres of the grass, brush and oak cover types is a goal for the state lands in the subsection during implementation of this plan. The aspen/balm of Gilead cover type will be targeted to achieve the cover type increases for each cover type presented below:

- Increase the oak cover type by 400 acres (41%) during the first ten-year planning period and by 749 acres (77.5%) over the next 50-years; and,
- Increase brush and grass cover types in the subsection by 7,733 acres (4.3%) during the first ten-year planning period and by 15,563 acres (8.6%) mostly by the end of the second planning decade;

Patch management within the subsection during implementation of this plan will emphasize designated large forest patches and increasing their average size over time. Six percent of the DNR timberlands addressed by this plan have been designated as forested patches. Riparian areas will be managed to provide habitat for fish, wildlife and plant species. The Minnesota Forest Resource Council's (MFRC's) "*Voluntary Site-Level Forest Management Guidelines*" will be applied on all state lands. These guidelines identify specific management strategies for riparian areas that maintain quality for fisheries and animal habitat, eliminate visual impacts and provide for erosion control throughout the subsection.

Minnesota County Biological Surveys (MCBSs) have been completed for a majority of the counties that are in the subsection (i.e. Kittson, Marshall, Pennington, Red Lake, and Roseau Counties). MCBSs for Beltrami, Clearwater, and Polk Counties are currently in progress. The Survey documented some important sites of biodiversity significance. Strategies have been developed to manage state lands in these MCBS sites while

sustaining or minimizing the loss to the biodiversity significance factors on which the MCBS sites were ranked. Known locations of rare plants and animals and their habitats and rare native plant communities will be protected, maintained, or enhanced on state lands in the subsection.

The treatment level (i.e. harvest, thinning, etc.) recommended for the 10-year plan shows a dramatic increase in timber offered in the first two decades of the planning period when compared with past harvest volumes in the subsection (i.e. 489,764 cords offered in FY 2012-2021 compared to 224,700 cords sold in FY 2000-2009). After the first two planning periods (FY 2012-2031) the timber offered for sale in the subsection will return to the more traditional levels that have been offered in the past (i.e. 2000-2009 levels).

Other issues addressed in the plan include:

- Protecting wetland and seasonal ponds;
- Limiting damage from insects, disease, and exotic species;
- Minimizing forest management impacts on visual quality;
- Monitoring climate change effects on forest lands;
- Protecting cultural resources;
- Evaluating disturbance events; and,
- Planning new road accesses.

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## Chapter 1. Introduction

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This Subsection Forest Resource Management Plan (SFRMP) process considers forestlands administered by the Department of Natural Resources (DNR) Divisions of Forestry and Fish and Wildlife in the Aspen Parklands Subsection (AP). This Subsection covers approximately 2.9 million acres in an area from near Gully in the southeast to Roseau in the northeast, and from Lancaster in the northwest to Crookston in the southwest (See Map 1.1).

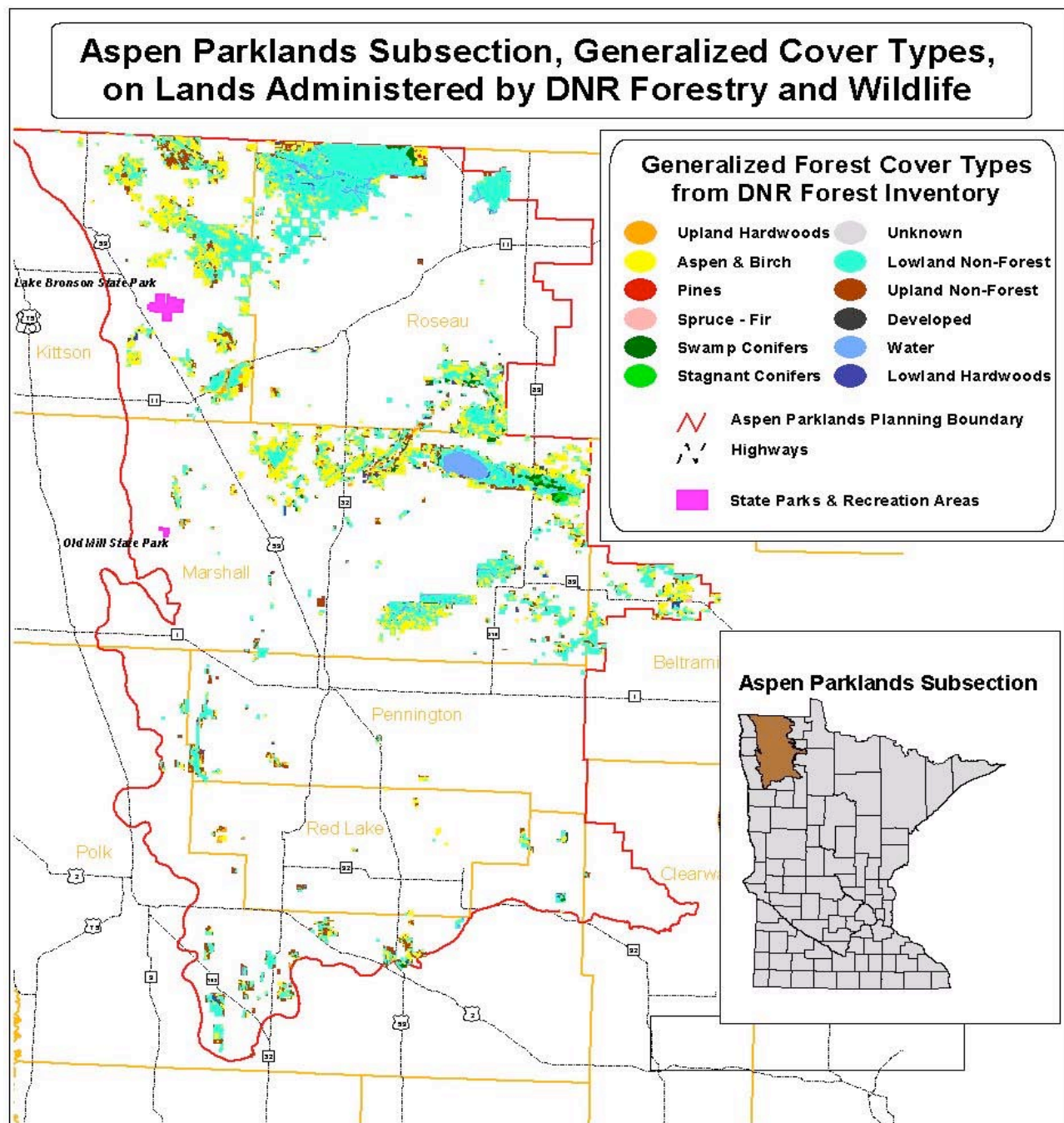
### 1.1 Planning area description

Agriculture and recreation are the major uses of land in this Subsection. Public agencies (state and federal) administer 16 percent of the land in the Subsection, with the state portion being 12 percent or 355,000 acres. Approximately 95,000 acres of DNR Forestry and Wildlife land is forest and woodlands that are considered for the resource management objectives in this plan. Other cover types totaling 250,000 acres are non-forested and may be considered for biomass harvesting to meet resource management objectives in this planning effort. Other state lands (totaling approximately 9,000 acres) such as state parks and Scientific and Natural Areas (SNAs) are not considered for resource management under this plan. However, these areas do contribute to some of the plan's goals.

As shown on Table 1.1 and Figure 1.1, the federal government owns 2 percent (68,000 acres) of the lands in the Subsection that are managed by the U.S. Fish and Wildlife Service including Agassiz National Wildlife Refuge, Glacial Ridge National Wildlife Refuge and numerous Waterfowl Production Areas (WPAs). Kittson, Marshall, Red Lake, Roseau, Pennington and Polk counties own and manage less than one percent of these lands (24,000 acres). Private lands comprise 83 percent (2.4 million acres), of this The Nature Conservancy (TNC) owns approximately 1 percent (40,000 acres) of the private lands in the Subsection. There is no industrial forest land in the Subsection.

Map 1.1, on the next page, details the cover types that exist on state administered lands in the AP Subsection.

**Map 1.1. Aspen Parklands Subsection generalized cover types on lands administered by DNR Divisions of Forestry and Fish and Wildlife.**

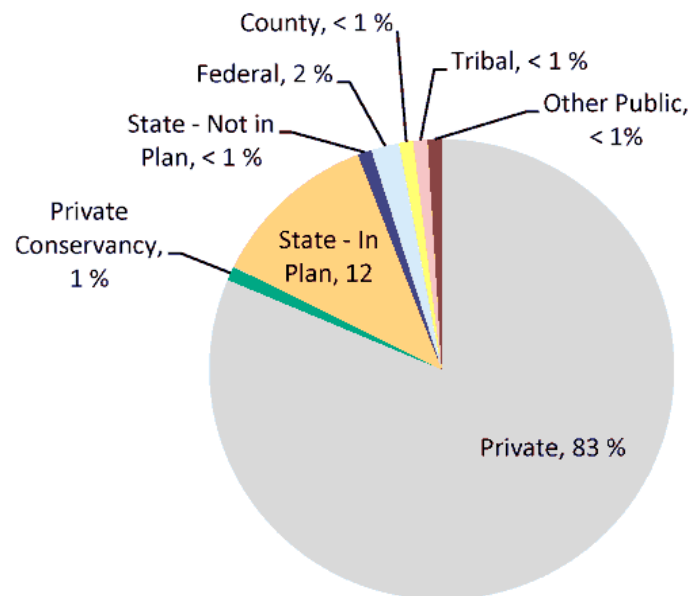


**Note:** The maps have been reduced and printed in grayscale in this document. It is recommended that these maps be viewed at a larger scale and in color. The colored maps and this report can be viewed at:

<http://www.dnr.state.mn.us/forestry/subsection/aspenparklands/plan.html>

**Table 1.1. Land ownership in the AP Subsection – total acres<sup>1</sup>.**

Ownership	Acres	Percent of total land base
Private <sup>2</sup>	2,382,000	83%
Private – Conservancy <sup>3</sup>	40,000	1%
State lands included in the plan	344,000	12%
State lands - Forestry	7,000	<1%
State lands - Wildlife	337,000	12%
State lands excluded from the plan <sup>4</sup>	9,000	<1%
Federal	68,000	2%
County <sup>5</sup>	24,000	<1%
Tribal	4,000	<1%
Local government <sup>6</sup>	<1,000	<1%
Total	2,873,000	100%

**Chart 1.1. Land ownership percentages in the AP Subsection.**

<sup>1</sup> Source: 1976 to 1998 Minnesota DNR GAP Stewardship---“All Ownership Types” data. Includes all lands administered by units of DNR including Forestry, Section of Wildlife, Section of Fisheries, Parks and Trails, and Ecological and Water Resources. This SFRMP only covers Forestry and Section of Wildlife administered lands. All acres in the table have been rounded to the nearest thousand.

<sup>2</sup> Private – Includes all private land except for Private Conservancy land listed separately.

<sup>3</sup> Private -- Conservancy Lands: The Nature Conservancy

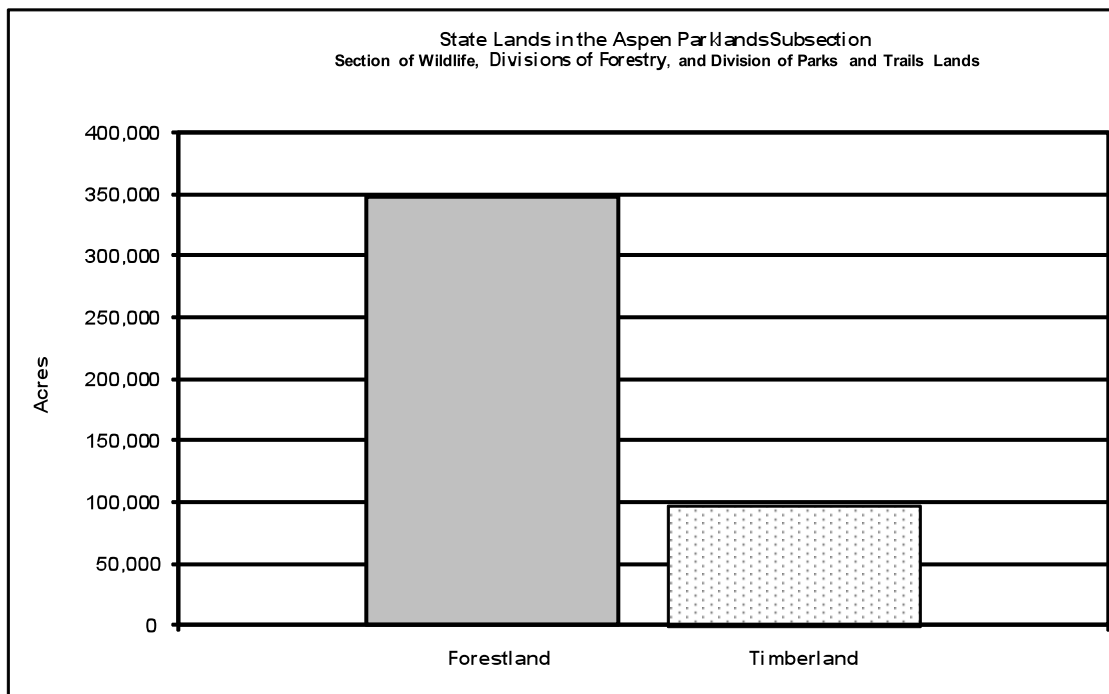
<sup>4</sup> State lands excluded from plan – Scientific and Natural Areas, Parks and Trails, Department of Transportation, Section of Fisheries, and Division of Ecological and Water Resources.

<sup>5</sup> County includes both County Fee and County Administered State Owned lands.

<sup>6</sup> Local Government– Independent School Districts and City Ownerships.

Based on the Gap Analysis Program (GAP) classification completed by the DNR Division of Forestry using satellite imagery of all lands in the AP, 3.3 percent of the land area (non-water) is covered by forest. Based on the DNR forest inventory data of timberland that will be considered in this plan, aspen/balm of Gilead cover types comprise 85,160 acres or 89 percent of the timberlands total. Non-forested brushland, wetlands, and grasslands comprise 250,000 acres or 73 percent of the AP's land area under state ownership.

**Figure 1.1. State forestlands and timberlands in the AP Subsection.**



*Forestland* consists of all DNR administered lands included in the forest inventory from aspen to stagnant conifers, muskeg, lowland brush, and lakes. *Timberland* includes those cover types that are capable of producing merchantable timber and are available for timber management, meaning they are not withdrawn from management based on land administrator or by reserved status such as old growth. Timberlands represent about 27 percent of the total forestland (all ownerships) in the AP. State lands reserved from harvest such as designated old-growth stands, SNAs and State Parks (1,575 acres) are not included in Timberlands.

**Note:** Due to updates to the forest inventory and other data sources during the planning process, there may be slight differences in acreages shown between various tables and figures in this planning document. These differences will not have a significant effect on the recommendations in this plan.

## 1.2 Scope of Subsection Forest Resource Management Plan

### Subsection Forest Resource Management Plan

A SFRMP is a DNR plan for vegetation management on forest lands administered by the DNR Divisions of Forestry and Fish and Wildlife. Vegetation management includes actions that affect the composition and structure of forest lands, such as timber harvesting, thinning, prescribed burning, and reforestation. The geographic area covered by these plans is defined by Ecological Classification System (ECS) subsections. In response to growing public interest in DNR timber management planning, the DNR SFRMP process was developed to provide a more standardized, formal process and opportunities for increased public involvement. In addition, it is based at the subsection level of the DNR's ecological classification system rather than DNR administrative areas as in the past (i.e., DNR Forestry Area boundaries). The SFRMPs do consider the condition and management of forest lands not owned by the DNR, but only propose forest management direction and actions for DNR lands.

Consistent with state policy (Minnesota Statutes 89A), the SFRMP process pursues the sustainable management, use, and protection of the state's forest resources to achieve the state's economic, environmental, and social goals.

The SFRMP planning process is divided into four steps. In Steps 1 and 2, the subsection Planning Team prepares information to assess the current forest resource conditions in the subsection and identify forest resource management issues that will be addressed in the subsection plan. In Step 3 (preparation of the Draft AP SFRMP), the subsection Planning Team finalizes the issues and develops general directions and strategies to address these issues. The strategies will help in developing cover type management recommendations, stand selection criteria, stand treatment levels, 10-year stand exam, and new access needs lists. The Planning Team also prepares the 10-Year Stand Exam List and New Access Needs List.

Step 4 (Final AP SFRMP) is preparation of the final plan following public review of the draft plan, and incorporating changes resulting from comments received.

There are two opportunities for public input during the SFRMP process. First, in review of the *Preliminary Issues and Assessment document*<sup>7</sup>; and second, review and comment on the Draft AP SFRMP which includes vegetation management strategies, desired future forest composition, and the 10-year stand exam and new access needs lists.

### ECS subsections

The DNR has developed an ECS as a tool to help identify, describe, map, and manage ecosystems (see *Appendix A: Ecological Classification System*). ECS units are defined by climatic, geologic, hydrologic, topographic, soil, and vegetation data. The DNR ECS divides the state into six levels of ecological units, each level nested together within the next higher

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<sup>7</sup> Minnesota DNR, September 2009, *Preliminary Issues and Assessment*, Subsection Forest Resource Management Plan. A copy can be found at:

[http://files.dnr.state.mn.us/forestry/subsection/aspenparklands/prelim\\_issues\\_assess.pdf](http://files.dnr.state.mn.us/forestry/subsection/aspenparklands/prelim_issues_assess.pdf)

level. Subsections are the third level down in the ECS hierarchy in Minnesota. There are 17 forested subsections in the state, ranging in size from 339,285 to 3,657,011 acres.

### **Goals for the planning effort**

While the planning process will produce many tangible “products,” such as assessment information, issues, and strategies, the end result of the planning process will be two key products:

- **Desired Future Forest Composition (DFFC) goals:** The goals include long-term (50 years or more) and short-term (10-years) desired changes in the structure and composition of DNR forestlands in the Subsection. Composition goals include the amount of various cover- types, age-class distribution of cover types, and their geographic distribution across the Subsection. DFFC goals for state forestlands are developed from assessment information, issues, the general direction identified in response to the issues, and strategies to implement the desired management direction.
- **List of DNR forest stands to be examined for treatment over the next 10-year period.** SFRMPs identify forest stands on lands administered DNR Divisions of Forestry and Fish and Wildlife administered lands that are proposed for treatment (e.g., harvest, thinning, regeneration, and re-inventory) over the 10-year planning period. Forest stands are selected using criteria developed to begin moving DNR forest lands toward the long-term DFFCs. Examples of possible criteria include stand age and location; soils; site productivity; and size, number, and species composition. Many decisions and considerations go into developing these criteria and the list of stands proposed for treatment. Examples include:
  - 1) Identifying areas to be managed as older forest or ERF;
  - 2) Identifying areas to be managed at normal rotation age (NRA);
  - 3) Identifying areas for various sizes of patch management;
  - 4) Management of riparian areas and visually sensitive travel corridors;
  - 5) Age and cover type distributions; and,
  - 6) Regeneration, thinning, and prescribed burning needs.

Decisions will be made based upon the management activities (including no action) that will best move the forest landscape toward the DFFC goals for state forest lands.

### **Who develops SFRMPs?**

SFRMP Planning Team members include staff from the DNR Divisions of Forestry, Fish and Wildlife, Ecological and Water Resources. A list of team members who were involved with drafting of the SFRMP is included at the end of this chapter. These Planning Teams have primary responsibility for the work and decision making involved in developing the subsection plans. Decision-making by the team is through an informed consent process. Managers of adjacent county, federal, tribal, and industrial forestlands may be invited to provide information about the condition of their forest lands and future management directions. As much as possible data relating to all ownerships are used in the planning process.

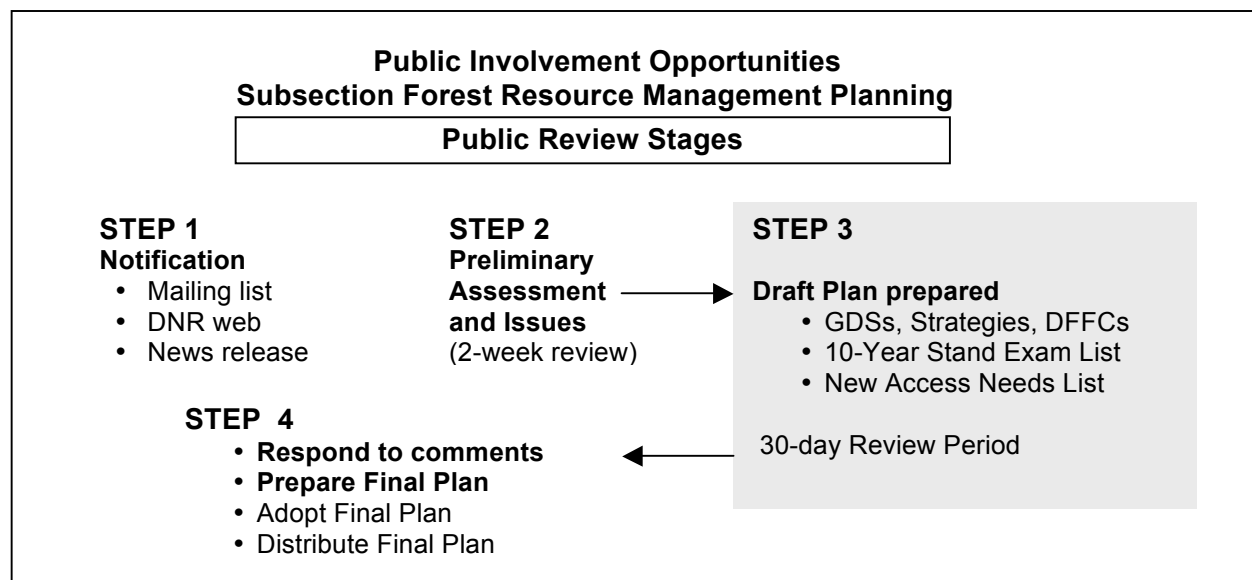


### 1.3 SFRMP Process Overview

Table 1.2 outlines the steps in the DNR SFRMP process. This SFRMP is currently finishing step 3. Figure 1.2 shows the opportunities for public involvement during the SFRMP planning process.

**Table 1.2. SFRMP process overview.**

<b>Step 1</b>	<b>Initiating the Planning Process</b> <ul style="list-style-type: none"> <li>• DNR forms interdisciplinary team for the subsection(s).</li> <li>• DNR staff assembles base assessment information.</li> <li>• Web page is established for the subsection on the DNR Web site.</li> <li>• DNR develops mailing list of public/stakeholders.</li> <li>• Public is informed that the planning process is beginning in the subsection, the estimated schedule for the planning process, and how and when they can be involved.</li> </ul>
<b>Step 2</b>	<b>Preliminary Assessment and Issue Identification</b> <ul style="list-style-type: none"> <li>• Subsection team adjusts and supplements the base resource assessment information for the subsection.</li> <li>• Team identifies the preliminary issues to be addressed in the plan.</li> <li>• DNR distributes assessment information and the preliminary issues for public review and input.</li> </ul>
<b>Step 3</b>	<b>SFRMP Draft Plan Including:</b> <b>Strategies, Desired Future Forest Composition, and Stand Selection Criteria</b> <ul style="list-style-type: none"> <li>• DNR finalizes the list of Issues to be addressed in the plan based on public input from Step 2.</li> <li>• Subsection Team develops General Direction Statements (GDSs) in response to the final list of Issues.</li> <li>• Subsection Team and work groups develop Strategies and Desired Future Forest Composition (DFFC) goals consistent with the general direction.</li> <li>• Team develops stand selection criteria to help identify DNR forest stands for treatment over the 10-year planning period to move toward the DFFC goals.</li> </ul> <b>Draft List of Stands to be Treated and New Access Needs</b> <ul style="list-style-type: none"> <li>• DNR staff identifies state forest land stands to be considered for treatment over the 10-year planning period.</li> <li>• DNR staff identifies road access needs associated with the list of stands proposed to be treated.</li> <li>• Draft AP SFRMP and draft list of stands to be treated and road access needs are distributed for public review and comment.</li> </ul>
<b>Step 4</b>	<b>Final Plan</b> <ul style="list-style-type: none"> <li>* Subsection Team summarizes public comments and develops DNR responses.</li> <li>* A summary of comments, responses, and plan revisions are presented to the department for commissioner's approval.</li> <li>* Commissioner approves final plan.</li> <li>* Final Plan is distributed, including summary of public comments and DNR responses.</li> </ul>

**Figure 1.2. SFRMP public involvement opportunities.**

## 1.4 Contents of the Aspen Parklands SFRMP

This plan contains products developed by the AP SFRMP Team for public review as part of Step 3 in the planning process. These products include the final list of issues addressed, general direction statements (GDSs) and strategies to address the issues, desired future forest composition (DFFC) goals, stand selection criteria, cover type management recommendations, responses to public comments received from the *Preliminary Issues and Assessment* document, and the 10-year stand exam lists and new access needs lists.

In Step 2 of the process, the AP Team identified a preliminary list of Issues to be addressed in the plan. These Issues were developed based on the general field knowledge of department staff and forest resource information assembled by the team in the *Preliminary Issues and Assessment* document. The preliminary list of issues was distributed for public review and comment in September 2009. The preliminary list of issues was revised based on input from DNR staff and the public. This revised list of issues is presented in Chapter 2 of this plan as the final list of issues that have been addressed in the AP plan.

In Step 3, the AP Team, working with technical work groups, developed GDSs and strategies and DFFCs to address the final list of Issues. DFFC goals are most commonly expressed in terms of desired changes in the age-class structure, the amount of various forest types within the Subsection, and the geographic distribution of forest types and age-classes across the Subsection. The GDSs, strategies and DFFCs developed by the work groups are based on existing DNR policies/mandates, technical expertise from within and outside the Planning Team, forest resource information from the *Preliminary Issues and Assessment* document and other sources, and public input from Step 2 of the process. Strategies developed to address the various Issues were then examined to identify and group similar strategies, and to resolve strategies that might be contradictory. A list of the GDSs and DFFCs that were developed for the AP SFRMP is presented in Chapter 3 of this plan.

GDSs, strategies, and DFFC goals were used to develop cover type management recommendations as presented in Chapter 4 of this plan. These cover type management recommendations define proposed criteria to select a pool of forest stands for treatment over the 10-year planning period as identified in Step 3. Stand selection criteria can include: normal rotation ages (NRA) (i.e. ages at which most forest stands will be harvested); extended rotation forest rotation ages (i.e. ages at which stands designated for older forest management will be harvested); potential productivity of the site for timber (i.e., site index); soil types; stand density, or stocking measures (e.g., basal area); tree species composition; brush and ground cover; stand size; stand location; insect and disease occurrence; and other specific criteria needed to address issues. Stand selection criteria presented in the AP Plan are those identified by the AP Team as best moving DNR forest lands toward the identified DFFC goals for the AP.

The AP Team summarized and developed responses to public comments received during Step 2 of the overall SFRMP planning process. These responses are included in Chapter 5 of this plan.

## 1.5 Monitoring of SFRMPs

As this Subsection plan is implemented, monitoring of forest management activities is critical to achieve the goals of the AP SFRMP Plan. Many DNR forest management activities are currently tracked, such as cover type acres treated; treatment methods and acres; timber volumes sold and harvested; and regeneration methods, species, and success. However, some management activities and objectives are not readily tracked, such as stand composition changes. Monitoring of forest activities includes both site-level monitoring ((*MFRC Voluntary Site-Level Forest Management Guidelines*<sup>8</sup>) (*MFRC Site-Level Guidelines*)) and landscape-level monitoring (forest management consistent with the goals of the AP SFRMP Plan).

Each year as Annual Stand Exam Plans are developed from the Subsection plan, the Divisions of Fish and Wildlife and Ecological and Water Resources will provide input to The Division of Forestry regarding selection of stands and stand treatments. The Annual Stand Exam Plans developed by each Forestry Area are based on the state's fiscal year, July 1 – June 30. These annual harvest plans are typically prepared and cruised during the fall and winter months leading up to the start of the fiscal year. During development of the AP SFRMP Stand Exam List and also during each Forestry Area's identification of their Annual Stand Exam Lists other Divisions are provided an opportunity to identify stands where they would like to participate in a joint field visit/stand evaluation. These joint visits allow all Divisions to affect the stand prescriptions applied and stand management objectives. These review opportunities are also provided for annual plan additions (i.e., stands added during the year due to windthrow salvage, new information about a stand, etc.). A public review process is included for both the annual plans and additions.

Approximately one-tenth of the stands selected for treatment, as identified in the AP SFRMP, will be field visited each year during the 10-year plan period. Final stand treatment prescriptions will be determined after the field visit/stand examinations are completed. Prescriptions and objectives assigned to stands during the AP SFRMP planning process are

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<sup>8</sup> Minnesota Forest Resources Council. 2005. Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers and Resource Managers. St. Paul, MN. 615pp.

preliminary and may be adjusted based on current stand conditions and other information and input at the time of the stand examination.

Following timber sales or after forest development projects are contracted, Forestry staff administer timber harvest permits, forest development projects (e.g., site preparation and tree planting), and road projects as the work is completed. Forestry staff regularly monitors these activities to ensure that permit regulations and contract specifications are being met. In addition, standardized timber sales inspections are completed on at least 10 percent of active timber sales each year. The application of *MFRC Site-Level Guidelines* (e.g., riparian management zone guidelines) is monitored during permit and contract supervision and inspections. Wildlife habitat projects that are conducted on state lands will also contribute to plan goals. These projects will be administered, recorded, and monitored by Section of Wildlife staff.

In addition to Division of Forestry monitoring, the MFRC site-level monitoring program will also periodically sample sites in this Subsection as part of its overall statewide monitoring program. The objective of this statewide monitoring program is to evaluate the implementation of the *MFRC Site-Level Guidelines* through field visits to randomly selected, recently harvested sites across the various forest land ownerships (state, county, national forest, tribal, forest industry, non-industrial private lands, etc.). The monitoring results from sites on state lands in this Subsection will be used to determine implementation of the *MFRC Site-Level Guidelines*.

To monitor landscape-level forest management by DNR against the goals of the AP SFRMP, two types of monitoring questions will be addressed:

1. Implementation Monitoring, which determines whether the management actions are being implemented as written in the AP SFRMP, meaning:

Are management actions being carried out in a manner that is consistent with the AP SFRMP? and,

2. Effectiveness Monitoring, which determines the appropriateness or effectiveness of specific management actions designed and implemented to accomplish specific objectives identified in the AP SFRMP, meaning:

Are management actions having the desired on-the-ground effect?

It is often not possible to see the results of prescriptions and objectives assigned to stands, for many years. Many of the treatments assigned to stands in this plan may not be accomplished until after the 10-year plan is over. Some reasons are:

- 1) A portion of the stands identified for treatment won't be field -examined (and for many, offered for sale) until late in the 10-year planning period;
- 2) The harvest of timber sales occurs up to five years after the sale date;
- 3) Forest development activities may be needed to regenerate the site to the desired species after the timber sale harvest is completed;
- 4) Desired structural changes in stands may take many years or decades to occur;
- 5) Forest inventory data may not capture the forest stand composition components or changes for many years or capture it at all; and,
- 6) Desired conversions may take multiple treatments to complete.

Because of this, preliminary stand-management objectives (see *Appendix G: SFRMP Additional Field Names and Codes*) have been developed to record the intent or objectives of stand treatments. Preliminary objectives may be assigned to some stands during the SFRMP process to provide preliminary guidance for the appraiser to consider during the on-site stand evaluation. Final objectives will be assigned after the stand examination/appraisal for a timber sale or other treatment is completed. The assignment of objectives to stands allows recording of the various stand treatments on an annual basis to assist in monitoring the implementation of the AP SFRMP. This will help determine if strategies are being applied and if management objectives and goals are being met.

A significant portion of the data needed to monitor plan implementation and effectiveness will be collected from existing databases. Other data, especially those relating to effectiveness of management actions, are more difficult to obtain.

The following data sources and existing forestry management tools will be used to implement AP monitoring:

1. Forest Inventory Module (FIM):

The primary source of information about the current condition of DNR forest lands is the Forest Inventory Module. FIM is a stand-level forest inventory. A stand is a contiguous group of trees similar in age, species composition, and structure; and growing on a site of similar quality, to be declared a distinguishable forest unit. A forest is comprised of many stands. FIM captures essential information about every forest stand on more than four million acres of DNR forest land. It is the basic data set from which decisions are made about if, when, where, and in what manner DNR forest stands will be treated. Information gathered includes overstory and understory tree species, stand age, timber volumes, site productivity, shrub and ground species, insects and diseases, and other specific site conditions. Native plant community (NPC) classification will be captured on stands for which evaluations have been completed.

2. Silvicultural and Roads Module (SRM):

The Silviculture and Roads Module enables foresters to plan and record management objectives and actions on state lands. An SRM site is the piece of land for which the manager has developed a prescription (i.e., a series of actions). The site may be a FIM stand, part of a stand, or more than one stand. SRM allows for multi-year prescriptions for sites to manage the site for a specified objective. The site prescription consists of all the actions prescribed for a site to obtain a desired future condition. Actions include all the timber harvesting, site prep, planting, and seeding, timber stand improvement (TSI), and regeneration survey work needed to manage a stand for a specified objective. This long-range schedule and record of completed work helps track management activities, obligations, and management objectives. It is the foundation for budget requests and work plans.

3. Timber Sales Module (TSM):

The Timber Sales Module includes the following functions: timber sales reporting, supports the appraisal and sale of timber harvest permits, tracking security provided by permit holders, accounting for harvested timber, and collecting revenue.

4. AP Stand Exam List Shapefile:

The SFRMP shapefile includes FIM stand data for all state-administered forest lands in the subsection plans. Subsection boundaries may have been slightly adjusted to avoid splitting of stands for consideration of access, etc. Therefore, the SFRMP subsection shapefile boundaries may be somewhat different than the original ECS subsection shapefile.

In addition to the standard FIM data fields, the SFRMP shapefile includes fields added during the planning process to identify stands for specific purposes (e.g., ERF, ecologically important lowland conifer (EILC), patches, preliminary objectives, new access data, and stand-selection fields). This will make it possible to create a statewide shapefile and provide a uniform set of fields for importing into SRM, posting on the DNR data resource site (DRS), reporting, and monitoring purposes.

5. Annual Harvest List and Annual Plan Additions Shapefiles:

Annual Harvest Lists and Plan Additions are drawn from SFRMP shapefiles and include additional information (including prescription, treatment acres, etc.). Adjustments can be made to add or remove stands, revise comment fields, or change joint visits (etc.).

6. DNR Data Resource Site (DRS):

The Data Resource Site (DRS) is a standardized collection of GIS data, metadata and programs. A DRS is a place where geographic information system (GIS) resources are stored and made available to the users. The layers available on the DRS are designed such that use by DNR staff is intuitive and efficient. Many layers have been converted to shapefiles that are statewide in extent and targeted to a specific piece of information.

7. Internal Assessments and Inventories:

Data from existing and pending assessments and inventories conducted by the Divisions of Ecological and Water Resources and Fish and Wildlife will be used. Examples of possible data sources include: wildlife population surveys (ruffed grouse, deer, goshawk, red-shouldered hawk, etc.); harvest reports; and water sampling results (impaired waters).

8. External Assessments and Inventories including resource management information, studies, and surveys conducted by other stakeholders.

9. Imagery available through the Division of Forestry, Resource Assessment Center.

**Sampling of sites:**

Because so much of the monitoring data comes from the SRM database, it is important to attempt to validate the accuracy of SRM data entry and consistency between the site objective and vegetation conditions (incorporating both implementation and effectiveness monitoring). The SFRMP Process Work Group will develop a method of site sampling (number of sites, site selection, techniques, etc.), emphasizing the application of existing survey tools/efforts such as timber sale inspections and regeneration surveys to gather validation data.

**Baseline data:**

Every effort will be made to identify baseline data for each indicator. The subsection assessments done at the beginning of the planning process contain all or most of the necessary data. Some indicators are tracked as a frequency or occurrence, for which there was not prior record keeping (e.g., the number of treatment deferrals). Although most pre-plan implementation data is lacking, data will be recorded annually so trend information during the plan's time frame will be available.

**Data collection, analysis and interpretation:**

Data from the SRM and FIM databases, and GIS shape files (primarily for implementation monitoring) will be collected periodically during the life of the plan. Effectiveness monitoring data will be collected and compiled at a mid point and at the end of a plan's time frame. This information will be provided to the subsection team for interpretation and analysis as the basis for preparing the landscape level monitoring of implementation of the AP Plan.

Data is entered into the FIM, SRM, and TSM continually. Fiscal year entries must be completed by September 1 of the following year. Data for the previous fiscal year can be extracted anytime after September. Plan shape files and DRS files are continually available.

For more information on monitoring of SFRMPs, please visit the DNR's SFRMP web page at:

<http://www.dnr.state.mn.us/forestry/subsection/index.html>

## **1.6 DNR staff involved in developing the AP SFRMP**

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Ross Hier, Assistant Area Wildlife Supervisor, Crookston  
Jon Drimmel, Timber Program Forester, Bemidji  
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## Chapter 2. SFRMP Issues

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### 2.1 Introduction

#### How SFRMP issues were identified

Subsection Forest Resources Management Plan (SFRMP) teams used assessment information<sup>9</sup>, Minnesota Department of Natural Resources (DNR) policies and guidelines, local knowledge, existing plans, and public input to identify the final issues relevant to the scope of this plan. The subsection team began with a common set of issues developed from previous SFRMPs. These common SFRMP issues were refined and supplemented based on subsection-specific conditions and considerations and public comments.

#### Issue definition

A SFRMP issue is a natural resource-related concern or conflict that is directly affected by, or directly affects decisions about the management of vegetation on lands administered by the Minnesota DNR Divisions of Forestry, Fish and Wildlife, and Unit of Trails and Waterways-Parks and Trails Division. Relevant issues were defined by current, anticipated, or desired forest vegetation conditions and trends, threats to forest vegetation, and vegetation management opportunities. The key factor in determining the importance of issues for a SFRMP is whether the issue can be addressed in whole or substantial part by vegetation management decisions on DNR-administered lands.

Issues that cannot be addressed in whole or substantial part by vegetation management decisions on DNR-administered lands are outside the scope of the SFRMP process. For example, a SFRMP will not address recreation trails system issues or planning. However, aesthetic concerns along existing recreational trail corridors can be a consideration in determining forest stand management direction in these areas. Another example is the plan establishes wildlife habitat goals (e.g., amount of various cover types and age-class distribution) but not goals for wildlife population levels.

<sup>9</sup> Minnesota DNR, September 2009, *Preliminary Issues and Assessment*, Subsection Forest Resource Management Plan.

**Issues**

Issue topics A through N were identified as preliminary issues in the first steps of the SFRMP process. No new issues were added as a result of comments received during the public review period that was completed in October 2009.

**2.2 Preliminary Issues****A. Desired age-class distribution****A1. What are the desired age-class and growth-stage distributions of forest types across the landscape?**

Adequate representation of all age classes and growth stages provides a supply of wildlife habitats, timber products, and ecological values over time. A forest with a variety of stand ages and growth stages provides habitat suitable for more species and has greater potential to provide a sustainable yield of timber. A diverse forest is healthier and more resilient to widespread insect and disease outbreaks than a less diverse forest.

There are many likely consequences of managing a non-diverse forest (without adequate representation of all age classes and growth stages). A forest with too few age classes and growth stages risks epidemic insect and disease outbreaks, loss of species with age-specific habitat requirements, and the loss of forest-wide diversity. Such a forest would also provide a boom-and-bust scenario for forest industries that depend on an even supply of particular forest products over time.

**A2. What are the appropriate amount, kind, and location of old forests?**

Old forest, in the context of this issue, is defined as stands that exceed their normal rotation age. The distribution of old forest represents age classes and growth stages of forest beyond the normal rotation age of each cover type. Old forest provides the necessary structural complexity and habitats for many animal species, plant species, and communities that is sometimes lost in simplified, younger forests. Old forest can also reduce timber quantity and quality for some types of forest products over time by holding timber longer between harvests. Therefore, a balance is needed that considers necessary habitats, forest diversity, and timber productivity levels.

The likely consequences of managing a forest without age classes beyond the normal rotation age are:

- 1) The loss of individuals or populations of species with old forest-specific habitat requirements;
- 2) Loss of diversity;
- 3) Reduced recreational and economic opportunities associated with the loss of old forest values such as rare bird watching, fall color viewing, mushroom gathering, and camping;
- 4) Reduced ecological services associated with old forest values such as maintaining water quality, natural disturbance regimes, rare species habitat, and biodiversity; and,
- 5) The loss of potential for some larger-diameter forest products.

The likely consequences of managing a forest with an overabundance of age classes beyond the normal rotation age are:

- 1) Reduction in populations of species that use younger forest habitats;
- 2) Decreased timber productivity; and,
- 3) Decreased timber quality and quantity due to decay, disease, windthrow, and mortality.

**A3. What are the appropriate amount, kind, and location of young, early successional forests?**

The 0-30 age group of aspen and balsam of Gilead cover types represent the majority of young, early successional forests in the context of this issue. Young, early successional forest is an issue because it provides important habitat for numerous plant and animal species that must be represented on the landscape in order to maintain an overall healthy biodiversity. Many species depend on dense young forests to provide an ample food supply, offer protection from predators, and shelter from weather. In addition, the patch size and spatial distribution of this young forest on the landscape is an important element of habitat quality. Approximately half of the aspen cover types are currently in the 0-30 age group. These cover types are currently below the long-term acreage goals of young, early successional forest in the Aspen Parklands.

If an appropriate amount of early successional forest does not occur on the landscape, the likely consequences of not addressing this issue could include:

- 1) Reduced populations of important game species, particularly ruffed grouse, deer, and American woodcock;
- 2) Reduced recreational hunting opportunities associated with these game species;
- 3) Reduction in some associated songbird populations;
- 4) Loss of social, economic, and ecological value of these species; and,
- 5) Loss of traditional use of the natural resources associated with these young forests (e.g., berry picking, bird watching, etc.).

**A4. What are the desired growth-stage distributions of brushland and prairie types across the landscape?**

Providing sufficient differing growth stages of brushland and prairie communities can provide diverse wildlife habitats, biomass, and many other ecological values over time. A landscape with a variety of brushland and prairie growth stages provides habitat suitable for more species and has greater potential to provide a sustainable yield of biomass.

There are consequences of not managing for a diverse brushland or prairie community (without adequate representation growth stages). Brushland and prairie landscapes with few growth stages risk loss of plant and animal species richness.

**B. Desired mix of vegetative composition, structure, spatial arrangement, growth stages, and Native Plant Communities (NPCs)****B1. What is the appropriate composition and spatial arrangement of vegetation across the landscape?**

Existing landscape patterns are a consequence of large scale conversion of native prairie to agriculture. Remaining native habitat has also been influenced by a lack of fire. In addition, natural drainage patterns and wetland function across the landscape have been altered by ditching. This has resulted in:

- 1) Loss of habitat connectivity at the landscape scale;
- 2) System simplification;
- 3) Fewer available habitat complexes and associations which has reduced habitat for native animals and plants.

The likely consequences of not addressing this issue are:

- 1) Increased isolation of wildlife and plant populations;
- 2) Species loss or decline;
- 3) Reduced resilience of ecosystems to climate change and disturbance events;
- 4) Increase in exotic and undesirable species;
- 5) Increase of certain populations to undesirable levels resulting in negative impacts; and,
- 6) Continued loss of ecologically intact landscapes.

**B2. What is the appropriate composition, structure, and spatial arrangement of vegetation at the stand scale?**

Composition, structure, and growth stages of prairie, brushland and forest stands once demonstrated diversity and complexity, but stands in this Subsection have experienced a simplification and movement away from ecological diversity. Lost representation of stand diversity, growth stages, and native plant community distributions impacts sustainability goals for biodiversity, ecosystem health, and productivity across the Subsection.

The likely consequences of not addressing this issue are:

- 1) Further loss or decline of native species;
- 2) Reduced ability to adapt to climate change;
- 3) Increase in exotic and undesirable species; and,
- 4) Continued loss of ecologically intact representative areas.

**B3. How will we ensure restoration, maintenance, and enhancement of important native plant species and communities that have declined?**

Many important plant species and communities are rare in this Subsection. The rarity of these species and communities is partially due to land development, ditching, harvest activity, insect infestations, disease, drought, and herbivory. Thus, many communities have

lost their ability to regenerate and sustain important species due to their loss of composition, structure, and function.

Certain native plant communities in this Subsection are outstanding for their uniqueness, species diversity, known association with rare species, and limited occurrence. Examples of these types of communities are floodplain forest, lowland hardwood forest, calcareous fens, wet prairie, dry oak savannah, and a variety of oak woodlands. Like with individual species, these native plant communities have declined due to land development, fragmentation, harvest, insect infestations, disease, drought, and herbivory. The result is that these native plant communities are no longer self-sustaining and are simplified in composition, structure, and function.

The likely consequences of not addressing these issues are:

- 1) Loss of native species diversity;
- 2) Loss of habitat for rare species;
- 3) Loss of native plant community composition, structure, and function;
- 4) Loss of associated wildlife to these communities;
- 5) Simplified stands and landscapes;
- 6) Loss of examples of high-quality intact native plant communities used as controls to compare and monitor the effects of management; and,
- 7) Loss of the social, economic, and ecological values of these species and communities

#### **B4. How can intensive management of plant communities be applied to retain some of the characteristics of natural disturbance events?**

Catastrophic disturbance events can have significant impacts on native plant communities, depending upon their scale, frequency, and intensity. Management activities applied across a large area or too frequently, can result in the fragmentation and loss of individual species, species assemblages, and whole communities. Communities that are adapted to large scale disturbances, such as fire dependant ones, are often impacted in a manner that results in a mosaic of undisturbed islands where plants and animals persist during the disturbance event and initial regeneration period. If a disturbance occurs on too frequent a cycle, these refugia can also be lost. Management activities which are quite intensive often result in native plant community simplification and fragmentation at the stand and landscape scale. These “stand replacing events” such as brush removal or forest clear-cuts, may cause ground disturbance from heavy equipment. Regeneration and stand maintenance activities often disturb the sites further, and if herbicides are applied, additional plant species and structural diversity is lost. This activity may result in disruption of the soil profile, soil compaction, loss of native herbaceous species diversity, reduced structural complexity, and an increase in exotic and aggressive plants.

The likely consequences of not addressing this issue are increasing:

- 1) Simplification of stand and landscape communities;
- 2) Fragmentation of high-quality native plant communities, and,
- 3) Loss and fragmentation of habitat for associated wildlife species, and,
- 4) Increased disturbance by invasive species.

#### **B5. How do we limit fragmentation and maintain connectivity between habitats?**

Management activities such as timber harvest, road and trail construction and maintenance, constructed drainage systems, and a private land base dominated by agriculture have all contributed to a reduction in patch size, composition, structure, and age, as well as a disruption in hydrologic connectivity. These changes represent a movement away from biodiversity and sustainability, and natural resources able to produce a range of products. This fragmentation results in a loss of the viable economic base for timber and recreational resources, habitats lost, and reductions in the populations associated with those habitats. Lost connectivity results in the loss of ecologically intact landscapes and the ability of the landscape to be self-sustaining.

The likely consequences of not addressing this issue are:

- 1) A loss in economic livelihood;
- 2) A reduction in patch size;
- 3) Reduced connectivity between habitats; and,
- 4) Reduced resilience to catastrophic events.

Addressing hydrologic connectivity is beyond the scope of this plan.

## **C. Riparian and aquatic areas**

### **C1. How can we address the impacts of vegetation management on permanent wetlands, wetland inclusions, and seasonal ponds?**

Site-level considerations and guidelines that are routinely applied without considering site-specific conditions may not be adequate to protect aquatic resources such as permanent wetlands, wetland inclusions, and seasonal ponds. These ecosystems may be negatively impacted if one relies strictly on existing guidelines without considering specific conditions associated with a given site (such as soils, topography, hydrology, past management, existing vegetation, and desired vegetation). These impacts include loss or degradation of these communities and loss of associated wildlife. There is also a concern for impacts to permanent wetlands from management activities in adjacent upland stands, such as skid trails along the wetland-upland boundary.

### **C2. What vegetative management activities will be used within the riparian management zone (RMZ)?**

Vegetation and habitat management activities carried out within the RMZ can affect the functions associated with riparian areas. RMZs are areas of special concern along streams, lakes, and open water wetlands and are among the most important and diverse parts of ecosystems. They are intended to retain a relatively continuous forest, shrub, or herbaceous cover for the protection and maintenance of aquatic and wildlife habitat, aesthetics, recreation, and forest products.

This Subsection contains a variety of landscape types including forested, brushland, and open land. The vegetation composition and structure that is managed or retained within the RMZ should be appropriate to the native plant community and landscape type. Reserve areas of trees and snags may not be appropriate in many brushland or open land landscapes.

In this Subsection, rivers and streams commonly meander extensively, lakes are rare, and flooding can be a problem due to level topography. Failure to protect riparian zone functions may cause negative impacts to water quality, fisheries, and wildlife habitat.

### **C3. How can we address cumulative vegetation management impacts on aquatic resources at a watershed/sub-watershed level?**

Management activities may affect the hydrology within any specific watershed or sub-watershed because the amount and type of vegetative cover greatly influences the rate of hydrologic change. Failure to consider the cumulative impacts to aquatic resources could result in increased run-off and stream bank erosion, more conspicuous run-off events, less stable flows, reduction or destruction of habitat for aquatic organisms, reduced water availability, and poorer water quality.

***Issue is beyond the scope of this plan:*** This issue cannot be addressed in whole or a substantial part by vegetation management decisions on DNR-administered lands. State-administered lands comprise 12 percent of the land ownership in the Subsection. To fully evaluate cumulative impacts within watersheds, timber and biomass harvest, forest development, agricultural development, ditches, and land-use changes (current conditions and planned) need to be evaluated across all ownerships. The DNR will continue to be a participant/cooperator in watershed management planning efforts.

## **D. Access to state land**

### **D1. How can we plan for access to the stands identified for management during the 10-year plan period, while protecting and minimizing the negative impacts that access development or use may have on other vegetative resources?**

Permanent and temporary access routes are necessary to effectively manage sites identified for management during the 10-year planning period. These access routes will have both positive and negative attributes. They provide access for management activities, fire response, and recreation. However, the construction, maintenance, rehabilitation and abandonment of access routes has costs, i.e., land disturbance, loss of acres from the timber land base, increase in the spread of exotic species and undesirable native plants and animals, potential conflicts with adjacent private landowners, potential for user-developed trails, degradation of water quality, disruption of natural and constructed drainage systems, destruction of fish habitat, forest fragmentation, and road densities greater than needed.

The likely consequence of not addressing this issue is the lost opportunity to have a well thought-out management access plan to minimize the negative attributes.

## **E. Biological diversity**

### **E1. How can management of stands within larger areas of biodiversity significance be adapted to enhance biodiversity and native plant community composition, structure, and function?**

Larger areas with biodiversity significance provide reference areas to improve our understanding of these ecosystems and help us evaluate the effects of vegetation management on biodiversity. These areas present opportunities for large patch

management and the restoration of native plant communities and ecosystems. These areas have great potential for addressing forest certification, landscape level goals, and biodiversity-related goals of the Minnesota DNR and other landowners.

The likely consequences of not addressing this issue are:

- 1) Degradation of existing biodiversity and ecosystem function;
- 2) Loss of opportunities for maintaining or restoring patch relationships that are ecologically based (e.g., based on natural disturbance processes, wildlife habitat connectivity, and wildlife-habitat associations);
- 3) Loss of landscape level habitat connectivity, and,
- 4) Inability to maintain state forest certification.

## **E2. How do we plan to retain and restore within-stand structural complexity on actively managed lands?**

The Aspen Parklands ecological subsection contains many dynamic ecosystems. Management of both public and private lands has altered the rate and direction of natural change. Some current practices tend to reduce within-stand structural complexity and diversity of species, both directly and indirectly (through substrate modification). The concern is that structure is impacted directly by management where the management objectives simplify structure by using silvicultural practices where biological legacies, existing woody debris, and finer organics are removed and micro-topographic features are reduced or eliminated. Reduced within-stand structural complexity reduces the overall biodiversity in these stands.

The likely consequences of not addressing this issue are:

- 1) Loss of composition and vertical structure necessary to sustain native plant and animal species;
- 2) Loss of regeneration sites for some species;
- 3) Loss of native plant community composition, structure, and function; and,
- 4) Loss of associated wildlife.

## **F. Wildlife habitat**

### **F1. How do we manage vegetation to provide for the habitat needs of game and nongame species?**

Both game and nongame wildlife species depend on healthy ecosystems. Legal mandates, the expectations of stakeholders, and the Minnesota DNR internal policies require the ecological integrity of these ecosystems to be maintained and enhanced. A variety of advocacy groups exist today that also work towards protecting wildlife species and the natural resources. Practical reasons to maintain ecological integrity include:

- 1) The economic vitality of forest, biomass, and tourism industries;
- 2) The maintenance of recreational opportunities for the public;
- 3) The health of wildlife species and their populations;
- 4) Public health; and,
- 5) The control of insects and disease.



Loss of important habitat in our forests, brushlands and prairies is a reason for concern for a number of wildlife species. *Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife*<sup>10</sup> lists 85 Species in Greatest Conservation Need (SGCN) that are known or predicted to occur within the Subsection. Of these, 30 species are federal or state endangered, threatened, or of special concern. A wide range of factors from timber and biomass harvest practices, to development have an effect on wildlife species and the ecosystems in which they inhabit. Best Management Practices (BMPs) can and should be implemented to minimize impacts that could have a negative effect on habitat.

The likely consequences of not addressing this issue are:

- 1) Loss of wildlife habitat;
- 2) Loss or reduction of species associated with declining habitats;
- 3) Economic losses resulting from a decline in recreational activity associated with wildlife viewing and hunting; and,
- 4) Social losses because of a decline in enjoyment associated with wildlife viewing, hunting, and aesthetics.

## **G. Forest, brushland, and prairie health**

### **G1. How do we address the impacts of forest insects and disease?**

Forest insects and disease organisms influence forest ecosystem dynamics. These influences have both positive and negative impacts. What is perceived to be beneficial from one perspective may be viewed as detrimental from another. Insects and diseases can reduce timber production and lumber grade and increase fire hazard. Alternatively, they can promote diversity of tree species, direct forest development and forest structure and generate dead wood, which provides important habitat and soil nutrients.

Native insects and disease organisms are usually well-balanced with their respective host trees. A few trees may die while the insect and disease populations are sustained; basically, they co-exist. Where climate or management has altered the natural disturbance regime (e.g., prolonged drought or fire control), insects and disease organisms can 'take over' the role of fire in a fire-dependent forest. An example would be the increasing impact of jack pine budworm on senescing jack pine stands in the absence of wildfires, which normally would have caused stand re-initiation.

Non-native insect and disease organisms have not co-evolved with our tree species, so they can cause a range of problems once they become established. Effects can range from non-discernable effects to widespread and rapid tree mortality, depending on the organisms involved. For example, Dutch elm disease spread through Minnesota in the 1970's killing elms and altering riparian ecosystems. Emerald ash borer is our newest immigrant. Emerald ash borer, from eastern Asia, is expected to cause 99.99% mortality of black and green ash and cause deforestation of our Wet Forest sites as it spreads into our forests. We anticipate that it will take more than a few decades to accomplish the infestation of the 950 million ash trees that are currently growing in Minnesota.

<sup>10</sup> Minnesota Department of Natural Resources, 2006. *Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife*, Comprehensive Wildlife Conservation Strategy. Division of Water & Ecological Resources, Minnesota Department of Natural Resources.

**G2. How will we respond to threats by invasive plant species in the Subsection?**

Natural resource managers are concerned about invasive species that are introduced and become established on public land. Aggressive native plants and exotic invasive species have the potential to displace native plants, reduce habitat, change soil chemistry, and disrupt natural community functions. Increased use of public lands results in greater risk for the transport of invasive species of all kinds. Failure to address the invasive species issue could result in permanent changes to native communities.

**G3. How will natural disturbances be considered in vegetative management decisions?**

Catastrophic events such as floods, large-scale insect infestations, and fire may have a negative impact on the amount of forest and brushland “harvested” during the 10-year stand treatment time frame. They may also impact the long-term desired future condition of the subsection plan. It is difficult to predict when and where a catastrophic event may occur. However, failure to consider the possibility of natural disturbances occurring within the Subsection, and what management practices might be allowed within these disturbed areas, could result in a loss of marketable materials available for sale and an increase in fire danger in the vicinity of the catastrophic event.

**G4. How do we manage vegetation to reduce negative animal impacts?**

Vegetation management directly affects wildlife populations. Undesirable increases in certain wildlife populations can have adverse impacts on plant communities resulting from the browsing and grazing by wildlife (herbivory), crop depredation, nuisance animal complaints, potential spread of wildlife disease (e.g., Bovine Tuberculosis), and possible human health issues.

Resource managers should coordinate management activities to benefit wildlife populations while protecting native plant communities and forest health. A good example is to avoid planting white cedar seedlings adjacent to an area being managed for a deer wintering area or vice versa.

The likely consequences of not addressing this issue are:

- 1) Loss of public support for management programs;
- 2) Undesirable competition between species;
- 3) Increased exotic and undesirable species;
- 4) An increase in populations to the point they become a nuisance;
- 5) Negative economic impacts; and,
- 6) Negative impacts to native plant communities.

## **G5. How should vegetation management respond to global climate change within the planning period?**

Canadian and Hadley climate model predictions for the Midwest (*MacCracken et al. 2000*<sup>11</sup>) suggest that the average temperature will have increased two to five degrees Fahrenheit by 2030 and five to twelve degrees Fahrenheit by 2095. In Minnesota uncertainty exists on how or if average annual precipitation will change. Seasonal precipitation patterns are predicted to change, however, with precipitation concentrated in fewer storm events leading to longer more intense droughts (*MNDNR-Section of Wildlife*<sup>12</sup>, *Galatowitsch et al. 2009*<sup>13</sup>).

Scientists believe that predicted climate change will affect the size, frequency, and intensity of disturbances and stresses such as fires, windstorms (blowdown), and droughts. It will affect the survivorship of existing plant and animal species and the distributions of plants and animals. Increases in the reproductive capability and survivorship of exotic species, insect pests, and pathogens will impact forests and wildlife.

Large-scale mortality due to a combination of drought stress, blowdown, fire, and insect damage is likely, and has led to rapid and widespread forest change in the past (*Galatowitsch et al. 2009*). Moisture is the most important limiting factor and fire is the most important disturbance in the forest-prairie transition zone which includes the Aspen Parklands Subsection. Certain tree species, such as black spruce, balsam fir, and birch will respond negatively to increased soil warming, decreased soil moisture, etc.

Because Minnesota is situated on the prairie-forest border, summer precipitation is already marginal for forests on some soils. Many contemporary forests are projected to become savannas, with forests restricted to cooler, wetter refuges, such as silty soils, lowlands, and north slopes. Although many of Minnesota's existing grasslands may persist, a gradual shift in composition to drier species (e.g. mesic prairie to dry prairie; dry oak savannah to prairie) will likely occur in response to higher temperatures and evapotranspiration (*Galatowitsch et al. 2009*). Carbon sequestration by forests and wetlands may be affected.

The likely consequences of not addressing this issue are:

- 1) Acceleration and exacerbation of climate change impacts to all communities in this landscape;
- 2) Lost opportunity to begin directing management toward mitigating and slowing the effect of climate change on the most vulnerable species and native plant communities;
- 3) Species and community losses; and,
- 4) Reduced habitat for native wildlife and plants.

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<sup>11</sup> MacCracken M., E. Barron, D. Easterling, B. Felzer, and T. Karl. 2000. Scenarios for climate variability and change: the potential consequences of climate variability and change for the United States. U.S. Global Change Research Program, National Science Foundation, Washington, D.C.

<sup>12</sup> Climate Change: Preliminary Assessment for the Section of Wildlife of the Minnesota Department of Natural Resources

<sup>13</sup> Galatowitsch, S., et al. Regional climate change adaptation strategies for biodiversity conservation in a midcontinental region of North America. *Biol. Conserv.* (2009), doi:10.1016/j.biocon.2009.03.030

## **H. Timber and biomass harvest level**

### **H1. What is the appropriate timber and biomass harvest level considering resource sustainability?**

One of the primary outcomes of this plan is to develop a treatment plan to identify harvest levels on State lands in the Subsection for the next 10 years. The harvest level will determine the future age-class distribution of the forested lands. Some of the cover types in the planning area have a pronounced age-class imbalance and the harvest level will be the primary tool used to correct this imbalance.

Establishing an appropriate harvest level will require the successful integration of economic, social, and ecological factors. Timber and biomass harvest provides forest products for society and jobs for those in forest products related industries. Managing for sustainability requires that timber and biomass harvests be balanced with other forest benefits. Sustainably managed forests can support a healthy and competitive forest products industry, provide the diversity of habitats needed by plant and animal species, maintain water quality, and provide a wide array of recreational opportunities.

The likely consequences of not addressing harvest levels and age-class imbalance are:

- 1) An unpredictable supply of timber and biomass for industry;
- 2) Reduced diversity of habitat for use and occupation by native plants and animals; and,
- 3) Continued age-class imbalance across the landscape.

### **H2. How can we ensure adequate and sustainable “non-timber products” for the future?**

Demand for most of these types of products has been light in this Subsection but it could be expected to increase. Collecting and using non-timber products (e.g., sweetgrass, beargrass and sage in the prairies, red willow and diamond willow in the brushlands, birch bark in the forests) is a traditional harvest practice for some groups and can provide welcome diversification for local economies. Non-timber products are particularly important in areas where employment opportunities in the mainstream economy are limited. They help support local individuals, families, and cottage industries in an expanding worldwide market.

The consequences of not addressing this issue include:

- 1) The possible unsustainable harvest of these resources;
- 2) Inadvertent harvest of rare species;
- 3) Adverse impacts to wildlife habitat and native plant communities; and,
- 4) Loss of economic diversity in rural areas

## **I. Timber and biomass productivity**

### **I1. How can we increase timber productivity in forested areas?**

State Wildlife lands, which make up the abundance of acreage in this Subsection, are managed exclusively for the benefit of wildlife species. Treatment is widely varied and may include timber harvest, prescribed burning or biomass harvest, but it must be primarily for the benefit of wildlife.

State Forestry lands are required to be managed for multiple uses and therefore must find compromises and middle ground between many demands on the forested land base. Society continues to demand forest products, but also demands wildlife habitat, recreational opportunities, watershed protection and scenic views from the same public land base. Although demand for forest products has increased, some lands previously available for harvest are now being managed with reduced emphasis on timber production. Increasing timber productivity on selected forest lands is a way to continue to provide consistent levels of harvest and improved timber quality from fewer acres.

Managing state forest lands without regard for increasing timber productivity would result in further decline in timber quality and quantity as older age classes lose merchantable volume to decay and mortality. This would:

- 1) Negatively impact logging and forest products industries as stumpage rates increased due to the reduction of useable volumes;
- 2) Increase procurement, chemical, and waste management costs for the forest products industries, reducing their competitiveness in the global marketplace; and,
- 3) Require harvesting additional acreage of over-mature timber to produce constant levels of merchantable timber volume.

### **I2. How can sustainable biomass production be integrated into vegetation management?**

Biomass harvesting has recently become a potential source of sustainable energy. Both grass and woody biomass resources on state owned lands can be a viable alternatives to petroleum based fuels. Land managers within the Subsection have been maintaining open land and brushland communities by shearing, mowing, and prescribed burning. Biomass harvesting can be another tool to accomplish this maintenance.

Recently, a Brushland Biomass Harvesting chapter was added to the *MFRC Site-Level Guidelines* due to increased demand for woody biomass and recent biomass power legislation (M.S. § 216B.2424). These guidelines are best management practices for sustainably managing woody biomass harvest and are intended to be a tool for maintaining brushland and open land habitat on public and private lands.

The level of biomass production from lowland and upland brushland sites is directly correlated with the nutrient levels in the soils. The biomass guidelines state that high production sites have the greatest nutrient loss, but also have the greatest nutrient capital and highest rates of nutrient replenishment—lost nutrients are usually replaced within 10

years. Less productive sites have lower nutrient replenishment rates, but biomass and thus nutrient removal are also lower.

These guidelines should not replace site-specific evaluations of woody biomass management techniques. Ongoing research will continue to quantify and qualify what level of woody biomass harvest is sustainable without adversely impacting these brushland and open land habitat.

## **J. Visual quality**

### **J1. How will vegetation management activities minimize impacts on visual quality?**

Scenic beauty, or visual quality, is one primary reason people choose to spend their recreation and vacation time in or near forested areas. Where forested communities lie adjacent to recreational trails, lakes, waterways, or near public roads and highways there is a need to consider the impacts of management activities to the visual quality of the site after the management activity has been completed.

Failure to be sensitive to the visual quality impacts of any management activity may result in a negative experience for the vacationing or recreating public visiting forested areas of the state. These negative experiences may result in increased regulations for most future forest management activities.

## **K. Statutory & policy requirements**

### **K1. How will resource managers achieve desired results and continue to uphold various state and federal statutes?**

Divisions within the DNR must follow legal mandates, while fulfilling both Department and Division missions and policies. For example, State Trust Fund lands must generate income for various trust accounts under state law, and timber sales are currently the primary tool for this process. Wildlife habitat management and preservation, not timber sales, is the mandate for acquired Wildlife Management Area (WMA) lands. Another related example is the DNR commitment to certified sustainable forests, which requires the department to manage all MCBS sites of outstanding biodiversity significance as well as some areas of high biodiversity significance as High Conservation Value Forest (HCVF), which may require practices that reduce the near term income derived from timber harvest on these lands.

The vegetation management planning process will take administrative land status, relevant statutes, and departmental policies into consideration during the planning process. Failure to follow these mandates and legislative intent may be a violation of federal or state law.

## **L. Cultural resources**

### **L1. How will cultural resources be protected during vegetation management activities?**

Cultural resources are scarce, non-renewable features that provide physical links to our past. A cultural resource is an archaeological site, cemetery, historic structure, historic area, or traditional use area that is of cultural or scientific value. Cultural resources are remaining

evidence of past human activities. To be considered important, a cultural resource generally has to be at least 50 years old. A cultural resource may be the archaeological remains of a 2,000- year-old Indian village, an abandoned logging camp, a portage trail, a cemetery, food gathering sites (e.g. ricing camps and sugarbushes), or a pioneer homestead. They often possess spiritual, traditional, scientific, and educational values and should be treated as assets rather than liabilities. In addition to federal and state laws that protect certain types of cultural resources, the *MFRC Site-Level Guidelines* provide information and recommendations to assist private and public land managers in taking responsible actions when cultural resources are encountered. Failure to follow the recommended management practices to protect cultural resources could result in loss of or damage to the cultural resource.

## **M. Rare features**

### **M1. How will rare plants and animals, their habitats, and other rare features be protected?**

Protecting rare features on state lands is a key component of ensuring species, community, and forest-level biodiversity in this subsection. In 1978, the Minnesota Legislature, through the Legislative Committee on Minnesota Resources (LCMR), established requirements for the DNR (Natural Heritage Program) to collect and disseminate data on Minnesota's significant biological resources. Information on the distribution, abundance, and ecology of rare species, their habitats, and other rare features gathered by the DNR (Minnesota County Biological Survey and Natural Heritage and Nongame Research Program) provides much of the basis for determining the status of rare features in the state. The DNR acknowledges this leadership role in advocating for maintaining habitat for rare features throughout the state, regardless of ownership, and in protecting and providing habitat for rare and threatened species on state lands (DNR - Directions 2000).

In 2006, the DNR published *Tomorrow's Habitat for the Wild and Rare: an Action Plan for Minnesota Wildlife* which was established as part of the U.S. Fish and Wildlife Service's State Wildlife Grants program established by Congress in 2001. This plan identifies 292 "Species of Greatest Conservation Need" (SGCN) and their habitats by ecological subsection in Minnesota. A SGCN is defined as: "a wildlife species whose populations are rare, declining, or vulnerable in Minnesota". The Aspen Parklands Subsection is home to 85 SGCN and their habitats. The DNR is committed to protection of the species and habitats outlined in the plan.

*Minnesota's List of Endangered, Threatened, and Special Concern Species* (ETS List) was created in 1984 and was last revised in 2007. Created under Minnesota's Endangered and Threatened Species Statute, the ETS List draws attention to species that are at greatest risk of extinction within the state; special regulations are applied to those listed as endangered or threatened. By alerting resource managers and the public to species in jeopardy, activities can be reviewed and prioritized to help preserve the diversity and abundance of Minnesota's flora and fauna.

Note that the federal Endangered Species Act of 1973, as amended (16 USC 1531 \_1544) requires the U.S. Department of the Interior to identify species as endangered or threatened according to a separate set of definitions, and imposes a separate set of restrictions

pertaining to those species. Three species on the federal list are known to occur in the Subsection. They are the western prairie-fringed orchid, gray wolf, and piping plover.

The possible consequences of not addressing this issue are:

- 1) Rare species extirpation at the local and state level;
- 2) Rare species declines leading to status changes, (e.g., special concern species changed to a threatened or endangered species);
- 3) Rare species habitat loss or degradation; and,
- 4) Loss of biodiversity at the species (genetic), community, and/or landscape level.

## **N. Other jurisdictions**

### **N1. How will vegetation management objectives be coordinated across ownership boundaries?**

Vegetation management across ownership boundaries must be a multidisciplinary collaboration to ensure that we reach landscape level ecological benefits. Fragmentation of habitat across the landscape as a result of split ownership boundaries may pose a challenge as we attempt to meet future management objectives in the Aspen Parklands. Through coordination with adjoining landowners we can minimize the reduction of patch sizes and maintain or enhance wildlife corridors between existing habitat patches. This effort will involve communication and organization between local government units, private landowners, federal and state agencies, and local conservation organizations.

A number of conservation plans and agendas currently exist that include goals towards meeting this challenge. *A Strategic Conservation Agenda 2009-2013* outlines goals and management directions for the Minnesota Department of Natural Resources (DNR) as we move forward with integrated management of private and public lands. *Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife* was written in cooperation with a wide range of conservation organizations in Minnesota. The documents' main focus is on Minnesota's animal "species in greatest conservation need" (SGCN) and suggests priority conservation actions for these species within the Subsection. The *Conservation Area Plan for the Tallgrass Aspen Parkland* is a document produced by The Nature Conservancy (TNC) as a collection of expertise from both Canada and Minnesota. These examples highlight only a few of the available tools that will help guide the effort for coordinated vegetation management across the Subsection.

The likely consequences of not addressing this issue are:

- 1) Continued fragmentation of habitat;
- 2) Loss or reduction of species and their populations as a result of fragmentation;
- 3) Reduced recreational hunting opportunities for the public;
- 4) Reduction in patch sizes across the landscape;
- 5) Potential loss of species diversity as patch size decreases; and,
- 6) Delayed habitat work because of lack of coordination.



## 2.3 From Issues to General Direction Statements (GDSs) and Strategies

Table 2.1a provides a linkage between the issues described in Chapter 2 and the associated GDSs and their strategies in Chapter 3.

**Table 2.3a. General Direction Statements Generated from SFRMP Issues.**

Major Category (from Chapter 3 of draft plan)	Issues	General Direction Statement(s) that address the issue(s)
	<p><b>B1.</b> What is the appropriate composition and spatial arrangement of vegetation across the landscape?</p> <p><b>B2.</b> What is the appropriate composition, structure, and spatial arrangement of vegetation at the stand scale?</p> <p><b>B3.</b> How will we ensure restoration, maintenance, and enhancement of important native plant species and communities that have declined?</p> <p><b>B4.</b> How can intensive management of plant communities be applied to retain some of the characteristics of natural disturbance events?</p> <p><b>B5.</b> How do we limit fragmentation and maintain connectivity between habitats?</p> <p><b>M1.</b> How will rare plants and animals, their habitats, and other rare features be protected.</p>	<p><b>1A.</b> Old forest is located primarily along riparian areas and traditionally forested areas in the eastern portion of the Subsection.</p> <p><b>1B.</b> Species in greatest conservation need and key habitats are maintained or enhanced in the Subsection.</p> <p><b>1C.</b> Vegetation composition will be managed according to ecological classifications to more closely reflect vegetation that developed under natural disturbance regimes.</p> <p><b>1D.</b> Patch management will maintain or enhance existing large patches and increase the average patch size over time while considering natural spatial patterns.</p> <p><b>1E.</b> Rare native plant communities are protected, maintained, or enhanced.</p> <p><b>1F.</b> Maintain or enhance biodiversity on MCBS sites of biodiversity significance.</p>

		<b>2C.</b> Native Plant Communities will be managed to include representation of all historically occurring growth stages.
<b>Major Category (from Chapter 3 of draft plan)</b>	<b>Issues</b>	<b>General Direction Statement(s) that address the issue(s)</b>
<b>3.1 Biological diversity, forest composition, and spatial distribution (cont.)</b>		<b>3A.</b> Species, age, and structural diversity within stands will be representative of the native plant community and growth stage.
<b>3.2 Age-class Distribution</b>	<p><b>A1.</b> What are the desired age-class and growth-stage distributions of forest types across the landscape?</p> <p><b>A2.</b> What is the appropriate amount, kind, and location of old forests?</p> <p><b>A3.</b> What is the appropriate amount, kind, and location of young, early successional forests?</p> <p><b>E1.</b> How can management of stands within larger areas of biodiversity significance be adapted to enhance biodiversity and native plant community composition, structure, and function?</p>	<p><b>1A.</b> Old forest is located primarily along riparian areas and traditionally forested areas in the eastern portion of the Subsection.</p> <p><b>1E.</b> Rare native plant communities are protected, maintained, or enhanced.</p> <p><b>2D.</b> Young, early-successional forest will be represented as it historically occurred.</p> <p><b>3A.</b> Species, age, and structural diversity within stands will be representative of the native plant community and growth stage.</p>
<b>3.3 Within-stand Composition and Structure</b>	<b>E2.</b> How do we plan to retain and restore within-stand structural complexity on actively managed lands?	<b>3A.</b> Species, age, and structural diversity within stands will be representative of the native plant community and growth stage.
<b>3.4 Timber &amp; Biomass Productivity</b>	<b>I1.</b> How can we increase timber productivity in forested areas?	<b>4A.</b> Timber and biomass productivity is increased.

<b>3.5 Harvest Levels</b>	<p><b>H1.</b> What is the appropriate timber and biomass harvest level considering resource sustainability?</p> <p><b>H2.</b> How can we ensure adequate and sustainable “non-timber products” for the future?</p>	<p><b>5A.</b> Treatment levels move cover types toward the desired age-class structure.</p> <p><b>5B.</b> Harvest of non-timber products will be managed to maintain biodiversity and sustainability.</p>
<b>Major Category (from Chapter 3 of draft plan)</b>	<b>Issues</b>	<b>General Direction Statement(s) that address the issue(s)</b>
<b>3.6 Wildlife Habitat</b>	<p><b>C1.</b> How can we address the impacts of vegetation management on permanent wetlands, wetland inclusions, and seasonal ponds?</p> <p><b>F1.</b> How do we manage vegetation to provide for the habitat needs of game and nongame species?</p>	<p><b>1B.</b> Species in greatest conservation need and key habitats are maintained or enhanced in the Subsection.</p> <p><b>6A.</b> Vegetation will be managed at multiple scales to provide habitat for nongame species.</p> <p><b>6B.</b> Vegetation will be managed at multiple scales to provide habitat for game species.</p> <p><b>7B.</b> Vegetation management will protect or enhance wetlands.</p>
<b>3.7 Riparian and Aquatic Areas</b>	<p><b>C2.</b> What vegetative management activities will be used within the riparian management zone (RMZ)?</p> <p><b>C3.</b> How can we address cumulative vegetation management impacts on aquatic resources at a watershed/sub-watershed level?</p>	<p><b>7A.</b> Vegetation management will protect or enhance riparian areas</p> <p><b>7B.</b> Vegetation management will protect or enhance wetlands.</p> <p><i>Cumulative impacts are beyond the scope of this SFRMP.</i></p>
<b>3.8 Pests, Pathogens, Exotic Species, and Climate Change</b>	<p><b>G1.</b> How do we address the impacts of forest insects and disease?</p>	<p><b>8A.</b> Limit damage to native plant communities from insects, disease and invasive species to acceptable levels where feasible.</p>

	<p><b>G2.</b> How will we respond to threats by invasive plant species in the Subsection?</p> <p><b>G4.</b> How do we manage vegetation to reduce negative animal impacts?</p>	<p><b>8B.</b> Minimize the negative impacts caused by wildlife on forest communities.</p> <p><b>8C.</b> Vegetation will be managed to promote resilient communities in an attempt to mitigate the effects of global climate change.</p>
Major Category (from Chapter 3 of draft plan)	Issues	General Direction Statement(s) that address the issue(s)
<b>3.8 Pests, Pathogens, Exotic Species, and Climate Change (cont.)</b>	<b>G5.</b> How should vegetation management respond to global climate change within the planning period?	
<b>3.9 Visual Quality</b>	<b>J1.</b> How will vegetation management activities minimize impacts on visual quality?	<b>9A.</b> Minimize management impacts on visual quality in sensitive areas.
<b>3.10 Access to State Land</b>	<b>D1.</b> How can we plan for access to the stands identified for management during the 10-year plan period, while protecting and minimizing the negative impacts that access development or use may have on other vegetative resources?	<b>10A.</b> Access routes are well planned and minimize new construction.
<b>3.11 Cultural Resources</b>	<b>L1.</b> How will cultural resources be protected during vegetation management activities?	<b>11A.</b> Cultural Resources will be protected.
<b>3.12 Natural Disturbance Events</b>	<b>G3.</b> How will natural disturbances be considered in vegetative management decisions?	<b>12A.</b> Natural disturbance events will be promptly evaluated to determine the management needed to address their impacts.
<b>3.13 Other Jurisdictions</b>	<b>N1.</b> How will vegetation management objectives be coordinated across ownership boundaries?	<b>13A.</b> Vegetation management will be coordinated across ownership boundaries.

## Chapter 3. General Direction Statements and Strategies

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### 3.0 Introduction

In response to the final list of issues identified in Chapter 2, the subsection team developed general direction statements (GDSs) to address the issues, strategies to achieve the general directions, and desired future forest composition (DFFC) goals. GDSs take into account the direction provided in state statutes and rules; department policies, guidelines, and direction (e.g., *Directions 2000*<sup>14</sup> and *A Strategic Conservation Agenda 2009-2013*<sup>15</sup>), and management that will sustain the vegetative resources on state-administered forestlands in the AP Subsection. GDSs provide general direction such as: increase, decrease, maintain, or protect a certain condition, output, or quality. Strategies were developed for each of the GDSs to achieve the general direction.

In situations where there is currently an ability to measure and quantify progress, DFFC goals were identified. DFFC goals are long-term (50+ years) goals for the ultimate desired condition of DNR forest lands in the AP Subsection. Examples of DFFC goals are: cover type acres, age class distribution, amount of young and old forest, and cover type treatment levels (e.g., harvest level). DFFC goals, general direction strategies (Chapter 3), and cover type management recommendations (Chapter 4) were used to determine stand treatment levels and define stand selection criteria to identify a pool of stands from which to select stands to be treated during this 10-year plan. This step of the plan provides recommended treatment levels by cover type to move toward the DFFC goals and a 10-year stand treatment list, which will include information regarding locations, acres, and prescriptions for stands selected for treatment. The GDSs, strategies, and DFFC goals presented in this chapter guided the selection of stands and the application of treatments to stands selected for treatment.

<sup>14</sup> <http://files.dnr.state.mn.us/aboutdnr/reports/directions2000.pdf>

<sup>15</sup> <http://www.dnr.state.mn.us/conservationagenda/index.html>

In this chapter, the 20 GDSs and associated strategies are grouped under 12 forest resource management topic areas or categories. Some categories have several GDSs to address the associated issues while others have only one.

### **3.1 Biological Diversity, Forest Composition, and Spatial Distribution**

**GDS-1A. Old forest is located primarily along riparian areas and traditionally forested areas in the eastern portion of the Subsection.**

Consideration of old forest during planning was done to:

1. Ensure an adequate representation of older stands and old forest components within even-aged cover types;
2. Address visual quality concerns and recreation desires;
3. Help maintain the integrity of forested riparian areas;
4. Complement or connect old-growth stands and other old patches;
5. Provide habitat for wildlife species and other organisms associated with old forest;
6. Provide for older growth stages of NPC types;
7. Provide large-diameter timber products;
8. Compliment the DNR's High Conservation Value Forest (HCVF) policy and Minnesota County Biological Survey (MCBS) sites of biodiversity significance; and,
9. Help contribute to carbon sequestration on state forest lands.

A forest stand of any particular even-aged managed forest cover type is considered old forest whenever its age exceeds the normal rotation age (NRA) agreed on by the landscape rotation age work group for that cover type. Determining the amount of old forest to be sustained in this Subsection required balancing many factors: timber productivity, economic impacts, historical forest conditions, habitat requirements, forest health, and timber quality. The goal is to provide a representation of older forest stands and old forest components that is sustainable over time, balanced with the need to provide a stable timber supply, increased timber productivity, and early successional forest habitat. Information about Minnesota's old-growth forest policy can be found at:

[http://www.dnr.state.mn.us/forests\\_types/oldgrowth/index.html](http://www.dnr.state.mn.us/forests_types/oldgrowth/index.html)

The type and acreage of old-growth forests in the AP Subsection can be found in table 3.1c of this chapter.

Providing for adequate and sustainable amounts of old forest across the landscape over time requires:

1. Designating some current old forest to be maintained as old over time (e.g., as done in the old-growth designation process);
2. Designating forest that is held to an older forest condition (i.e., extended rotation forest); and,
3. Specifying situations under which forest managers will create or maintain old forest components within treated stands, based on site factors found there (e.g., some patch management; management within Minnesota County Biological Survey (MCBS) sites of biodiversity significance).

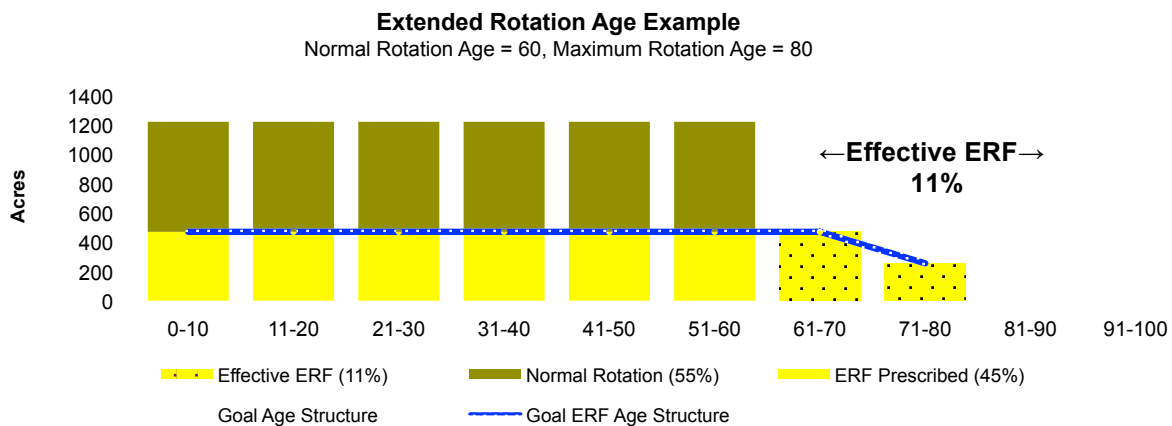
## GDS-1A - Strategies

### a. Determine the desired level of extended rotation forest for even-aged managed cover types.

The acreage and age of DNR timber lands to be managed as ERF was provided to the AP team by the interdisciplinary statewide ERF Workgroup. Forests managed as ERF are key to achieving DFFCs for the AP Subsection. Effective ERF (EERF), or “old forest”, is the portion of ERF acreage that is actually over the normal rotation age (NRA) for the cover type. Forest stands designated as ERF can (and should) be in any age class, therefore there are cases where large numbers of acres must be designated ERF to achieve the identified old forest goal due to the current cover type age class distribution. Cover types typically managed under even-aged regimes are the focus of ERF designation – such a management designation is unnecessary for cover types managed under uneven-aged regimes.

Designated ERF stands are harvested in stages between NRA and maximum rotation age (MRA) to help achieve the desired tapered distribution in older age classes. The harvest-scheduling model was programmed to consider ERF acreage goals together with other goals when selecting stands.

**Figure 3.1a. Extended rotation forest example.**



**Table 3.1a. Current old forest acres for modeled even-aged managed cover types.**

Cover type	Acres <sup>16</sup>	Ac >NRA <sup>17</sup>	% >NRA	Goal % >NRA <sup>18</sup>
Aspen/balm of Gilead	85,160	15,798	19%	3%
Black Spruce, Lowland	1,697	1,380	22%	11%-16%
Tamarack	3,754	1,329	35%	5%

<sup>16</sup> Managed Acres: Forestry and Wildlife lands considered available for timber harvest.

<sup>17</sup> Acres of managed forest older than the normal rotation age (NRA) established for the cover type.

<sup>18</sup> Old Forest percentage goal: Percent goal of cover type timber land acreage to be managed beyond the normal rotation age.

**b. Select ERF stands in even-aged managed cover types so that when a balanced age class distribution is achieved, the desired amount of effective ERF will be provided.**

Due primarily to existing imbalances in age classes in some cover types, there will be fluctuations in the amount of effective ERF until a balanced age class distribution is reached. After this, fluctuations may occur periodically because of major disturbances such as wind, flood, or fire. More severe fluctuations may occur in some cover types due to the relatively small number of stands that make up the total acres in the cover type. Table 3.1 b shows the percent of effective ERF at the beginning of each decade based on the prescribed ERF and treatment levels for the cover types. These estimates are based on modeling of proposed stand treatments over the next five decades.

**Table 3.1b. State timber land percent old forest and effective ERF per decade by type for even-aged systems.**

Cover type <sup>19, 20</sup>	Period (decade)						EERF% <sup>21</sup>
	1	2	3	4	5	6	
Aspen/balm of Gilead “T” and “O” stands ERF %	4.9%	3.6%	2.4%	2.2%	3.4%	3.0%	3.0%
Aspen/balm of Gilead “T” and “O” stands old forest%	30.2%	21.1%	9.1%	6.7%	7.8%	7.9%	
Aspen/balm of Gilead “S” stands old forest%	18.8%	13.2%	8.1%	1.6%	5.4%	5.6%	
Aspen/balm of Gilead “R” stands old forest%**	73.6%	22.4%	0	0	0	0	
Aspen/balm of Gilead “C” stands old forest%**	75.0%	72.8%	0	0	0	0	
Black spruce-lowland; low site index (SI<40) ERF %	7.3%	8.9%	10.4%	10.4%	32.1%	11.0%	11.0%
Black spruce-lowland; low site index (SI<40) old forest%	32.8%	30.9%	33.4%	27.8%	41.7%	18.2%	
Black spruce-lowland; high site index (SI=40+) ERF %	0	0	0	0	23.2%	16.0%	16.0%
Black spruce-lowland; high site index (SI=40+) old forest%	0	0	0	0	23.2%	16.0%	
Tamarack; low site index (SI<40) ERF %	4.3%	8.4%	5.0%	4.7%	8.4%	6.1%	5.0%
Tamarack; low site index (SI<40) old forest%	46.1%	46.0%	40.0%	24.7%	19.6%	9.1%	
Tamarack; high site index (SI=40+) ERF %	2.8%	0	0	3.6%	4.4%	4.4%	5.0%
Tamarack; high site index (SI=40+)old forest%	26.0%	23.7%	26.1%	29.5%	9.6%	7.9%	

<sup>19</sup> Aspen/balm of Gilead/offsite aspen (A/BG) stands have been divided into 5 subtypes “T”, “O”, “S”, “R” and “C”. For definitions of each aspen/balm of Gilead subtype see section 4.2 of Chapter 4.

<sup>20</sup> For “C” and “R” stands old forest is defined as >20 years of age.

<sup>21</sup> EERF% is represented by the aspen/balm of Gilead “T” and “O” stands only.



**c. Manage forested riparian management zones primarily to reflect old forest conditions.**

In the AP Subsection RMZs will be managed in accordance with the *MFRC Site-Level Guidelines* for longer-lived uneven-aged, mixed-species stands. This management will provide shade and moderate microclimate, coarse woody debris, microhabitat diversity, resiliency to natural catastrophes, bank stability, nutrient cycling, carbon and nutrient input. (see GDS-7A, strategies b and c).

**d. Allow some stands to naturally succeed to long-lived cover types with, or without the use of harvest.**

Field evaluation tools include use of the *Field Guide to the Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass AP Forest Province*<sup>22</sup> (*NPC Field Guide*), and associated ECS silvicultural interpretations.

**e. Manage designated old-growth stands and old forest management complexes (OFMCs) according to DNR policy.**

Complete and follow long-term management plans for designated old-growth stands and the surrounding acres in the OFMCs that are to be managed for old forest characteristics. Use the *DNR Old-Growth Forest Guidelines, Amendments 5 and 6* as a guide. High-quality native plant communities (NPCs) and other stands that meet old-growth criteria can be nominated for designation as old growth following the *DNR Old-Growth Forest Guidelines*.

**Table 3.1c. Designated old-growth acres in the Aspen Parklands Subsection.**

Cover type	Old-growth acreage goal (1994)	Old-growth acres designated <sup>23</sup>
Black ash	40	73
Lowland hardwoods	80	204
Oak	30	175
Northern hardwoods	0	0
White cedar	0	0
Red pine	0	0
White pine	0	0
White spruce	0	0
Total	150	452

<sup>22</sup> Minn. DNR, 2005, *Field Guide to Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass Aspen Parklands Province*. Ecological Land Classification Program, Minnesota County Biological Survey, Natural Heritage and Nongame Research Program. Minnesota Department of Natural Resources St. Paul, MN 55155.

<sup>23</sup> From a candidate pool of 670 candidate acres, 452 acres were designated as old growth and 218 acres were released from candidacy

**f. Designate ecologically important lowland conifers according to Department direction.**

Ecologically important lowland conifers (EILC) are examples of high quality NPCs that include productive and stagnant stands of black spruce, tamarack, and cedar. *Appendix E: Ecologically Important Lowland Conifers (EILC): Stand Designation Process* describes the method the team used to designate EILC for the Subsection. Table 3.1d summarizes the acres designated by cover type. The designated EILC stands will be reserved from treatment during this 10-year planning period, or until such time as designation or release decisions are made by the Department. (*DNR Memorandum, July 3, 2000, Old-Growth Forest Guidelines and Protection of Important Lowland Conifer Sites*)

*Note: EILC acres will be included in cover type treatment acre calculations for this 10-year plan. Therefore, EILC designations will not cause a reduction in the treatment level in the black spruce, tamarack, and cedar cover types.*

**Table 3.1d. Acres designated as ecologically important lowland conifers (EILC)**

Lowland Conifer Type	State Forestland Acres	EILC Acres Designated	Percent of Cover Type Designated as EILC
Tamarack	3,754	1,273	34%
Black Spruce Lowland	1,697	315	19%
Stagnant Spruce	842	0	0%
Cedar	215	71	33%
Stagnant Tamarack	45	0	0%
Stagnant Cedar	0	0	0%
Lowland Conifer Total	6,552	1,659	25%

**g. Use silvicultural treatments that retain old forest components in some stands.**

Examples of silvicultural treatments that can retain old forest components include:

1. Selection harvest (i.e., group selection and single tree selection);
2. Intermediate harvest (i.e., thinning);
3. Shelterwood harvest with reserves;
4. Seed tree harvest with reserves;
5. Variable retention harvest; and,
6. Variable density thinning.

(See Chapter 4, Cover type Management Recommendations and GDS-3A)

**h. Consider the status of old forest within the Subsection when making decisions to add and offer unplanned wood for harvest.**

**GDS-1B. Species in greatest conservation need (SGCN) and key habitats are maintained or enhanced in the Subsection.**

Minnesota DNR participates in the State Wildlife Grants Program (SWG), created by the US Congress in 2001. Congress mandated that to participate in the SWG Program, states, in partnership with other conservation agencies and organizations, must develop a Comprehensive Wildlife Conservation Strategy (CWCS) to identify and manage species in greatest conservation need (SGCN) and associated key habitats.

SGCN are defined as native animals whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability. Minnesota's SGCN list includes 292 native animal species. Key habitats are defined as those habitats most important to the greatest number of SGCN in a subsection. Minnesota's CWCS identifies key habitats in terms of the DNR's three-volume Field Guide to Native Plant Communities. For a listing of SGCNs and key habitats known to occur in the AP Subsection, please visit the DNR's CWCS webpage:

[http://www.dnr.state.mn.us/cwcs/subsection\\_profiles.html](http://www.dnr.state.mn.us/cwcs/subsection_profiles.html)

By alerting resource managers and the public to SGCN and key habitats, activities can be reviewed and prioritized to complement Minnesota's CWCS.

### **GDS-1B - Strategies**

#### **a. Consider current SGCN and key habitat data in management activities in the Subsection.**

DNR staff from all Divisions will have access to the most up-to-date SGCN and key habitat locations by coordinating with the Division of Ecological and Water Resources.

SGCN and key habitat data are collected to various degrees by MCBS, Natural Heritage & Nongame Research Program, and various other sources. As new data is compiled it is made available to DNR staff and applied to management decisions per the DNR's Interdisciplinary Forest Management Coordination Framework<sup>24</sup> (Coordination Framework).

The Coordination Framework is used to maintain or enhance SGCNs and key habitats. Ecological and Water Resources staff will deliver SGCN and/or key habitat management considerations to managers for use in making forest management decisions for stands selected for treatment, access routes, and other management or development activities per processes outlined in the Coordination Framework.

#### **b. Select some ERF, OFMC, EILC, and patch stands based on their association with SGCNs and key habitats.**

SGCNs and key habitats were considered during the selection of stands in ERF, OFMCs, EILC areas, and the designated patches.

### **GDS-1C. Vegetation composition will be managed according to ecological classifications to more closely reflect vegetation that developed under natural disturbance regimes.**

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<sup>24</sup> DNR Divisions of Forestry, Fish and Wildlife, and Ecological Resources: *Interdisciplinary Forest Management Coordination Framework*. St. Paul, Minnesota. December 2007.

The proposed cover type change goals reflect the AP SFRMP team's attempt to increase the acreage of cover types that have declined historically, while maintaining or enhancing important wildlife habitats and plant communities, and providing a sustainable level of forest products. The ecologic, economic, and social considerations used in developing the cover type change goals for this Subsection include:

1. Historic vegetation composition;
2. Historic disturbance regimes;
3. Native plant community information;
4. Wildlife habitat;
5. Insect and diseases;
6. Community productivity (e.g., match the species to the site using *NPC Field Guide*);
7. Increase availability of certain forest products ; and,
8. Recreational values.

### **GDS-1C - Strategies**

#### **a. Increase the acres of oak, oak savannah, lowland brush and prairie grasses using the following actions:**

Use the *NPC Field Guide* as a tool to guide the on-site evaluation of stands for conversion from one cover type to another or managing for mixed species composition and stand structure.

Options available include:

1. Allow some stands to convert through natural succession;
2. Artificially convert some stands through mechanical site preparation, prescribed burning, planting, or seeding; and,
3. Harvest some stands to move toward the desired cover type and within-stand composition.

Conversions can be immediate, or can take place over the span of a rotation period through thinning, partial cuts, and intermediate treatments.

#### **b. Forest composition goals and objectives are consistent with other landscape planning jurisdictions.**

Department personnel have been involved with TNC of Minnesota planning efforts. Although the TNC plan differs in scope and scale from this plan, they share a number of goals and local and regional staff are committed to maintaining close relationships.

**c. Consider current rare plant species in management activities in the Subsection.**

Examples of plant species that have declined in the AP Subsection include species declining in and adjacent to the now rare oak woodlands:

- Blunt sedge (*Carex obtusata*);
- spike oat (*Helictotrichon hookeri*);
- long-stalked chickweed (*Stellaria longipes*); and,

some of the many now rare plants found in the unique calcareous fens in this Subsection:

- Sterile sedge (*Carex sterilis*);
- few-flowered spike-rush (*Eleocharis quinqueflora*);
- hair-like beak-rush (*Rhynchospora capillacea*); and,
- northern gentian (*Gentiana affinis*)

**GDS-1D. Patch management will maintain or enhance existing large patches and increase the average patch size over time while considering natural spatial patterns.**

There is broad consensus among scientists that managed landscapes are currently more fragmented and contain fewer large patches than landscapes where spatial patterns are determined primarily by natural disturbance and physical factors. Stand selection and treatment as part of the AP SFRMP process can significantly reduce habitat fragmentation and maintain and promote larger patches over time. The best available information on natural spatial patterns in this Subsection was used as a guide to understanding the distribution of patch sizes, cover type groupings, and age classes for patch management on state lands.<sup>25</sup> Although this plan considered management activities on other ownerships, patch management primarily focuses on identifying opportunities that exist on state land.

To guide patch management on state lands, a patch is defined as one or more adjoining stands that are relatively homogenous in structure, primarily in height and density, and are similar in vegetation cover and age. A future patch is defined as a group of adjoining stands that do not currently meet the patch definition, but that will be managed to enhance patch attributes over time.

Patches are defined by age, size, and general cover type grouping (Tables 3.1e-g). Patch ages are defined as old, intermediate, and young with an age range by category dependent on cover type. Patch sizes range from small (less than 40 acres) to large (greater than 640 acres). Patches may have smaller areas (e.g., 10-15 percent of the patch area) within them that are not in the same patch category as the main patch, such as inclusions, residual islands, legacy patches, corridors, and buffers.

Using Cooperative Stand Assessment (CSA) forest inventory data, the DNR conducted an initial patch assessment for state lands in the Subsection. Patches were created in a GIS data layer by dissolving common stand boundaries between stands of the same cover type group and age class. The initial patch assessment information was used as one of the tools for delineating the current patches and desired future patches on state lands in this Subsection as described in the following paragraphs.

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<sup>25</sup> Minn. DNR. January 2008. Addressing Patch Management in SFRMP, page 38 in *SFRMP Process Guidebook IV*. (Draft).

**Table 3.1e. Patch ages by cover type category.**

Cover Type Groupings			Age Class Definition (In years)		
Code	Category	Sub-Category	Young	Inter.	Old
UC	Upland Conifer	jack pine, upland black spruce, and balsam fir	0-20	21-60	>60
		red pine and white pine	0-20	21-90	>90
		white spruce and upland white cedar	0-20	21-80	>80
LC	Lowland Conifer	tamarack, white cedar, and lowland black spruce	0-20	21-90	>90
UDA	Upland Deciduous Aspen	aspen, birch, and balm of Gilead	0-20	21-50	>50
UDO	Upland Deciduous Oak	northern hardwood and oak	0-20	21-80	>80
LD	Lowland Deciduous	ash and lowland hardwood	0-20	21-80	>80

**Table 3.1f. Patch size classes for patch management in AP SFRMP**

Size Class	Size Range (acres)
Class 1 - Large	Greater than 640
Class 2 - Medium Large	251 – 640
Class 3 - Medium	101 – 250
Class 4 - Small Medium	41 – 100
Class 5 - Small	Less than 40

**Table 3.1g. Patch type codes for patch management in AP SFRMP**

Patch Type Code	Description
PYUDA	Patch young upland deciduous aspen
PIUDA	Patch intermediate upland deciduous aspen
POUDA	Patch old upland deciduous aspen
PYUDO	Patch young upland deciduous oak
PIUDO	Patch intermediate upland deciduous oak
POUDO	Patch old upland deciduous oak
PYLD	Patch young lowland deciduous
PILD	Patch intermediate lowland deciduous
POLD	Patch old lowland deciduous
PYUC	Patch young upland conifer
PIUC	Patch intermediate upland conifer
POUC	Patch old upland conifer
PYLC	Patch young lowland conifer
PILC	Patch intermediate lowland conifer
POLC	Patch old upland lowland conifer

The following tables (Tables 3.1.h and i) provide a summary of the initial patch assessment for the AP Subsection. By patch size class, the AP landscape contains a greater proportion of medium to small forested patches. All AP upland forested cover type groupings show a lower abundance, in many cases a complete absence, of large patches across all age classes. Upland deciduous aspen is by far the most common forested cover type group in the AP Subsection. By age class, the majority of upland deciduous aspen patches are in the intermediate age class with a significant amount in the young age class, and the fewest in the oldest age class. The lowland conifer cover type group, although much smaller in acreage, is also dominated by intermediate age patches, but is more variable in terms of the distribution of patch sizes.

Mature and older growth stage large patches have benefits for some wildlife species and provide conditions that favor many native plant species over invasive and weedy plant species. Without attention to the maintenance or creation of large old patches they are likely to be lost through time.

Consideration of the initial patch assessment in stand-level decisions (e.g., grouping stands into harvest blocks based on the initial patch assessment) is an important component of providing for the range of patch conditions on the AP landscape. Opportunities to maintain and build large patches, both young and old, are of particular concern for the reasons previously stated. Small and medium sized patches of all age classes, although relatively common on the landscape today, also need attention so that they are retained or created on the landscape where desired and so that diversity of patch sizes is not lost over time in the effort to maintain and create large patches.

**Table 3.1h. AP Subsection timber lands existing patch size class summary.**

<b>State Timber Land Acres</b>	<b>Class 1 <u>Acres</u> % of Tim- berland</b>	<b>Class 2 <u>Acres</u> % of Tim- berland</b>	<b>Class 3 <u>Acres</u> % of Tim- berland</b>	<b>Class 4 <u>Acres</u> % of Tim- berland</b>	<b>Class 5 <u>Acres</u> % of Tim- berland</b>
99,414	<u>3,211</u> 3%	<u>12,514</u> 13%	<u>20,383</u> 21%	<u>25,826</u> 26%	<u>37,479</u> 38%

**Table 3.1i. AP timber lands existing patch type summary.**

Patch Type	Class 1 Large		Class 2 Medium Large		Class 3 Medium		Class 4 Small Medium		Class 5 Small		Tally of Patch Code in Subsection	Acres of Patch Code in Subsection
	Tally	Acres	Tally	Acres	Tally	Acres	Tally	Acres	Tally	Acres		
PYUDA	0	0	6	2,439	39	5,741	118	7,158	983	10,779	1,146	26,117
PIUDA	3	2,535	21	7,655	67	10,620	172	10,961	1,761	15,997	2,024	47,768
POUDA	0	0	1	363	11	1,759	63	3,799	478	6,312	553	12,233
PYUDO	0	0	0	0	0	0	0	0	4	40	4	40
PIUDO	0	0	0	0	7	980	12	664	99	1,366	118	3,010
POUDO	0	0	0	0	2	335	7	460	32	341	41	1,136
PYLD	0	0	0	0	0	0	0	0	7	90	7	90
PILD	0	0	1	334	1	131	16	914	99	982	117	2,361
POLD	0	0	0	0	0	0	2	129	22	371	24	500
PYUC	0	0	0	0	0	0	1	63	7	40	8	103
PIUC	0	0	0	0	1	107	1	52	39	214	41	373
POUC	0	0	0	0	0	0	1	44	7	87	8	131
PYLC	0	0	0	0	2	217	1	65	6	56	9	338
PILC	1	676	3	1,211	2	333	16	1,001	41	535	63	3,756
POLC	0	0	1	513	1	161	7	517	18	271	27	1,462
<b>Total</b>	<b>4</b>	<b>3,211</b>	<b>33</b>	<b>12,515</b>	<b>133</b>	<b>20,384</b>	<b>417</b>	<b>25,827</b>	<b>3,603</b>	<b>37,481</b>	<b>4,190</b>	<b>99,418</b>

**“Designated” Patches**

Maintaining and creating large (Class 1), medium large (Class 2), and medium (Class 3) forest patches in appropriate areas of this landscape is a priority of this plan. Patch management of other non-forested cover types was addressed through the priority open landscape area designation process and will be implemented through the application of the associated management agreement.

After analyzing the initial patch assessment data in relationship to other pertinent topics (e.g., forest management activities, rare species, forest interior wildlife species, species in greatest conservation need, key habitats, game species), the team, with input, review, and approval from field staff, identified 12 future patches for forest patch management emphasis. These 12 forested patches are in either upland deciduous (4) or lowland conifer (8) cover type groups and are intended to be managed on a normal or extended rotation schedule. These designated patches include 4 large patches, 4 medium large patches, and 4 medium sized patches. Not every patch has stands designated for treatment during this planning period.



Table 3.1j provides a brief summary of the 12 designated patches. A unique code identifies each patch within the AP FIM dataset that provides a general idea of the patch direction. An example of an AP designated patch code definition is as follows:

**FPXYY:** **F** = future patch (the group of stands do not currently meet patch definition; management is directed towards a desired future patch condition; if the group of stands do currently meet the patch definition the “F” is dropped from the code).  
**P** = patch  
**X** = short-term patch goal: **Y** = Young; **I** = Intermediate; **O** = Old  
**YY** = patch type: **UD** = Upland Deciduous or **LC** = Lowland Conifer

Specific locations and the stands included in the 12 AP designated patches can be found in the AP 10-year FIM shapefile. A map showing general locations is in *Appendix M: Maps*.

**Table 3.1j. AP Summary of designated patches.**

Designated Patch Type	Patch Size Class	Tally	Acreage
FPILC	3	2	350
FPOLC	1	3	2,681
FPOLC	2	3	1,291
FPOUD	2	1	289
FPOUD	3	1	167
FPYUD	1	1	801
FPYUD	3	1	206
	<b>Total</b>	<b>12</b>	<b>5,785</b>

### **GDS-1D - Strategies**

**a. Apply management strategies that contribute to the long-term goal stated in (GDS-1D) above.**

Group treatment activities within patches in close spatial and temporal proximity.

**b. For stands outside of the designated patches, practice whole stand/community management to maintain or enhance existing patch size.**

Look for opportunities to build or retain patches that are lacking on the landscape as displayed in tables 3.1h through 3.1j above.

When adding unplanned stands, consider their relationship to the initial patch assessment (i.e., Does the unplanned stand complement or hinder identified patch goals?).

**c. When possible, cooperate with other landowners in patch management to maintain existing large patches and increase the average patch size across multiple ownerships.**

Efforts should be made to work with other landowners to identify other large patches not identified during this process.

**GDS-1E. Rare native plant communities are protected, maintained, or enhanced.**

Minnesota's native species and ecosystems have been evaluated and assigned an S or G rank based on the conservation status rank system developed by NatureServe<sup>26</sup> and its member programs and collaborators. The resulting statewide (S) and global (G) ranks best characterize each community's relative rarity or risk of elimination on the statewide or global scale (Table 3.1k). Example of rare or threatened plant

**Table 3.1k. Statewide (S) and global (G) conservation rank definitions for native plant communities (NPCs).**

Rank	Definition
<b>S1</b>	<b>Critically Imperiled</b> —Critically imperiled in Minnesota because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation.
<b>S2</b>	<b>Imperiled</b> —Imperiled in Minnesota because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation.
<b>S3</b>	<b>Rare or Uncommon or Vulnerable</b> —Vulnerable in Minnesota due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation.
<b>S4</b>	<b>Apparently Secure</b> —Uncommon but not rare; some cause for long-term concern due to declines or other factors.
<b>S5</b>	<b>Secure</b> —Common, widespread, and abundant in Minnesota
<b>G1</b>	<b>Critically Imperiled</b> —At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
<b>G2</b>	<b>Imperiled</b> —At high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors.
<b>G3</b>	<b>Vulnerable</b> —At moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors.
<b>G4</b>	<b>Apparently Secure</b> —Uncommon but not rare; some cause for long-term concern due to declines or other factors.
<b>G5</b>	<b>Secure</b> —Common; widespread and abundant.

*Appendix J: Native Plant Communities in the AP Subsection* provides a list of Native Plant Community (NPC) Types and Subtypes and associated Conservation Status Ranks known or likely to occur in the AP Subsection.

Note: As MCBS and native plant community interpretations progress across the AP Subsection S and G-ranks will be revisited and refined as justified<sup>27</sup>.

Locations of the rare native plant community types and subtypes listed in *Appendix J* will be documented and may be assigned a relative rank for the quality of the NPC occurrence.

<sup>26</sup> NatureServe - In cooperation with the Network of Natural Heritage Programs and Conservation Data Centers. 2002. Element Occurrence Data Standard. Arlington, VA.

<sup>27</sup> Minn. DNR 2008. Conservation Status Ranks for Minnesota Native Plant Communities (October 2008). Minnesota Department of Natural Resources – Division of Ecological Resources. St. Paul, MN 55155.

Generally, NPCs are ranked for quality based on factors associated with size, condition, and landscape context. The relative quality of the NPC is assigned on a continuum from “A” through “D”, with an “A” rank indicating an excellent quality NPC, and a “D” rank indicating a poor quality NPC. The Conservation Status Ranks for S or G ranked communities do not address relative quality although it is generally true that “A” quality examples are rarer than lower quality examples for any given NPC type or subtype.

Because the MCBS is the primary source for NPC data and MCBS prioritizes survey efforts within MCBS sites, most documented locations of rare NPCs are within MCBS sites. However, as more NPC data is collected by other DNR Divisions and cooperators, more locations of rare NPCs outside MCBS sites will be documented.

### **GDS-1E - Strategies**

#### **a. Complete the Minnesota County Biological Survey (MCBS) in this Subsection.**

Document known locations of NPCs with statewide and global ranks of critically imperiled (S/G-1) or imperiled (S/G-2), and those NPCs with S or G ranks of S/G-3 to S/G-5 that are rare or otherwise unique in the Subsection. Complete the quality ranking analysis for each of these plant communities. Make this data readily available for use by DNR personnel.

**Table 3.1I. State and global imperiled or critically imperiled NPCs found in the AP Subsection and their associated ranks.**

<b>NPC</b>	<b>S-rank (State)</b>	<b>G-rank (Global)</b>
FDw24	S2	
FPs63a	S2S3	G2G3
MHw36	S2	
OPp93a	S2	G2Q
UPn12a	S1	G2G3
Upn12b	S2	
UPn12c	S1	G2G3
Upn13		G1 or G2
UPn13b	S1S2	G2
UPn13c	S1	G1 or G1G2
UPn23a	S2	G2G3
UPn23b	S2	G2G3
UPn24b	S1	
WMp73	S3	G2G3
WPn53	S2	G2G3

#### **b. Manage known locations of critically imperiled (S/G-1) or imperiled (S/G-2) NPCs, and those that are rare statewide or with limited occurrences in the Subsection to maintain their ecological integrity.**

Where rare NPCs occur, vegetation management within and adjacent to these NPCs will protect, maintain, or enhance the ecological integrity of NPCs. Some NPCs of concern are best managed by avoidance, while others are best maintained or enhanced by using

appropriate harvesting or other management activities. Work closely with our state-wide and federal cooperators on all management activities that will affect these communities.

**c. Ensure adequate training for Department personnel in the use of the *NPC Field Guide* and ECS silvicultural interpretations.**

DNR personnel have been trained in the use of the “Field Guide to the Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass Aspen Parklands Province” for identification of NPCs. Additional materials, such as the DNR ECS silvicultural interpretations, will also be used to guide management.

**GDS-1F. Maintain or enhance biodiversity on MCBS sites of biodiversity significance.**

MCBS sites range from 10s to 1,000s of acres in size. These sites contain intact native plant communities, populations and/or concentrations of rare species, critical animal habitat, and/or functional landscapes representative of pre-European settlement Minnesota. The MCBS “site” provides a geographic framework for evaluating and communicating statewide and regional biodiversity significance. Important factors influencing MCBS site ranks include:

1. Rare species occurrences;
2. Native plant community (NPC) quality, rarity, and size; and,
3. Landscape context and presence/absence of landscape-level functions.

In order to provide a relative measure of how sites of *biodiversity* compare to each other, MCBS sites are ranked according to the four levels described below.

**O - OUTSTANDING.** These MCBS sites contain the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes present in the state.

**H - HIGH.** These MCBS sites contain the “best of the rest,” such as MCBS sites with very good quality occurrences of the rarest species, high quality examples of the rarest native plant communities, and/or important functional landscapes.

**M - MODERATE.** These MCBS sites contain significant occurrences of rare species and/or moderately disturbed native plant communities, and landscapes that have a strong potential for recovery.

**B - BELOW MCBS MINIMUM BIODIVERSITY THRESHOLD (BMT) FOR STATEWIDE SIGNIFICANCE.** These MCBS sites lack significant populations of rare species and/or natural features that meet MCBS minimum standards for size and condition. These include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movements, buffers surrounding higher quality natural areas, and open space areas.

Sites of biodiversity significance serve as ecological reference areas that help us:

1. Improve our understanding of ecosystem form and function;
2. Improve our understanding of Minnesota’s native biodiversity;
3. Evaluate the effects of management on biodiversity, rare species, native plant communities, and ecosystem form and function; and,

4. Identify areas to be managed as high conservation value forests (HCVF).<sup>28</sup>

The MCBS site boundaries are influenced by land-use history and/or notable differences in landforms, native plant communities, rare species occurrences, and/or ecological classification system units (e.g., subsections).

MCBS biodiversity significance guidelines are applied statewide. Biodiversity significance rankings for some sites will be updated as survey work proceeds across the state to reflect new information and our growing understanding of Minnesota's native biodiversity.

The MCBS is currently at various stages within the AP planning area. Kittson, Marshall, Pennington, Red Lake, and Roseau counties have been completed. Polk, Clearwater and Beltrami counties are currently in-progress. See process description in Section 5.4 on page 5.15, *Preliminary Issues and Assessment*:

[http://files.dnr.state.mn.us/forestry/subsection/aspenparklands/prelim\\_issues\\_assess.pdf](http://files.dnr.state.mn.us/forestry/subsection/aspenparklands/prelim_issues_assess.pdf)

Based on MCBS survey work completed as of August 2010, Table 3.1m provides a summary of biodiversity significance and survey priority rankings for MCBS sites that include state lands. *Appendix M: Maps* contains a map of MCBS sites of biodiversity significance.

Table 3.1m. Summary of biodiversity significance rankings for MCBS sites that are associated with state administered lands (August 2010).

Rank	Number of MCBS Sites <sup>29</sup>	Total MCBS Site Acres	State Forest land Acres <sup>30</sup>	Timber Land Acres <sup>31</sup>	10-Year Stand Exam List Acres <sup>32</sup>
<b>O</b>	93	116,162	85,543	20,698	10,683
<b>H</b>	575	100,082	62,072	18,539	7,472
<b>M</b>	387	132,740	71,138	18,604	8,140
<b>B</b>	104	91,593	64,414	17,685	7,308
<b>Total</b>	<b>1,159</b>	<b>440,577</b>	<b>283,168</b>	<b>75,526</b>	<b>33,605</b>

The DNR has developed an interim approach that uses MCBS sites of outstanding and high biodiversity significance to help identify a pool of candidates sites to be managed as High

<sup>28</sup> DNR's commitment to manage for a broad set of objectives and forest resources coincides with Principle 9 in the Forest Stewardship Council™ (FSC)® Forest Management (FM) Standard, which requires certificate holders to identify High Conservation Value Forests (HCVFs) and manage such areas to "maintain or enhance" identified High Conservation Values (HCVs). FSC broadly defines HCVFs as "areas of outstanding biological or cultural significance."

<sup>29</sup> Includes all MCBS sites that comprise portions of State Administered lands within the planning area. Acres represented of MCBS sites includes those portions that extend outside of State Administered lands.

<sup>30</sup> Portions of MCBS sites that overlap *Forestland*, which consists of all DNR administered lands included in the forest inventory from aspen to stagnant conifers, muskeg, lowland brush, and lakes.

<sup>31</sup> Portions of MCBS sites that overlap *Timberland*, includes those cover types that are capable of producing merchantable timber and are available for timber management, meaning they are not withdrawn from management based on land administrator (ex. State Parks) or by reserve status such as old growth.

<sup>32</sup> Portions of MCBS sites that overlap stands on the 10 year Stand Exam list.

Conservation Value Forests (HCVFs). Within areas being managed as HCVFs, forest certification standards require the DNR to maintain or enhance all high conservation values identified for the site. These standards also require monitoring of the identified high conservation values, especially as management is applied, to insure that these values are maintained or enhanced over time.

Management activities such as timber and biomass harvesting, site preparation, access route construction and maintenance, and tree planting will occur on forestry and wildlife administered lands within MCBS sites following the guidance and directions contained in Chapter 3 – General Directions Statements and Chapter 4 – Cover type Management Recommendations. Management activities carried out on MCBS sites will emphasize the following strategies to help minimize the loss of the factors on which the MCBS sites were ranked.

#### **GDS-1F - Strategies**

**a. Determine which MCBS sites are of greatest concern or importance for AP SFRMP over the 10-year planning period.**

The MCBS sites of greatest concern or importance for AP SFRMP were determined to be those MCBS sites with state lands that have a biodiversity significance rank of Outstanding or High. These MCBS sites represent the best known occurrences of existing biodiversity significance, so they provide the greatest opportunity to sustain or minimize the loss to native biodiversity.

**b. Consider the broader context and significance of MCBS sites as a whole when assigning management objectives, and designing silvicultural and other prescriptions.**

Management decisions will incorporate connections between stand-level actions and their effect on a site's biodiversity significance. Final management objectives will be carried out consistent with the Coordination Framework.

**c. Determine location and composition of stand conversions based on NPCs.**

Managers will determine the NPC class for stands planned for conversion, site preparation, and development activities using the "Field Guide to the Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass Aspen Parklands Province". Additional information to help determine in which NPC class a stand is located will become available as MCBS completes NPC mapping for MCBS sites of outstanding and high statewide biodiversity significance, and as various other efforts continue to expand the collection and application of NPC data in Minnesota. Final management objectives will be carried out consistent with the Coordination Framework.

The *NPC Field Guide* and associated ECS silvicultural interpretations<sup>33</sup>, *Appendix J: Native Plant Communities*, and other resources will help managers determine appropriate management direction for the identified NPCs.

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<sup>33</sup> [http://www.dnr.state.mn.us/forestry/ecs\\_silv/interpretations.html](http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html)

Whenever possible and practical, commercial timber products should be utilized in conjunction with conversion of a site. Manage stand cover type conversions with less intensive site preparation.

**d. Allow some stands to succeed to the next native plant community growth stage, with or without harvest or other management activity.**

Most likely candidates for succession will be stands that contain adequate regeneration stocking levels and structural characteristics for the site to convert to a later growth stage. Other candidates would include stands whose location, condition, or rare species occurrences are critical factors to a site's biodiversity significance.

**e. Emulate the within-stand composition, structure, and function of NPC growth stages when managing stands in MCBS sites.**

Determine which species to harvest and retain and the spatial and temporal arrangement of them based on NPC succession and disturbance ecology. DNR Forestry's ECS silvicultural interpretations will be an important resource to assist in making the link between stand-level considerations and NPC ecology.

Examples include:

- Coarse woody debris and snags – species, size class distribution, spatial distribution, availability through time;
- Leave trees and legacy patch selection and design are influenced by how the NPC would have been disturbed under natural conditions;
- Diameter classes in uneven-aged managed stands reflect the range and abundance expected for the NPC;
- Use silvicultural techniques during forest management activities to recruit desired species through natural regeneration – leave trees that are likely to produce seeds, leave and remove trees that help create/maintain microclimate conditions favorable to seedling establishment and growth; and,
- Use silvicultural techniques that take advantage of opportunities to increase recruitment of desired species from adjacent stands of the same and adjacent native plant communities

**f. Apply variable retention harvest techniques during harvest.**

The main objectives of variable retention are to retain the natural range of stand structure and forest functions. With retention systems, forest areas to be retained are determined before deciding which areas will be cut. Standing trees are left in a dispersed or aggregate form to meet objectives such as retaining NPC form and function, old-growth structure, habitat protection, and visual qualities. Variable retention retains structural features (e.g., snags, large woody debris, and live trees of varying sizes and canopy levels) as habitat for a host of forest organisms. (See legacy patches recommendations in *MRFC Voluntary Site-level Forest Management Guidelines, Wildlife Habitat Section, pages 43-47.*) During harvest, retain tree species and diameters present at older growth stages, in clumps or dispersed, to more closely replicate pattern after natural disturbance. Include retention of large, downed logs. For example: Leave legacy patches throughout the stand; islands of residual vegetation that include tree species present at older growth stages.

**g. Designate some stands as ERF to provide old forest conditions.**

ERF designated stands will help maintain old forest conditions within MCBS sites and will retain older growth stages on the landscape for longer periods of time than stands managed as normal rotation forests. When ERF stands are harvested within MCBS Sites make efforts to retain the older forest components that are present in the stand or retain features that allow older forest components to continue developing.

**h. Increase the use of prescribed fire as a management technique in fire-dependent NPCs.**



Prescribed fire will be used in fire dependent communities to restore, maintain, and enhance the diversity of these systems. The restoration of a fire dependent community may require the unit to be burned more frequently and more intensely than what was historically documented, however once a community has been restored to the desired growth stage, managers will maintain that community by burning close to the historic fire return interval and intensity. Managers will also adjust the seasonality of prescribed fire applications to achieve the fire effects necessary to maintain the native plant community. For example, grassland fires historically occurred throughout the snow-free dormant and growing seasons under a wide variety of conditions. Managers of these systems should attempt to vary the time of year under which a unit is burned, so that they maintain a site's diversity. The variation in season and on the ground conditions under which a piece is burned creates a mosaic of burned and unburned areas, variable fire intensity, and helps to maintain species diversity by not favoring certain species.

**i. Locate roads to minimize fragmentation of a MCBS site.**

Roads contribute to an increase in ecosystem fragmentation and an increase in terrestrial invasive species abundance. All efforts should be taken to minimize new road construction and enlarging existing roads/trails within MCBS sites.

**j. Apply special management recommendations for known rare features.**

Rare features include rare plants, rare animals, and their habitats. Additional rare feature locations are likely to be discovered in the Subsection. Management activities will be carried out in a manner that protects, maintains, or enhances rare features according to DNR policy and state statute.

**k. Defer management of some stands that have been identified as having important unique features for further assessment (e.g., EILC, nominated natural areas, and rare or representative ecosystems).**

Reasons that may lead to a recommendation to defer a stand from treatment include nominated old-growth, rare native plant communities, rare species habitat, or significant negative impacts to a site's biodiversity significance.

**l. Consider timber productivity, Trust Fund responsibilities, and other forest management priorities when managing stands in these MCBS sites.**

Land status and timber productivity will be considered while implementing the other strategies on stands identified for management. Areas will follow DNR policy regarding replacing stands that are deferred from treatment. Other Divisions will have an opportunity to review proposed preliminary MCBS sites as described in the *Coordination Framework*.

MCBS sites that have been recommended to be managed as HCVFs will be managed to maintain or enhance identified high conservation values. MCBS sites that are not formally identified to be managed as HCVF are no longer subject to the noted certification standards (i.e., maintain, enhance, and monitor HCVs). However, the GDS-1F Strategies will continue to apply to these sites. In addition, many high conservation values will be maintained under other existing DNR policy and state statutes. DNR's approach to managing and monitoring HCVFs will continue being developed and refined over the life of the plan,

**m. Department personnel will communicate with other landowners, as opportunities arise, to inform them of the significance of these MCBS sites and management options that could be implemented to address the biodiversity objectives of these MCBS sites.**

The intent of this strategy is to provide information on the MCBS sites and cooperate in land management across ownerships in the landscape when possible and agreed upon by the landowners affected. It is not meant to imply or mandate how other landowners should manage their lands.

For example:

1. DNR staff will implement stand-level management activities that achieve landscape-level biodiversity goals and objectives across ownerships;
2. When assisting private landowners with woodland stewardship plans, information on the biodiversity significance of these MCBS sites and recommended management strategies will be provided; and,
3. MCBS personnel will communicate and deliver information about priority MCBS sites of biodiversity significance to other landowners within these MCBS sites.

## **3.2 Age Class Distribution**

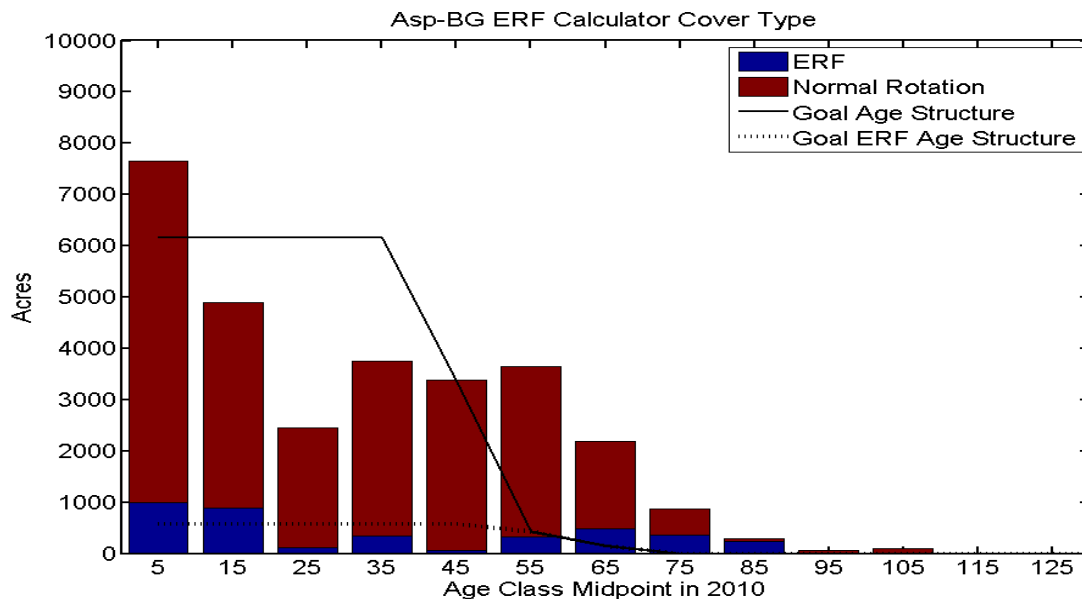
**GDS- 2A. Even-aged managed cover types will move toward a balanced age class structure.**

A balanced age class structure has relatively equal acres in each 10-year age class out to the normal rotation age. A goal is to provide an even flow of wildlife habitat and timber harvest. A steady supply of these resources over time is important to wildlife, recreation, the forest products industry, and the local economies that depend on them.

The current age class distributions of the aspen/balm of Gilead cover types vary by the category with more acreage in the young age classes for “T” and “O” stands and the “S”, “R” and “C” stand acreage concentrated in the middle age classes. The age class distributions for the lowland conifer SI groups are currently imbalanced and contain mostly middle and older aged stands. Because of the relatively small total acreage of these lowland conifer groups and the size of individual stands, it is not possible to fully balance these age class distributions over time but improvements can be made in the future. After the first two decades of accelerated harvest, a goal is to minimize large fluctuations in the overall harvest level to the extent possible.

Figure 3.2.a, for example, shows the current age class distribution of the aspen/balm of Gilead cover type “T” and “O” stands and the desired future forest composition (DFFC) or goal of an even age class distribution. The graph includes current conditions and goals for both cover type acres managed under normal rotation ages and extended rotation ages.

**Figure 3.2a. Comparison of current aspen/balm of Gilead “T” and “O” stands age class distribution to the desired age class distribution.**



The following strategies will be implemented to move even-aged managed cover types toward a balanced age class distribution.

### **GDS-2A - Strategies**

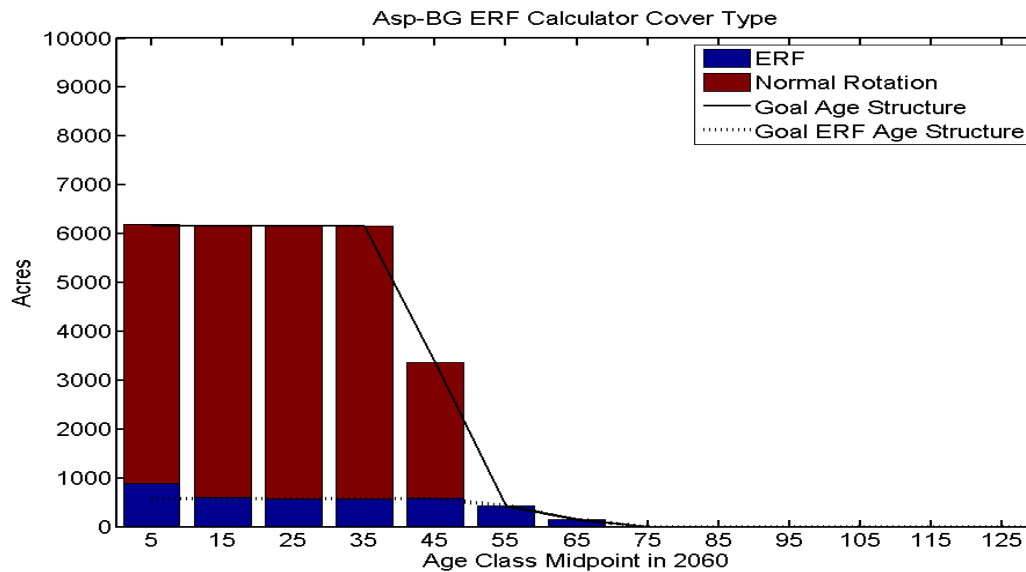
#### **a. Target the selection of stand treatment acres to the appropriate age classes.**

The Remsoft model was used to attempt to balance age classes by selecting stands from specific age classes based on criteria developed during the planning process, including normal rotation age, maximum rotation age, and ERF percentage. Achieving a balanced age class distribution for the lowland conifer SI groups was not possible for reasons mentioned above.

**GDS-2B: ERF stands in even-aged managed cover types will move towards a declining age class structure from the normal rotation age to the maximum rotation age.**

DNR guidance to AP SFRMP teams requires the development of a declining age class structure from normal rotation age to the determined maximum rotation age for each even-aged managed cover type. Figure 3.2b shows an example for the aspen/balm of Gilead cover type “T” and “O” stands DFFC for the AP Subsection.

**Figure 3.2b. Desired age class structure for the aspen/balm of Gilead cover type.**



The ERF goal for this cover type is to have 3 percent of the acres over NRA (effective ERF) with a declining age class distribution from NRA (45 years) out to the MRA (65 years). Figure 3.2b illustrates the tapering off of the age class distribution after age 40 because of the actual NRA being 45 (i.e., the mid-point of a ten-year age class). Achieving the desired declining age class structure requires harvest to occur between the NRA and the MRA.

ERF stands, when they are beyond the NRA (3 percent of the cover type acreage in this example), will provide old forest habitat, recreational opportunities of older forests, and opportunities for large-diameter timber product management.

The following strategies will be used to achieve the desired declining age class structure in even-aged managed cover types:

#### **GDS-2B - Strategies**

**a. Prescribe ERF stands within even-aged managed cover types so that each age class will be represented to produce a sustainable amount of old forest over time.**

Area field staff selected stands to designate as ERF to meet ERF goals. These selections were then reviewed and approved by the AP SFRMP team. Old forest conditions in even-aged managed cover types will be achieved by designating some stands in each of these cover types for ERF management. In addition to evenly distributing the designation of ERF stands among age classes, spatial considerations (e.g., patch management) will be used to develop and maintain desired old forest conditions. See GDS-1A.

**b. Target ERF treatment acres to the appropriate age classes to move toward the declining age class structure after normal rotation age.**

The Remsoft model provided for the achievement of old forest conditions by harvesting appropriate acreages from each age class of ERF over normal rotation age. The remaining un-harvested acres will contribute to old forest conditions until they reach the maximum rotation age.

**GDS-2C. NPCs will be managed to include representation of all historically occurring growth stages.**

Growth stages incorporate both horizontal and vertical developmental stages (stand structure changes over time) and successional stages (species composition changes over time) that occur after a disturbance. For example, in the Northwestern Wet Aspen Forest (WFw54) NPC, there are three growth stages (young, mature, and old).<sup>34</sup> In the past, growth stages developed through natural disturbances such as wind and fire. Now, growth stages additionally are emulated through forest and habitat management activities such as timber harvest, prescribed burns, shearing, and forest development activities.

These growth stages are very important to the wildlife species that inhabit these plant communities. Wildlife habitat and the species occurrence can vary with growth stage, for example, woodcock may use the early growth stage of WFw54 for feeding while the mature and old growth stages would likely be more important as white-tailed deer and elk winter cover. Forest songbird populations will change in WFw54 as the community matures, and will become more diverse as the structure becomes more complex with time.

The plan will not establish acreage goals for growth stages by ecosystem type or native plant community. The strategies in the plan will provide representation of all NPC growth stages. Stands can also be managed to maintain the existing growth stage or assist in moving the stand to the next older or youngest growth stage. Strategies for NPCs are listed below. In addition, the *NPC Field Guide*, and the ECS silvicultural interpretations can provide options for accomplishing these goals.

**GDS-2C. - Strategies**

**a. Determine growth stages of stands selected for treatment in the AP Subsection.**

Stands in this plan will be classified to NPC per DNR policy. Encourage the use of growth-stage information in developing stand management prescriptions.

**b. Strive to emulate the within-stand composition, structure, and function of NPC growth stages when managing stands.**

Focus on NPCs where enough information was available to describe growth stages.

**c. Consider the contribution of non-timber land cover types (e.g., stagnant conifer types), inoperable stands, and reserved areas (e.g., old growth, SNAs, state parks) in providing representations of growth stages.**

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<sup>34</sup> Minn. DNR, 2005, *Field Guide to Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass Aspen Parklands Province*. Ecological Land Classification Program, Minnesota County Biological Survey, Natural Heritage and Nongame Research Program. Minnesota Department of Natural Resources St. Paul, MN 55155.

- d. Designate representative sample areas (RSAs) and high conservation value forests (HCVFs) per DNR direction.
- e. Apply ECS silvicultural interpretations to management decisions.

**GDS-2D. Young, early-successional forest will be represented as it historically occurred.**

The 0-30 age group of aspen and balm of Gilead cover types represents young, early successional forest in the context of this GDS. The desired long-term cover type acres and balanced age class distribution for T, O, S, and R stands in these cover types will determine the amount of young forest planned to be sustained over time. Currently, these two cover types comprise 85,958 acres. Because of the goal to increase the acreage of grass and brush cover types in these Subsections, the long-term result of applying the plan strategies will be that these early successional cover types will comprise 69,731 acres. Currently, the 0-30 age group of aspen and balm of Gilead cover types comprise 50 percent of the total acres in these two cover types. When a balanced age class is achieved, and conversions have been accomplished, the 0-30 age group will comprise 78 percent of the total acres in these two cover types. See tables 3.2a-c, following:

**Table 3.2a. AP early-successional forest cover types – acres by decade.**

<b>AP Early-Successional Forest Cover type Acres</b>						
<b>Cover type</b>	<b>Current</b>	<b>1st Decade</b>	<b>2nd Decade</b>	<b>3rd Decade</b>	<b>4th Decade</b>	<b>5th Decade</b>
Aspen/BG	85,958	77,830	70,109	69,948	69,871	69,731

**Table 3.2b. AP acres of young forest in early-successional cover types by decade**

<b>AP Young Forest – Acres of Cover Type Under 30 Years Old</b>						
<b>Cover type</b>	<b>Current</b>	<b>1st Decade</b>	<b>2nd Decade</b>	<b>3rd Decade</b>	<b>4th Decade</b>	<b>5th Decade</b>
Aspen/BG - T&O	15,003	18,819	20,079	18,571	18,460	18,509
Aspen/BG - S	7,518	10,630	12,488	13,306	11,051	11,051
Aspen/BG - R	13,008	22,025	24,595	24,595	24,595	24,595
Aspen/BG - C	7,761	3,874	0	0	0	0
Total	43,290	55,348	57,162	56,472	54,106	54,155

**Table 3.2c. AP percent of young forest in early-successional cover types by decade.**

<b>AP Young Forest – Percentage of Cover Type Under 30 Years Old</b>						
<b>Cover type</b>	<b>Current</b>	<b>1st Decade</b>	<b>2nd Decade</b>	<b>3rd Decade</b>	<b>4th Decade</b>	<b>5th Decade</b>
Aspen/BG T&O	51%	65%	70%	65%	65%	65%
Aspen/BG - S	45%	64%	75%	80%	67%	67%
Aspen/BG - R	53%	90%	100%	100%	100%	100%
Aspen/BG - C	50%	51%	0%	0%	0%	0%
Total	50%	71%	82%	81%	78%	78%

Regulated harvest of aspen and balm of Gilead cover types will ensure that young, early-successional forest will be adequately represented over time. Stands retained in these cover types will be managed to move towards a more balanced age class structure than currently exists, which will provide a more consistent amount of young forest over time. Most of the harvest in these cover types will occur through clearcut methods. Harvest prescriptions and other habitat management treatments will attempt to mimic the wildfires and wind events that occurred naturally. Maintenance of existing large patches and creation of additional large patches in the future will be accomplished by grouping of harvest activities and using a variety of harvest sizes. For aspen and balm of Gilead the emphasis will be on maintaining an adequate amount of young age classes on the landscape through a regulated harvest level.

### **GDS-2D - Strategies**

- a. Move aspen and balm of Gilead cover types toward a balanced age class structure.**
- b. Maintain young, early successional forest in a variety of patch sizes to provide habitat for the associated species.**

A variety of harvest sizes will be used while maintaining existing large patches and creating opportunities for large patches in the future by grouping of harvest activities.

## **3.3 Within-Stand Composition and Structure**

**GDS-3A. Species, age, and structural diversity within stands will be representative of the native plant community and growth stage.**

Diverse stands are more resilient to perturbations than less diverse stands. A stand with a mix of species and ages provides habitat for a wider variety of associated species while providing a diversity of forest products. The net economic, social, and ecological values and functions of most stands are related to the composition of trees, shrubs, ground flora, and structural characteristics. Structural characteristics include the sizes (diameter and height), abundance and distribution of overstory trees understory vegetation, and their arrangement (scattered or clumped) within the stand. Structural characteristics also include the presence or absence of snags and coarse woody debris and how these features are distributed through space. Retaining large-diameter structures provide micro-sites for seed germination, cavities for nesting and den sites, and important escape and nesting cover within stands.

Some plant communities can naturally exhibit low species diversity. Low tree species diversity can be natural and has occurred historically in peatlands and in association with large-scale disturbances, particularly fire.

### **GDS-3A - Strategies**

- a. Use selective harvesting to encourage diversity of species, ages, and stand structures.**

See the cover type management recommendations in Chapter 4.



**b. Implement the *MFRC Site-Level Guidelines* designed to maintain a diversity of tree species within a stand.**

The *MFRC Site-Level Guidelines* provide direction on retaining leave trees and snags, conifer retention and regeneration and timber stand improvement (TSI) activities, among others.

**c. Use the *NPC Field Guide*<sup>35</sup>, site index (SI), soils data, and ECS silvicultural interpretations to aid in determining the species composition and structure most appropriate for the site.**

**d. Reserve seed trees in harvest areas and site preparation areas, where possible.**

Resistance to windthrow, insect and disease risks, and the quality, number, and distribution of seed trees must all be considered when selecting seed trees. This may be accomplished by:

1. Timber harvesting techniques and site preparation methods that expose mineral soil may be used on some sites to facilitate natural seeding; and,
2. Select seed trees that have the potential to survive to produce seeds.

**e. Use the least intensive site preparation methods possible to ensure success.**

Site preparation can create conditions favorable to invasive species and alter structural diversity in the ground layer. Striving to minimize site preparation intensity will minimize these threats.

**f. Use harvest systems or methods that protect advance regeneration. Retain conditions that favor regeneration and understory initiation.**

When it is desirable to protect the existing seedlings and saplings in a stand, timber sale regulations will specify outcomes to protect these regenerating trees. In some cases, portions of the stand will be delineated to protect regeneration by restricting harvest activity in those areas. To enhance seedling recruitment of some species, a partial canopy may be retained to meet needed moisture and light requirements of the seedlings.

**g. Identify some stands where succession is allowed to occur to encourage development of within-stand diversity. Movement to the next successional stage may be achieved with or without harvest.**

Use field evaluation of stands to determine if a stand should be allowed to succeed to the understory species. This strategy will meet some of the forest composition change goals. Consult the *NPC Field Guide* and ECS silvicultural interpretations for help in reaching these decisions.

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<sup>35</sup> Minn. DNR, 2005, *Field Guide to Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass Aspen Parklands Province*. Ecological Land Classification Program, Minnesota County Biological Survey, Natural Heritage and Nongame Research Program. Minnesota Department of Natural Resources St. Paul, MN 55155.

**h. Manage seeded stands to represent the array of plant diversity.**

Seeded stands will be managed to meet forest management and biodiversity goals. This may be accomplished by:

1. Accepting lower stocking levels of seeded species if other desirable species are present;
2. Planting or seeding mixed species appropriate to the site; and,
3. Use the least intensive site preparation necessary to successfully regenerate the site, while favoring retention of the existing ground-layer plant species.

**i. Use ERF in some even-aged managed stands to encourage greater structural diversity.****j. Encourage fruit and mast-producing species.**

Follow the *MFRC Site-Level Guidelines* for retaining and enhancing hard and soft mast (fruit) production.

### **3.4 Timber and Biomass Productivity**

**GDS-4A. Timber and biomass productivity will be increased**

Timber productivity refers specifically to the capacity of land to grow timber volumes, but the term also encompasses the quality of wood produced. DNR Forestry lands, a small portion of the lands in this Subsection, are required to be managed for multiple uses including timber but also wildlife habitat, recreational opportunities, watershed protection, aesthetic, historical and ecological values. However, 98% of the DNR land in this Subsection is managed by DNR Wildlife, which, by statute, must be managed primarily for wildlife habitat. Timber harvest can be part of the overall habitat management strategy on Wildlife lands but not a primary goal. Timber quality and productivity, therefore, would be a secondary benefit on Wildlife lands.

Increasing the timber productivity on State Forest lands is a way to maintain or increase current harvest volumes and improve timber quality, while continuing to manage most state lands in this Subsection with little emphasis on timber. Increases in timber productivity can be achieved during this 10-year plan by establishing new aspen management regimes based on age classes and focusing productivity efforts on those age classes most likely to produce timber products, reducing exposure to intense fire, increasing intermediate stand treatments, converting to site-appropriate species, and continuing to protect soil productivity by applying the *MFRC Site-Level Guidelines*.

## **GDS-4A - Strategies**

### **a. Manage the aspen cover type under five management regimes: Timber (T) (45 years and older), Short-Rotation (S) (age 20-44), Regeneration (R) (under age 20), as well as Other (O) and Conversion (C) (to be converted from aspen type to oak or other non-forest cover type)**

The aspen cover type was divided into management regimes, based on desired future conditions and conversion feasibility, to better meet wildlife habitat composition and structure needs as well as timber and biomass demands. Timber (T) and Short-Rotation (S) age classes will be managed primarily through harvest of timber or biomass products, while Regeneration (R) stands will be managed through biomass harvest or by non-consumptive treatments such as mowing, shearing or fire. Other (O) and Conversion (C) stands may offer an opportunity for harvest as part of the treatment leading to converting the stands to another cover type.

### **b. Minimize damage to forests from prescribed fires and wildfire.**

Wildfires and prescribed burning can damage the cambium which, if it doesn't kill the tree, leads to rot, char and reduced quality. Adjust boundaries of prescribed burn units to exclude large blocks of land managed as Timber (T) and Short-Rotation (S) stands. Work to reduce fire intensity so that negative impacts to forests are minimized and quality and marketability are maintained.

### **c. Harvest even-aged managed non-ERF stands at their normal rotation age**

Timber quality and quantity declines as older age classes lose merchantable volume to decay and mortality before harvest. This negatively impacts logging and forest products industries as the decrease in useable volumes results in higher stumpage rates for timber producers and higher procurement, chemical, and waste management costs for the forest products industries. Timber producers buy state timber in a competitive bidding process, which drives up base stumpage rates during times of decreasing timber availability. Forest products industries compete in a global market where the associated costs of using low-quality wood are an important factor in their ability to remain competitive.

Harvesting at normal rotation age captures volume at peak quality and growth rate, providing optimum value and productivity. However, deviations from the normal rotation age may be required to best move stands towards the desired balanced age class distribution.

### **d. Thin or selectively harvest in some birch, red pine, lowland hardwoods, ash, and oak stands to capture mortality and/or increase growth rates.**

These treatments may be prescribed for both normal rotation stands and ERF stands. Thinning in jack pine types may be considered on appropriate NPCs, with the intention of meeting specific SFRMP management objectives. The amount of thinning will depend on whether stands meets merchantability criteria based on a field examination, and whether there are markets for the timber or biomass products.

**e. Increase productivity of stands managed for timber through silvicultural treatments.**

Some forest types could benefit from application of silvicultural techniques designed to improve productivity. Dense stands can benefit from careful thinning to improve tree morphology and stand genetic characteristics. Thinning, whether pre-commercial or intermediate, will be consistent with the *MFRC Site-Level Guidelines* and will maintain adequate dead and down material for wildlife resources, protect riparian areas and preserve legacy patches.

Application of other silvicultural treatments designed to increase site productivity, such as release from competition, seeding, interplanting or site preparation, will be consistent with the *MFRC Site-Level Guidelines*.

Minimize the use of pesticides (e.g., herbicides and insecticides). When they must be used to control competing invasive vegetation or exotic forest insects and diseases on state lands, the following operational standards will be followed:

1. DNR Operational Order No. 59 - Pesticides and Pest Control;
2. Division of Forestry - Pesticide Use Guidelines;
3. Pesticide Labels;
4. Material Safety and Data Sheets for each pesticide and adjuvant being used or recommended; and,
5. *MFRC Site-Level Guidelines* relating to pesticide use

**f. Respond to insect and disease problems to reduce negative impacts to timber productivity and quality. Monitor infestations of invasive species and, if necessary, treat in accordance with DNR invasive species guidelines.**

**GDS-4B. Biomass productivity will be maintained or enhanced.**

Biomass fuel is an emerging market in Minnesota. Alternative energy sources are expected to grow statewide as energy production moves away from fossil fuels. Currently, biomass consumers are established only in some localized parts of northeast and east-central Minnesota. Biomass harvest in northwest Minnesota is limited to chipped or hogged logging and mill residues.

Open landscape vegetation such as prairie grasses, brush, and aspen suckers can be viable fuels for energy production, whether burned to produce steam for electricity or used for production of cellulosic ethanol. Open landscapes are commonly managed by mowing, burning or shearing, but some could be treated through biomass harvest. Dedicated biofuel harvesting equipment is still in the developmental stage.

Harvesting biomass at too frequent an interval can reduce site productivity by depleting soil nutrients and weakening plant vigor to the point where regeneration begins to decline. MFRC site level guidelines are in place for biomass harvesting on both forests and brushlands. These guidelines focus on how to protect the functions and values of resources during biomass harvesting activities. Implemented guidelines should minimize loss of site productivity.

## GDS-4B - Strategies

a. Treat some stands through biomass harvest, in accordance with MFRC site level guidelines for biomass harvest.

## 3.5 Harvest Levels

**GDS-5A. Treatment levels move cover types toward the desired age class structure.**

SFRMP treatment levels reflect the number of acres that will be divided into annual stand examination lists and field visited over the 10-year period. After field visits, treatments may include timber harvest or wildlife habitat projects, inventory alteration (i.e., correcting or updating forest inventory data), forest development without harvest, or deferring treatment (treat in a future planning period).

Treatment levels were developed for this plan by considering the other GDSs, and specifically the following factors:

1. Age class imbalances for even-aged managed cover types;
2. Acres over rotation age;
3. Representation of young and old forest;
4. Planned increases or decreases in cover type acreages through conversion;
5. Wildlife habitat goals;
6. Supply of timber; and,
7. Criteria for uneven-aged management and thinning

**Table 3.5a. Rotation ages for even-aged managed forest cover types.**

Cover Type	Cover Type Subgroup	Merchantable Age*	Normal Rotation Age <sup>36</sup>	Maximum Rotation Age*
Aspen/balm of Gilead	"T" stands	35	45	65
Aspen/balm of Gilead	"O" stands	35	45	65
Aspen/balm of Gilead	"S" stands	35	45	45
Aspen/balm of Gilead	"R" stands	31/5	45/20	45/20
Aspen/balm of Gilead	"C" stands	31/NA	45/NA	45/NA
Tamarack	SI = 40 & above	50	80	120
Tamarack	SI<40	70	100	160
Black Spruce Lowland	SI<40	80	100	160
Black Spruce Lowland	SI = 40 & above	70	90	120
Oak	NA	35	80	170
Jack Pine	NA	35	50	70
White Spruce	NA	30	70	100
Balsam Fir	NA	40	50	60
Birch	NA	35	45	55
Red Pine	NA	30	100	150

<sup>36</sup> Merchantable and rotation ages were established for the first decade of the plan's implementation (1<sup>st</sup> number) and for subsequent decades (2<sup>nd</sup> number) (if applicable).

## GDS-5A - Strategies

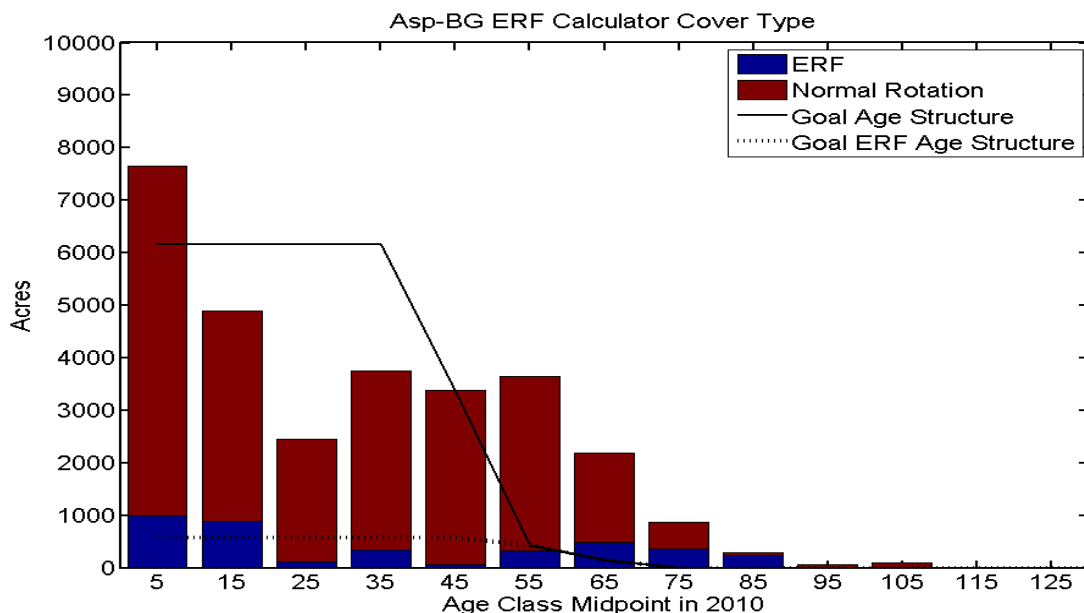
Following are descriptions and/or examples of how the above factors were considered.

### a. Even-aged cover types

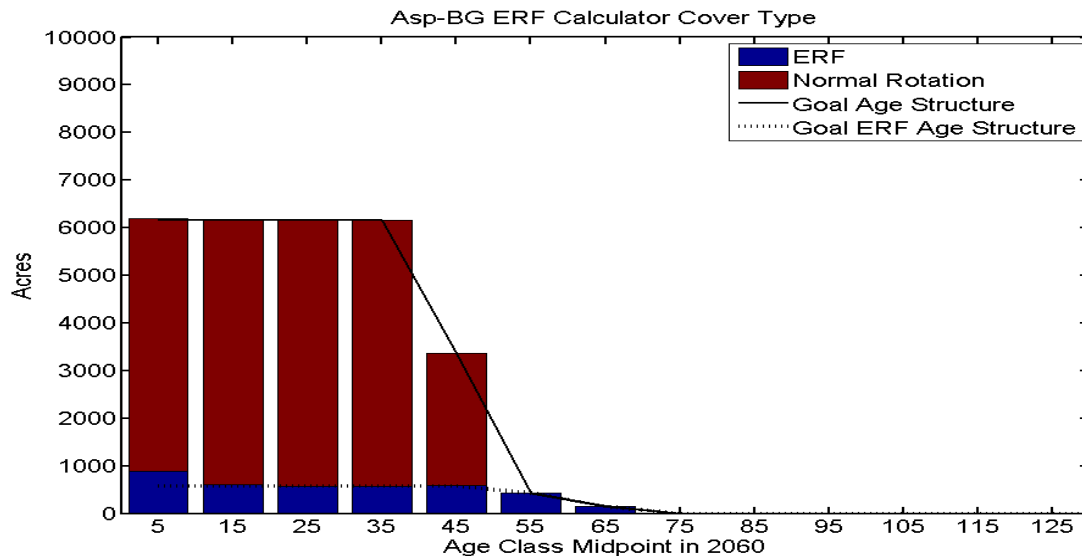
#### Age class imbalances

The long-term goal (DFFC) is to move toward a balanced age class distribution for modeled even-aged cover types with a declining distribution for the ERF designated stands in the lowland conifer groups and the aspen and balm of Gilead “T” and “O” stands. This goal was compared to the current age class distribution for all even-aged managed cover types. A Remsoft harvest-scheduling model was used to schedule harvest over the next 50 years for forest cover types with significant acreage managed under even-aged silvicultural systems. Treatment levels were developed to move the current age distributions closer to goals by the end of the 50-year planning period. At that time, most even-aged managed cover types will be closer to a balanced age class structure (see Figures 3.5a and 3.5b). Due to existing imbalances and the other considerations below, a balance will not always be achieved in 50 years.

**Figure 3.5a. Current age class distribution of the aspen/balm of Gilead cover type “T” & “O” stands in the AP Subsection.**



**Figure 3.5b. Estimated aspen/balm of Gilead cover type “T” and “O” stands age class distribution in 2060 in the AP Subsection.**



#### **Treating stands older than normal rotation age**

For SFRMP purposes, the *maximum rotation age* is the estimated maximum age at which a cover type will retain its biological ability to regenerate to the same cover type and remain commercially viable as a marketable timber sale. The Remsoft model, while generating the 10-year stand exam list, was allowed to select or skip stands that will reach or exceed maximum rotation age during 10-year planning period to optimize volume and generate even flow of timber over time. Table 3.5c focuses on acres of timber land over rotation age in the Subsection.

In most even-aged managed cover types, there are currently some acres beyond the normal and ERF rotation ages established by this plan. Several different ERF rotation ages were used for each cover type, as a way of achieving the desired declining age class distribution beyond the normal rotation age. Treatment levels were developed to address many of these acres in the next 10 years. This will effectively bring the average treatment age closer to the normal rotation age for the even-aged cover types. For some cover types in succeeding decades, the average treatment age increases as a result of holding stands longer to better balance the age class distribution over time. See Tables 3.5b and 3.5c.

**Table 3.5b. Acres over rotation age by cover type.**

Cover type	Rotation class	Planned rotation ages	Acres over planned rotation age**
Aspen/balm of Gilead	Normal	45	15,798
Aspen/balm of Gilead	ERF max*	65	3,091
Birch	Normal	45	88
Birch	ERF max*	55	11
Jack pine	Normal	50	36
Jack pine	ERF max*	70	16
White spruce	Normal	70	0
White Spruce	ERF max*	100	0
Balsam fir	Normal	50	72
Balsam fir	ERF max*	60	20
Tamarack – SI ≥40	Normal	80	519
Tamarack – SI ≥40	ERF max*	120	16
Tamarack – < 40	Normal	100	810
Tamarack – < 40	ERF max*	160	0
Black spruce, lowland – SI ≥40	Normal	90	0
Black spruce, lowland – SI ≥40	ERF max*	120	0
Black spruce, lowland – < 40	Normal	100	380
Black spruce, lowland – < 40	ERF max*	160	36

\* The oldest age that even-aged managed ERF stands can be held.

\*\* This table does not include acres currently under timber sale contract.

**Table 3.5c. Average stand treatment age for modeled even-aged managed cover types.**

Cover type	Average treatment age (years) by planning period (decade)				
	1	2	3	4	5
A/BG “T” & “O” stands (normal)	55	63	45	44	44
A/BG “T” & “O” stands (ERF)	70	87	70	56	55
A/BG “S” stands (normal)	47	53	49	35	45
A/BG “S” stands (ERF)	NA	NA	NA	NA	NA
A/BG “R” stands (normal)	42	24	20	20	20
A/BG “R” stands (ERF)	NA	NA	NA	NA	NA
A/BG “C” stands (normal)	43	33	NA	NA	NA
A/BG “C” stands (ERF)	NA	NA	NA	NA	NA
BSL; < 40 (normal)	145	168	141	117	112
BSL; < 40 (ERF)	0	0	0	148	150
BSL; SI ≥40 (normal)	0	70	83	75	85
BSL; SI ≥40 (ERF)	0	0	0	95	100
Tamarack; < 40 (normal)	140	136	143	137	110
Tamarack; SI ≥40 (ERF)	0	145	158	135	110



### Maintaining Old Forest

In most even-aged cover types, there are currently more acres of old forest than the amounts of effective ERF established in this plan (see GDS-1A). However, due to the age class imbalance, planning for desired amounts in the future was a part of treatment level considerations. In some cover types, the amount of prescribed ERF that is over normal rotation age (effective ERF) will not meet the established effective ERF goals (DFFC) in some future decades (see Table 3.5d). In these cases, holding non-ERF stands past the established normal rotation age ensures higher levels of old forest on the landscape, as well as helping to balance the age classes. Some cover types exceed the old forest desired future condition in the later decades because of the need to hold some stands past normal rotation age to move more quickly toward meeting the goal of balancing the age classes.

**Table 3.5d. Percent Old Forest per decade by cover type for even-aged systems.**

Cover type	Old Forest percent by planning period (decade)					
	1	2	3	4	5	6
A/BG "T" and "O" stands	30.2%	21.1%	9.1%	6.7%	7.8%	7.9%
BSL; < 40	32.8%	30.9%	33.4%	27.8%	41.7%	18.2%
BSL; SI ≥40	0	0	0	0	23.2%	16.0%
Tamarack; < 40	46.1%	46.0%	40.0%	24.7%	19.6%	9.1%
Tamarack; SI ≥40	26.0%	23.7%	26.1%	29.5%	9.6%	7.9%

### Maintaining young forest

Moving toward and eventually maintaining a balanced age class distribution in the aspen/balm of Gilead "T" stands, as well as maintaining the "R" and "S" stands in younger age classes, will ensure that young forest (0-30 years old) exists on the landscape over time (see GDS-2D for specific discussion about young, *early successional* forest). In most cover types, higher levels of young forest will occur after the initial decade, due to accelerated treatment.

### Planned increases/decreases in cover type acres

The first decade and long-term (50-year) desired future forest condition calls for decreases in the aspen/balm of Gilead cover types, primarily, due to conversions to non-forested cover types. Smaller decreases will also occur over time in the red pine and ash/lowland hardwoods cover types. Conversion treatments will be based on NPC site classifications, and will result in increases in the lowland brush, upland brush, lowland grass, upland grass, and oak cover types. Conversion treatments are not planned to occur proportionately throughout the 50-year period, because of considerations for habitat goals and stand age; rather, they will be concentrated in the first two decades. See Table 3.5e for cover type conversion goals for the AP Subsection.

**Table 3.5e. Cover type conversion goals for the AP SFRMP.**

Cover Type(s) / Group	2010 Acres	10-Year DFFC		50-Year DFFC	
		DFFC Acres	Percent acreage change	DFFC Acres	Percent acreage change
Grass/Brush	181,083	188,816	+4.3%	196,646	+8.6%
A/BG <sup>37</sup> (all categories)	85,958	77,825	-9.5%	69,726	-18.9%
Hybrid poplar	5	0	-100%	0	-100%
Ash/Lowland Hardwoods	3,101	3,101	maintain	2,801	-9.7%
Tamarack SI ≥40	1,996	1,996	maintain	1,996	maintain
Tamarack SI <40	1,758	1,758	maintain	1,758	maintain
Black Spruce Lowland SI <40	1,161	1,161	maintain	1,161	maintain
Black Spruce Lowland SI ≥40	536	536	maintain	536	maintain
Oak	967	1,367	+41.4%	1,716	+77.5%
Northern Hardwoods	233	233	maintain	233	maintain
Cedar	215	215	maintain	515	+139.5%
Jack Pine	166	166	maintain	166	maintain
White Spruce	148	148	maintain	148	maintain
Balsam Fir	98	98	maintain	98	maintain
Birch	94	94	maintain	94	maintain
Red Pine	80	80	maintain	0	-100%
White Pine	4	4	maintain	4	maintain
Totals	277,603	277,603		277,603	

### Supply of Timber

A Remsoft harvest-scheduling model was used to achieve a sustainable treatment level, taking into consideration any planned increases or decreases in each cover type over the next 50 years. While 10-year treatment levels will vary above or below the sustainable level until the age classes are balanced, adjustments were made in some decades to reduce these variations. The long-term goal is to provide a relatively stable supply of timber from state lands.

The following tables (Tables 3.5f-h) summarize treatment levels in acres by decade, applying all AP planning factors.

### b. Uneven-aged management and thinning

All uneven-aged and some even-aged managed cover types will be managed using selective harvest treatments. The uneven-aged managed cover types include ash/ lowland hardwoods, northern hardwoods, and white pine.

<sup>37</sup> Conversions were allocated to DNR Wildlife and Forestry administrative areas based on aspen/balm of Gilead "C" and "O" category acreages, adjusted with ecological information, cover type acreage DFFCs, and Remsoft model selections. For details see *Appendix F: Cover type Conversion Goal Process*.

Cover types that may be thinned include red pine, white pine, ash, and lowland hardwoods. All stands that meet thinning criteria will be field-visited for possible selective treatment. All ash stands will be visited in the first ten-year period, whether or not they meet the thinning criteria, but efforts will be concentrated on the higher site-index stands first, >SI 55, as per DNR ash management guidelines. See Chapter 4 for specific stand treatment recommendations.

**Table 3.5f. Treatment levels for even-aged managed cover types by decade for AP SFRMP.**

Cover Type(s) / Group	Total Acres	FY 2012-2021	FY 2022-2031	FY 2032-2041	FY 2042-2051	FY 2052-2061
A/BG "T" stands	30,925	6,264	6,153	6,153	6,153	6,202
A/BG "O" stands	715	366	111	161	77	0
A/BG "S" stands	20,675	5,939	3,684	3,684	3,684	3,684
A/BG "R" & "C" stands	80,783	23,484	20,403	12,298	12,298	12,300
Tamarack SI $\geq$ 40	1,649	172	237	237	729	274
Tamarack SI < 40	1,253	74	268	294	271	346
Black Spruce, Lowland SI < 40	834	40	103	152	213	326
Black Spruce, Lowland SI $\geq$ 40	374	0	50	30	244	50
<b>Total</b>	<b>137,208</b>	<b>36,339</b>	<b>31,009</b>	<b>23,009</b>	<b>23,669</b>	<b>23,182</b>

**Table 3.5g. Treatment levels for uneven-aged managed cover types for AP SFRMP.**

Cover Type	Previous Decade <sup>38</sup> Volume Harvested	2012-2021 (1 <sup>st</sup> decade of plan implementation) Treatment Acres
Ash/Lowland Hardwoods <sup>39</sup>	250 cords (~25 acres)	2,062
Northern Hardwoods	50 cords (~5 acres)	0
White Pine	0	0

**Table 3.5h. Thinning treatment levels for AP SFRMP.**

Cover Type	Previous Decade <sup>37</sup> Volume Harvested	2012-2021 (1 <sup>st</sup> decade of plan implementation) Treatment Acres
Red Pine	500 cords (~50 acres)	3
Oak	50 cords (~5 acres)	108
White Pine	0 cords (~0 acres)	4

<sup>38</sup> Previous harvest levels are an approximation from DNR Forestry administrative area annual stand examination lists from FY2001 to FY2008, based on legal descriptions roughly corresponding to subsection boundaries.

<sup>39</sup> All ash stands will be site-visited during the first decade of the planning period.

### **c. Biomass harvesting**

In the AP Subsection, biomass volume is available from three sources: tops and limbs from traditional harvests, whole tree biomass from “R” stands, and biomass harvests in non-timber types (e.g., brushlands). This is an emerging market in response to demand for alternative energy production, and Minnesota DNR policy is changing in response to this evolving market. Biomass harvesting, whether from forest lands or brushlands, will consider soil and nutrient concerns, NPC management recommendations, and will be conducted according to the MFRC Biomass Harvesting Guidelines.

- **Tops and limbs from traditional harvests**

Based on the harvest volume estimates for this 10-year plan, potentially 290,000 green tons of biomass could be available as tops and limbs from traditional timber harvests.

- **Whole tree biomass from “R” stands**

In the first decade, treatments in “R” stands will likely be traditional commercial harvests. Older “R” stands were targeted for treatment in the first decade to meet the current demand for stumpage, and also due to the current lack of demand for biomass in the Subsection. “R” stand treatments in future decades will occur at younger stand ages and treatments will gradually shift from traditional harvests to biomass harvests, if a market exists. In the second decade approximately 13,000 acres of “R” stands will be available for treatment with an average stand age between 20 and 30 years old. 12,800 acres of “R” stands will be available for treatment per decade for decades three through five with stand ages ranging from ten to twenty years old. The team estimates that the biomass volume available from “R” stands in future decades is 200,000 to 300,000 green tons per decade.

- **Biomass harvests in non-timber types**

Treatments will occur in non-timber types such upland and lowland grass and brush. Follow-up treatments of “C” stands may also include biomass harvests in the later stages (i.e. decades 2-5) of plan implementation. These stands are often treated by shearing, mowing and prescribed burning. Biomass harvest will be another option to treat these sites if markets are developed in the future. Establishing treatment levels for non-timber types is outside the scope of this plan so an estimate for biomass available from non-timber types will not be generated. (For additional details of biomass harvest potential, see the openland and brushland cover type write-ups contained in Chapter 4 of this draft plan.)

### **d. Stands Reserved or Deferred for Further Evaluation**

A total of 1,658 acres were identified by the AP SFRMP team to be reserved or deferred during the 10-year planning period as EILC. Stands designated as EILC, if they are released from the reserved or deferred status, will become available for active management after evaluations are completed. Evaluation procedures for EILC stands are being developed in a separate process as this plan goes to print (2011). Because these deferred acres were included in the cover type treatment level calculations, the proposed treatment levels recommended in this plan were not affected by the deferrals.

**Table 3.5i. Summary of AP deferred stands acres by cover type.**

<b>Lowland Conifer Type</b>	<b>State Forestland Acres</b>	<b>EILC Acres Designated</b>	<b>Percent of Cover Type Designated as EILC</b>
Tamarack	3,754	1,273	34%
Black Spruce Lowland	1,697	315	19%
Stagnant Spruce	842	0	0%
Cedar	215	71	33%
Stagnant Tamarack	45	0	0%
Stagnant Cedar	0	0	0%
Lowland Conifer Total	6,552	1,659	25%

**e. Acres comparison between the past plan and the recommended SFRMP treatment levels**

Past forest resource management plans were based on Division of Forestry area administrative boundaries while this SFRMP is based on ECS subsection boundaries. The proportion of each of the Forestry area's cover type acres, was used to calculate the estimated portion of past area plans' treatment acres by cover type in the Subsection. These estimates were used for comparing the past cover type acres treatment levels to those recommended in this SFRMP. Table 3.5g (above) provides a comparison between the past harvest levels for uneven-aged management by cover type and those recommended in this SFRMP (i.e. 2012-2021). Table 3.5j (below) provides a comparison between the past harvest levels for even-aged management by cover type and those recommended in this SFRMP.

**Table 3.5j. Projected AP even-aged treatment volumes compared with past harvest levels**

<b>Cover Types Even-aged</b>	<b>Proposed Treatment <sup>40</sup> (cords) FY 2012-2021</b>	<b>Past volumes <sup>41</sup> (cords) FY 2000-2009</b>
Aspen/BG	393,674	220,000
Tamarack (both site indexes)	3,254	600
Black Spruce Lowland (both site indexes)	3,973	200
Oak	22,312	100
Cedar	3,847	0
Jack Pine	1,476	2,250
White Spruce	6,126	500
Balsam Fir	30,149	450

<sup>40</sup> Volume estimates were generated via Remsoft modeling – all stands on the stand exam list are presumed to make a sale. Remsoft estimates volumes by extrapolating typical volumes generated for secondary species in stands using state-wide FIA data. The Aspen Parklands team believes that these volume estimates are high. The team believes that a significant number of stands will not be sold (based on past experience) due to the quality of timber in some stands and the distance to markets.

<sup>41</sup> Cords of timber sold in the Subsection over the past 10 years (actual sales).

Birch	22,928	400
Red Pine	2,025	200
Total	489,764	224,700

**f. Volume comparison between the past plan and the recommended SFRMP treatment levels.**

Minnesota DNR develops annual planned treatment levels on a cover type acreage basis. This SFRMP Estimate for harvest volumes (FY 2012-2021), provided in 3.5j, is an estimate produced by the Remsoft harvest-scheduling model, based on treatment acres, yield equations,<sup>42</sup> treatment method,<sup>43</sup> and cords per acre based on forest inventory data and preliminary prescriptions. Volume estimates were generated via Remsoft modeling. All stands on the stand exam list are presumed by Remsoft to make a sale. Remsoft estimates volumes by extrapolating typical volumes generated for secondary species in stands using state-wide FIA data. The AP Team believes that the secondary species composition does not reflect the species composition of the Subsection and their volume estimates are high. The team also believes that a significant number of stands will not be sold (based on past experience) due to the quality of timber in some stands and the distance to markets. Thus, the volume estimate is a rough estimate because not all treatment acres are suitable, or result in timber sales; the treatment method (prescription) may change after the field examination of the stand; and the forest inventory volume data (cords per acre) is typically not as accurate as the more intensive appraisals that are completed for timber sales. The previous decade volume given for comparison (FY 2000-2009) is based on actual average volume sold per year.

**GDS-5B. Harvest of non-timber products will be managed to maintain biodiversity and sustainability.**

Non-timber forest products, also known as special forest products, can be categorized into five general areas: decorative materials, foods, herbs, medicinal materials, and specialty items. Non-timber forest products include, but are not limited to: boughs, decorative trees (e.g., Christmas trees), spruce tops, birch tops, *Lycopodium spp.* (also referred to as princess pine or ground pine), diamond willow, bark, burls, conks, mushrooms, berries, Labrador tea, rose hips and blossoms, seedlings, cones, nuts, native plant seed, aromatic oils, and extractives.

The social importance, ecological role, and function of special forest products resources are only beginning to be understood. Improving our species-specific knowledge, as well as broadening forest inventories and developing appraisal methods for most types of non-timber forest products, will make determining sustainable harvest levels possible in the future. Currently, special product permits or informal timber sales are issued for some non-timber forest products (e.g., balsam boughs and decorative trees) to ensure that harvest operations do not damage the site's potential for future production. Harvest of non-timber forest products may be restricted on some state-administered lands such as WMAs, aquatic management areas (AMAs), and SNAs.

<sup>42</sup> Walters, David K. and Alan R. Ek. Whole Stand Yield and Density Equations for Fourteen Forest Types in Minnesota; Department of Forest Resources, University of Minnesota, 1530 North Cleveland Avenue, St. Paul, MN 55108.

<sup>43</sup> For all thinnable types, volume yield was assumed to be 10 cd/acre, and all uneven-aged systems used 33% of nominal Walters and Ek volumes.

The following strategies will be used to protect the long-term availability of these forest resources.

## GDS-5B Strategies

### a. Consider known traditional gathering areas when managing other forest resources.

For example, consider forest management effects on known areas such as those traditionally used for gathering maple syrup (sugarbush areas) or gathering wild rice (ricing camps) when planning forest management activities.

### b. Supervise and enforce special product permit regulations to ensure that the site's capacity for future production is not jeopardized.

Consider managing or using some forest stands for non-timber forest products, such as diamond willow, berry patches, or dogwood.

### c. Consider the known locations of important wildlife habitats, rare native plant communities or species, and the possible impacts of non-timber forest products harvest practices before issuing special product permits.

### d. Forest managers should proceed judiciously when issuing special products permits for species where limited knowledge and understanding constrains our ability to know if we are managing these groups of species sustainably (e.g., commercial harvest of mushrooms, *Lycopodium spp.*, and native plant seed).

## 3.6 Wildlife Habitat

### GDS-6A. Vegetation will be managed at multiple scales to provide habitat for nongame species.

Nongame<sup>44</sup> species are an important biological health indicator for prairie, brushland, forest, and wetland communities and are important to society for their inherent values. Legal statutes, public expectations and desires of interest groups, and DNR internal policies require the consideration of nongame species in the management of state-administered lands. One objective of the DNR strategic plan Directions 2000 (Minnesota DNR 2000) calls for “healthy self-sustaining populations of all native and desirable introduced plant, fish, and wildlife species, especially those species listed as threatened or endangered.”

The Subsection is important to the tourism industry in Minnesota<sup>45, 46</sup>. Many tourists appreciate and seek out opportunities to observe nongame species during trips to this area. They have a chance to see a number of species that are rare elsewhere, such as the gray wolf, Franklin's gull, marbled godwit, and snowy owl.

<sup>44</sup> In this plan, *nongame species* include amphibian, reptile, mammal, and bird species that are not hunted or trapped.

<sup>45</sup> U.S. Fish and Wildlife Service. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. *National Overview*. Issued May 2007.

<sup>46</sup> U.S. Fish and Wildlife Service. Wildlife Watching in the U.S.: The Economic Impacts on National and State Economies in 2006. Addendum to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation Report.2006-1.



There are hundreds of nongame wildlife species known or predicted to occur within this Subsection<sup>47</sup>. Each species has different habitat requirements, some of which conflict. Individual consideration of management needs for each species is therefore impossible to accomplish with a single approach across the planning area<sup>48</sup>.

Several management techniques will be considered to ensure that the Subsection is managed to maintain and enhance the habitat of nongame species.

A *coarse filter* approach (Hunter, 1990<sup>49</sup>) emphasizes management of forests from a local to landscape scale to maintain the integrity of ecosystem processes; to maintain components of the range of historic habitats and age classes; and to retain or enhance structural attributes within habitats. In using a coarse filter approach, it assumes that a broad range of habitats encompassing the needs of most species will be met, and their populations will remain viable on the landscape. Habitat analysis and management emphasis in this plan were primarily done at this level.

A *fine filter* approach considers the specific habitat needs of selected individual species that may not be met by the broader coarse filter approach. Providing habitat at this level will be guided primarily by department policies and guidelines that provide recommendations for habitat management at this finer level for a number of species, such as state or federal listed species (e.g., bald eagle).

A *meso filter* focuses on conservation of critical ecosystem elements such as structures (logs, snags, pools, springs, streams, reefs, and hedgerows) and processes (fire, flooding) that would be missed by a coarse or fine filter.

An example of how these three scales work would be that a meso filter would focus on coarse woody debris (CWD), the processes that created the CWD, and the features it provides to associated biodiversity; a coarse filter would focus on the ecosystem in which the CWD exists; and a fine filter would focus on a species that may use the CWD.<sup>50</sup>

## **GDS-6A - Strategies**

### **a. Provide old forest within forest management areas and riparian corridors.**

Old forest includes stands that are beyond the normal rotation age established for the cover type. Several nongame species within the Subsection are associated with old forest and old forest conditions such as large-diameter trees and/or uneven-aged successional stages. Examples of species are great gray owl, hairy woodpecker, and northern flying squirrel. Designation and maintenance of areas to be managed for old forest conditions across the landscape over time will ensure available habitat for many of these species. Extended

<sup>47</sup> Minnesota DNR. 2009. *AP Subsection Preliminary Issues and Assessment*. Pp 7.3-7.11.

<sup>48</sup> Minnesota Department of Natural Resources, 2006. *Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife*, Comprehensive Wildlife Conservation Strategy. Division of Ecological Services, Minnesota Department of Natural Resources.

<sup>49</sup> Hunter, M.L. 1990. *Wildlife, Forests, and Forestry: Principles of Managing Forests for Biodiversity*. Prentice-Hall Inc., Englewood Cliffs, N.J.

<sup>50</sup> Hunter, Malcolm L. Jr. A Mesofilter Conservation Strategy to Complement Fine and Coarse Filters. *Cons. Bio.* Vol.19, No. 4. August 2005.

rotation forests, Ecological Important Lowland Conifers, and designated old-growth forest are examples.

**b. Provide young forest distributed across the landscape.**

Young forest in this plan refers to stands that are 0-30 years old. Numerous nongame species within the Subsection are associated with young forest or young forest condition such as seedling and/or sapling successional stages. Examples of species are golden-winged warbler, red-tailed hawk, and gray wolf. Areas managed for young forest conditions will provide early successional habitat across the subsection.

**c. Provide native prairie distributed across the landscape.**

Many nongame species (bobolink, meadow lark, short-eared owl) are associated with and often completely dependent upon native and restored grasslands. Restoration to native prairie (considering site specific NPC evaluations) will ensure that this important habitat is available. Conversion and restoration efforts should focus on creating connecting corridors of native prairie habitats, since existing prairie parcels are often fragmented.

**d. Provide brushland habitat across the landscape.**

Brushlands (upland and lowland) are an important habitat for many nongame species associated with open landscapes. Chestnut-side warbler, golden-winged warbler, alder flycatcher and other species depend upon brushlands for reproduction and brood rearing. Mechanical harvest/regeneration and prescribed fire should be used to help maintain brushlands with diverse stand ages.

**e. Provide a variety of patch sizes across the landscape that better reflect patterns produced by natural disturbances, and attempt to maintain existing large patches.**

Providing a variety of patch sizes that better reflect the patterns created by natural disturbance factors and efforts to reduce the effects of habitat fragmentation will help provide habitat for nongame species with different patch size requirements.

**f. Manage to retain the integrity of riparian areas and provide protection for seasonal and permanent wetlands.**

Many nongame species are associated with forested wetlands or the riparian forest interface. These areas also serve as movement corridors. Consideration for the health and integrity of riparian areas and protection or mitigation of other wetlands will serve to provide such needs.

- Apply the *MFRC Site-Level Guidelines* relating to riparian areas and seasonal and permanent wetlands.

**g. Provide for the needs of species that depend on perches, cavity trees, bark foraging sites, and downed-woody debris.**

A number of species rely on tree perches, existing tree cavities or available trees that can be excavated to provide a cavity, insect foraging sites on dead or dying trees, or downed

trees or slash for roosting, nesting, or cover. Historically, natural processes provided these habitat needs. Today, the frequency and size of these processes have declined.

- Use the *MFRC Site-Level Guidelines* relating to leave trees, snags, and coarse woody debris to provide these important habitat features.

**h. Provide for the needs of species associated with conifer stands and mixed conifer/hardwood stands.**

A number of nongame species found within the Subsection have some association or dependence on coniferous trees, whether within conifer-dominated stands or in various mixes of conifer/hardwood stands<sup>51</sup> (see *Appendix K: Wildlife Species List/Habitat Relationships for the Aspen Parklands Subsection*). Several conifer species (white spruce, black spruce, and tamarack) have declined from historic levels in the Subsection.<sup>52</sup> The following strategies will be used to meet coniferous habitat needs:

1. Increase northern white cedar through active management in appropriate NPCs;
2. Maintain the presence of some conifers as a component of other cover types;
3. Follow the conifer retention guidelines found in the *MFRC Site-Level Guidelines*;
4. Apply the Cover type Management Recommendations (Chapter 4).

**i. Provide for creation and maintenance of within-stand diversity.**

Managing for a mix of tree species and ages along with a diversity of structural characteristics (e.g., tree diameter, tree height, and scattered or clumped distribution) in some stands will provide conditions for species that require within-stand diversity.

**j. Manage to favor native plant communities and retain elements of biodiversity significance.**

Habitat for nongame species associated with highly diverse native plant communities will be provided by the following strategies:

1. Identify and manage high-quality and/or rare native plant communities so they are maintained or enhanced.
2. Use the *NPC Field Guide* and associated ECS silvicultural interpretations to manage some stands to reflect the composition, structure, and function of native plant communities and natural disturbance processes.
3. Maintain or increase biodiversity, where ecologically appropriate, within areas of statewide biodiversity significance.

**k. Consider Natural Heritage Program data and other rare species information during development of both the 10-year and annual stand examination lists.**

Natural Heritage Program data will be available and considered during the 10-year and annual stand examination selection process. Before groundwork begins, field staff will check the database for known locations of rare nongame species in stands planned for

<sup>51</sup> Green, J.C. 1995. *Birds and Forests: A Management and Conservation Guide*. Minnesota Department of Natural Resources.

<sup>52</sup> Minnesota DNR. 2009. *AP Subsection SFRMP Preliminary Issues and Assessment*, Table 3.4.

treatment and, if present, will seek advice from appropriate staff or refer to established guidelines or considerations on avoiding negative impacts to these species.

**I. Apply the DNR management recommendations for habitats of nongame species (e.g., gray wolves, bald eagles, marbled godwit) as described in DNR guidelines and policies.<sup>53</sup>**

Follow recommendations in the *Forestry Wildlife Habitat Management Guidelines*<sup>54</sup> manual and apply considerations provided in Ecological and Water Resources Rare Species Fact Sheets.

**GDS-6B. Vegetation will be managed at multiple scales to provide habitat for game species.**

Game<sup>55</sup> species are an important indicator of biological health and are important to society for their recreational, economic, and inherent values. Legal statutes, public expectations, the desires of interest groups, and DNR internal policies require the consideration of game species in the management of state-administered lands. The DNR strategic plan, *Directions 2000*, states that an “objective is healthy, self-sustaining populations of all native and desirable introduced plant, fish, and wildlife species”; and for “populations of fish, wildlife and plant species to sustain recreational opportunities.”<sup>56</sup>

Public lands in the Subsection draw many hunters and trappers to the area each fall. White-tailed deer, waterfowl, black bear, and sharp-tailed and ruffed grouse hunting traditions are long-standing and important to local economies. Trappers target thriving populations of fisher, beaver, bobcat and mink.

The Subsection is important to the tourism industry in Minnesota. Many tourists appreciate and seek out opportunities to observe white-tailed deer, elk, black bear, waterfowl, sharp-tailed grouse, sandhill cranes, and prairie chickens during their trips to this area.

Ecologically, there have been historic and more recent changes to the Subsection that have affected game species and their habitat:

1. Changes in the abundance of trees, age structure of the forest, and structural and species diversity;
2. Changes in native plant communities (e.g. invasion of aggressive native and non-native species, drainage, etc.);
3. Loss of larger patches and connections between such patches;
4. Increased habitat fragmentation from agriculture, roads, trails, and development; and
5. Alteration of historic fire disturbance events.

Many game species are known or predicted to occur within the Subsection and each has different habitat requirements, some of which conflict. Individual consideration of management needs for each species is therefore impossible to accomplish with a single approach across the planning area. To ensure that the Subsection is managed to maintain

<sup>53</sup> Minnesota DNR. 2009. *AP Subsection SFRMP Preliminary Issues and Assessment*, Table 7.2, pgs. 7.11-7.13.

<sup>54</sup> Minnesota DNR. 1985. *Forestry-Wildlife Guidelines to Habitat Management*.

<sup>55</sup> In this plan, *game* species include those terrestrial species that are hunted and trapped.

<sup>56</sup> Minnesota DNR. 2000. *Directions 2000: The Strategic Plan*. St. Paul, MN.

and enhance the habitat of game species, a number of management techniques will be considered using both a coarse and fine filter approach.

## **GDS-6B - Strategies**

### **a. Provide young forest distributed across the landscape.**

Young forest in this plan refers to stands that are 0-30 years old. Many game species within the Subsection are associated with young forest or young forest conditions such as seedling and/or sapling successional stages (see *Appendix K: Wildlife Species List/Habitat Relationships for the Aspen Parklands Subsection*). Some examples of these species are white-tailed deer, black bear, snowshoe hare, ruffed grouse, and woodcock. Areas managed for young forest conditions will provide a distribution of young forest habitat across the Subsection.

### **b. Provide old forest distributed across the landscape.**

Old forest includes stands that are beyond the normal rotation age established for the cover type. Several game species within the Subsection are associated with old forest and old forest conditions (i.e., large-diameter trees, snags and multiple age classes) (see *Appendix K: Wildlife Species List/Habitat Relationships for the Aspen Parklands Subsection*). Examples of these species include fisher, wood duck, hooded merganser, and white-tailed deer. Designation and maintenance of areas to be managed for old forest conditions across the landscape over time will ensure available habitat for these species. Designated old-growth forest, EILC, and ERF stands are examples of strategies that provide old forest values across the landscape.

### **c. Provide native prairie distributed across the landscape.**

Many game species (prairie chicken, mallard, sharp-tailed grouse) are associated with native and restored grasslands. Restoration to native prairie (considering site specific NPC evaluations) will ensure that this important habitat is available. Conversion and restoration efforts should focus on creating connecting corridors of native prairie habitats, since existing prairie parcels are often fragmented.

### **d. Provide brushland habitat across the landscape.**

Brushlands (upland and lowland) are an important habitat for many game species associated with open landscapes. White-tailed deer, elk, sharp-tailed grouse, woodcock and other species depend upon brushlands for reproduction, cover, and foraging areas. Mechanical harvest/regeneration and prescribed fire should be used to help maintain brushlands with diverse stand ages.

The AP team utilized DNR's Brushland Assessment document<sup>57</sup> and review by field staff to identify and approve the following priority open landscape LTAs within the planning area:

- |                                |                                   |
|--------------------------------|-----------------------------------|
| 1. Beach Ridges;               | 11. New Folden Lake Plain;        |
| 2. Strandquist Lake Plain;     | 12. Thief River Falls Lake Plain; |
| 3. Goodridge Lake Plain;       | 13. Mud Lake Plain;               |
| 4. Blooming Valley Lake Plain; | 14. Bronson Lake Plain;           |
| 5. Landcaster Lake Plain;      | 15. Berner Lake Plain;            |
| 6. Fourtown Peatlands;         | 16. Ross Peatlands;               |
| 7. Roseau Lake Plain;          | 17. Gentilly Lake Plain;          |
| 8. Roseau River Lake Plain;    | 18. Brooks Lake Plain;            |
| 9. Dohrman Ridge;              | 19. Thief Lake Peatlands; and,    |
| 10. Duxby Lake Plain.          |                                   |

**e. Provide a balanced age class structure in cover types managed with even-aged silvicultural systems.**

A balanced age class structure leads to relatively equal acreages in each age class out to the normal rotation age. To provide an even flow of early successional forest habitat over time, it is necessary to avoid large fluctuations in harvest levels within the aspen and balsam of Gilead cover types. Future sustainability of game species habitat will be enhanced by addressing current age class imbalances to move toward a future balanced age class structure.

**f. Provide for the needs of species associated with conifer stands and mixed conifer/ hardwood stands.**

Although conifer abundance in the Subsection is naturally low, a number of game species found within the Subsection have some association with coniferous trees for food and/or cover needs (see *Appendix K: Wildlife Species List/Habitat Relationships for the Aspen Parklands Subsection*). Several conifer species (white spruce, black spruce, and tamarack) have declined from historic levels in the Subsection.

**g. Provide for creation and maintenance of within-stand diversity.**

Managing for a mix of tree species and ages along with a diversity of structural characteristics (e.g., tree diameter, tree height, and scattered or clumped distribution) in some stands will provide conditions for species that require within-stand diversity.

**h. Continue to manage special management areas for the benefit of game species.**

Most management benefiting game species in the Subsection will occur as a result of decisions designed to meet multiple objectives, the application of which will move across the landscape over time (coarse filter). In some cases, areas have been and will continue to be selected with the intent of maintaining the areas over time to provide specific game species benefits (fine filter). Following are examples of areas selected for specific game species management:

<sup>57</sup> *An Assessment of Open Landscapes for the Management of Brushland Wildlife Habitat in Northern and Central Minnesota* (MDNR Wildlife Resource Assessment Report 1, 2002).

1. Manage priority open landscape areas (OLAs) for the benefit of wildlife species (e.g., sharp-tailed grouse, prairie chicken, sandhill crane):
  - Utilize available information and review by field staff to identify and approve open landscape projects within designated OLAs in the planning area;
  - Coordinate across Divisions on management prescriptions for selected stands within OLAs in a manner that enhances open landscape habitat conditions (e.g., create larger blocks of even-aged cover types managed with a clearcut prescription, minimize snag and leave tree presence in the interior of harvest blocks, discourage conifer planting);
  - Coordinate across Divisions on management projects designed to enhance open landscape conditions in OLAs (e.g., prescribed burns, shearing, or mowing of brush).

### 3.7 Riparian and Aquatic Areas

#### GDS-7A. Vegetation management will protect or enhance riparian areas

Riparian areas encompass the transition zone between the terrestrial and aquatic habitats that occur along lakes, streams, and open-water wetlands. A *riparian management zone* (RMZ) is that portion of the riparian area where site conditions and landowner objectives are used to determine management activities that address riparian resource needs. Riparian areas are among the most diverse parts of an ecosystem. The management of riparian areas can influence water quality, water temperature, erosion rates, and deposition of woody debris in lakes and streams and the overall diversity of wildlife and plant species found in the watershed. Riparian areas provide corridors and connecting links of habitat for plant and wildlife species. Well-managed riparian areas are critical to protect, maintain, or enhance aquatic and wildlife habitats, aesthetics, recreation, water quality, and forest products.

This Subsection sits on the prairie-forest border. The habitat in this transition zone includes forested land, brushland and openland. Vegetation managed and retained in riparian areas will be appropriate for the native plant community identified, which may include a range of forest and non-forest types of various age classes within and adjacent to these riparian areas.

#### GDS-7A - Strategies

##### a. Apply the *MFRC Site-Level Guidelines* relating to riparian areas as appropriate for the habitat type.

Some examples from the guidelines are:

1. Manage for longer-lived, uneven-aged, mixed-species stands within the RMZ to provide:
  - a. Shade and moderated microclimate
  - b. Coarse woody debris
  - c. Microhabitat diversity



- d. Resiliency to natural catastrophes
- e. Bank stability
- f. Nutrient cycling and carbon and nutrient input;
- 2. Avoid creating large cleared areas within the RMZ;
- 3. Maintain a filter strip between the water body and harvest area;
- 4. Approach water crossings at or near right angles to the stream direction, and use measures to minimize streambank disturbances; and,
- 5. Manage for longer lived conifers.

DNR personnel check the application of riparian guidelines as a part of timber sales supervision and inspections. Also, MFRC site-level monitoring will periodically sample sites in this Subsection as part of the monitoring program at the statewide level. The objective of this statewide monitoring program is to evaluate the implementation of the *MFRC Site-Level Guidelines* through field visits to randomly selected, recently managed sites distributed across the various land ownerships (state, county, national forest, tribal, forest industry, non-industrial private lands, etc.) in the state.

**b. Manage to maintain or increase old forest in riparian areas where appropriate as indicated by *NPC Field Guide* and historical data.**

Old forests provide the best source of woody debris in aquatic systems and habitat for a wide variety of wildlife species. Longer rotation age reduces the frequency of future harvest activities and may provide opportunities for a wider variety of forest products. Old forest management complexes and EILC stands in riparian areas will be managed to maintain or increase old forest conditions.

**c. Using the *NPC Field Guide* and associated ECS silvicultural interpretations, manage for species and habitat types appropriate for the site.**

**d. Follow recommendations in *Tomorrow's Habitat for the Wild and Rare*.**

This document identifies Species in Greatest Conservation Need and associated Key Habitats.

**GDS-7B. Vegetation management will protect or enhance wetlands.**

Wetland areas include lowland forested areas (such as black ash, black spruce, tamarack, and white cedar cover types), lowland brush and lowland grass cover types, and seasonal ponds. These areas are protected using different site-level forest management guidelines than those required for riparian areas adjacent to lakes, streams, and rivers or permanent open water ponds.

**GDS-7B - Strategies**

**a. Apply the *MFRC Site-Level Guidelines*.**

Some examples of recommendations from the guidelines are:

- 1. Maintain filter strips;

2. Avoid disturbances such as ruts, soil compaction, excessive disturbance to litter layer, and addition of fill;
3. Use timber sale planning and administration to ensure that skidding and other equipment operations in upland stands take place outside of small non-open water wetlands and seasonal ponds. Meet with permittee/operator on site before the start of the permit activities to review details of the wetlands and protection measures within the sale area, and periodically visit the site during the harvest operation; and,
4. Leave-tree guidelines recommend selecting leave trees in clumps, islands, or strips centered around or that coincide with small non-open water wetlands and seasonal ponds.

DNR personnel will check the application of wetlands and seasonal pond guidelines as a part of their timber sales supervision and inspections.

- b. Areas will consider landforms and topography in their work areas that have seasonal ponds and small open-water wetlands, and address those features in site-specific prescriptions that are developed during the stand examination field visit.**

Identification of landforms and topographic features important for vernal pools, or seasonal wetlands, will help in their identification year-round.

For a discussion of key habitats and species in greatest conservation need, go to GDS-1B.

### **3.8 Pests, Pathogens, Exotic Species, and Climate Change**

#### **GDS-8A. Limit damage to native plant communities from insects, disease and invasive species to acceptable levels where feasible.**

Native insects and disease organisms are usually well-balanced with their respective hosts. While a few hosts may die while the insect and disease populations are sustained, the populations co-exist. Insects and diseases can influence ecosystem dynamics, promote diversity of species and generate elements of community structure that are important as habitat and in nutrient cycling, such as snags and coarse woody debris.

Epidemic populations of insect pests, however, can cause high levels of mortality and can have significant ecological and economic consequences. There will not be an attempt to eliminate native insects and diseases or their processes from the landscape, but rather to limit impacts on individual sites to an acceptable level that allows goals for wildlife habitat, timber production, biodiversity, water quality, aesthetics and recreation to be realized.

Natural resource managers are concerned about the introduction and establishment of exotic and invasive insect, disease, and plant species. Invasion of ecosystems by exotic species can cause significant economic losses and expenditures for control because they destroy or displace native plants and animals, degrade native species habitat, reduce productivity, pollute native gene pools, and disrupt ecosystem processes (e.g., hydrological patterns, soil chemistry, moisture-holding capability, susceptibility to erosion, and fire regimes). Examples of exotics with known adverse effects on Minnesota natural resources include: Dutch elm disease, gypsy moth, European buckthorn, and the emerald ash borer.

The emerald ash borer is expected to eventually cause mortality of almost all black and green ash, deforesting many wet forest sites. It will likely take several decades to infest the 950 million ash trees that are currently growing in Minnesota but will cause significant long term changes in this plant community.

There is potential for significant adverse impacts from other species already present in the Subsection, such as spotted knapweed, common tansy and leafy spurge. Resource managers will seek to limit the introduction and impacts of new invasive species, and minimize the impact of control measures on vulnerable native species.

Climate change effects may impact long term management of some ecological communities and foster spread of some insects, diseases and invasive species.

### **GDS-8A - Strategies**

#### **a. Identify and monitor harmful insect, disease, and exotic species populations as part of the Forest Health Monitoring Program, and document their occurrence on state-managed lands.**

Monitoring known insect and disease pests, conditions conducive to outbreaks, and populations of harmful exotic plants can provide useful information for predicting potential outbreaks and documenting and predicting range expansion. Early identification and risk assessment of new exotic species introductions improve potential to develop and implement appropriate responses. Involve private landowners and local units of government in gathering and disseminating information to help determine when and where preventive measures to limit impacts or control action must be taken.

Mutually established protocols for data collection and information sharing among federal (U.S. Environmental Protection Agency, U.S. Department of Agriculture) and state agencies improve capacity to respond to the spread of established exotic species into new areas, new species introductions, and outbreaks of established pests and diseases.

#### **b. Follow Minnesota Department of Natural Resources Operational Order 113 (Invasive Species) to minimize the spread of invasive exotic species during resource management activities.**

Resource management activities have significant potential as an avenue for unintentional introductions of exotic plants, especially in less developed portions of the Subsection. Examples include road maintenance or construction, shearing, or timber harvest. Each DNR Division has developed guidelines to minimize the spread of invasive species. Establishing and promoting practices that minimize these introductions will slow the spread of harmful exotics and reduce associated losses.

#### **c. Manage insect, disease and invasive species problems, as appropriate.**

Information gathered and provided by the agencies mentioned above is used as a basis for decisions regarding where and when insect, disease, and invasive species problems require action involving vegetation management. Intervention plans will be developed collaboratively *before* pest outbreaks (e.g., the strategic plan for the cooperative management of gypsy moth in Minnesota involving Minnesota DNR, Minnesota Department of Agriculture, USDA-APHIS, and USDA-FS). These plans detail appropriate integrated pest

management strategies, circumstances under which strategies can be appropriately and effectively used, responsibilities, and cost-sharing arrangements. Containment and eradication measures will seek to minimize impacts from these species, while also minimizing the impact of control measures on vulnerable native species.

If pesticides are needed to control insects, diseases, and invasive species on state lands, the following operational standards will be used:

1. DNR Operational Order No. 59 - Pesticides and Pest Control;
2. DNR Operational Order No. 113 – Invasive Species and DNR Divisional Invasive Species Guidelines Divisions of Forestry and Fish and Wildlife - Pesticide Use Guidelines;
3. Pesticide Labels - Refer to Material Safety and Data Sheets for each pesticide and adjuvant being used or recommended; and,
4. *MFRC Site-Level Guidelines* relating to pesticide use.

**d. Manage stands to reduce the potential impact of insects, diseases and invasive species.**

1. Emphasize the use of non-pesticide treatments, such as residual treatments or fire in management for prevention of insect, disease, and invasive species outbreaks;
2. Develop management plans and stand treatment prescriptions using recognized insect, disease, and invasive species management sources, while considering ecological processes and impacts to native species; and,
3. Provide information and training to equipment operators regarding techniques that minimize damage to leave trees or other residual areas.

**e. In ERF stands, a higher level of impact from native insect and disease infestations may be accepted as long as it does not jeopardize the ability to regenerate the stand to the desired cover type or the management goals of the surrounding stands.**

ERF will enhance old forest conditions within this Subsection. As a general rule, as stands are allowed to age, the incidence and impact of stem decay and root rot increase. However, retaining the potential to regenerate the stand will be a primary objective, except in stands where conversion to another type is planned.

**GDS-8B. Minimize the negative impacts caused by wildlife on forest communities.**

Wildlife species such as deer, hare, porcupine, beaver, and other rodents impact forests and plant regeneration through browsing, stem damage, and girdling. Solutions require an understanding of the dynamics of herbivory, seasonal wildlife movements, population structure, population control tools and their effectiveness, and proven repellents or exclusion methods. Keys to success include coordination between department staff, adequate funding, and sharing information regarding successful exclusion or abatement methods. The management strategies below attempt to minimize adverse impacts.

**GDS-8B - Strategies****a. Improve field staff knowledge about the complexity of factors that affect solutions to preventing or reducing resource damage caused by wildlife. Do this through training and/or field level coordination on sites where problems exist.**

1. Conduct training sessions addressing the factors that affect damage, potential solutions, and prevention based on research and experience;
2. Coordinate field visits at problem sites with DNR Area Wildlife staff and the appropriate land manager;
3. Collect information from damaged sites for database entry and analysis of wildlife damage; and,
4. Use the expertise of the DNR – Section of Wildlife's Depredation Program and research units when regeneration plans call for use of repellents or exclusion techniques.

**b. Consider the potential for wildlife impacts to planted or natural regenerating trees before damage occurs. Coordinate on preventative strategies before planting or timber sales begin.**

Work with DNR Area Wildlife staff to identify sites where significant damage may occur before forest management activities occur. Where necessary, incorporate plans for post-sale damage mitigation into forest regeneration and development plans.

**c. Focus forest regeneration efforts in areas less likely to be negatively impacted by wildlife species.**

1. Consider regeneration through seeding rather than planting nursery-grown seedlings;
2. Avoid unprotected plantings of susceptible species near known seasonal deer concentration areas; and,
3. In mixed species plantations, scatter susceptible species amongst less susceptible ones.

**d. On sites where damage from wildlife species is anticipated, use mitigation techniques to reduce damage when planting susceptible tree species.**

1. Consider regeneration through seeding rather than planting nursery-grown seedlings;
2. Favor planting on sites where edge (irregular boundaries) is minimized;
3. Plant larger sites;
4. Plant susceptible species away from the edge of the site;
5. Use protective measures such as fenced exclosures, bud capping, repellents, tree shelters, etc.; and,
6. To more efficiently implement protection control measures, clump plantings and/or locate them to be easily accessible.

**GDS-8C. Vegetation will be managed to promote resilient communities in an attempt to mitigate the effects of global climate change.**

Minnesota DNR recognizes that climate change, also known as global warming, is occurring at a rate that exceeds historical levels, and that the rate is likely to continue to increase. A growing body of evidence overwhelmingly supports the conclusion that climate change is real and will have serious implications for people and the natural world upon which we depend.

Scientists believe the predicted climate change will affect the size, frequency, and intensity of disturbances such as fires, windstorms, and insect outbreaks. It will affect the survivorship of existing plant and animal species and the distributions of plants and animals. Even at modest levels, independent studies are finding mounting evidence that the current climate change influences plant and animal ranges and behavior.<sup>58</sup> Some plant and animal species may not be able to adapt to the rate of change. Increases in the reproductive capability and survivorship of exotic species, insect pests, and pathogens will impact forests and wildlife. Certain tree species, such as black spruce, balsam fir, birch, and jack pine will respond negatively to increased soil warming and decreased soil moisture in. Carbon sequestration by forests and wetlands may be affected because of accelerated decomposition rates.

Management will be based on our current knowledge and adjusted based on future research findings. Although there are uncertainties about the effects of climate change on forest vegetation at the Subsection scale, the following strategies will be used to help monitor and mitigate the predicted effects of climate change on vulnerable species and native plant communities.

**GDS-8C - Strategies****a. Maintain or increase species and structural diversity across the Subsection.**

The native plant community composition and within-stand diversity goals of this plan will provide for more variety in species across the Subsection. Genetically diverse plant communities are more resilient in the face of invasion, catastrophic disturbance, and climate change, and better able to utilize a broader range of site conditions. Maintaining species diversity at multiple scales can reduce the risk of widespread, stand-replacing insect and disease outbreaks that could result from accelerated climatic change.

Structural diversity includes size, abundance and distribution of overstory and understory vegetation, the presence and abundance of snags and coarse woody debris, and the way these features are arranged within the stand.

Plant communities with species and structural diversity will provide habitat to a greater number of species than a plant community with uniform diversity. This variety will help the forest to survive changing conditions as well as serve as a reproductive source for forest plant and animal migration.

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<sup>58</sup> Root, T. et al., *Fingerprints of Global Warming on Wild Animals and Plants*, Stanford University, Nature-January 2, 2003; and Parmesan, Camille, *A Globally Coherent Fingerprint of Climate Change Impacts Across Natural Systems*, University of Texas.

The following are examples of tactics to increase species and structural diversity:

1. Planned increases in the upland and lowland grass, upland and lowland brush, white cedar and oak cover types;
2. Manage balsam fir and white spruce as secondary species where appropriate for the native plant community;
3. Identification of ERF stands;
4. Site visit all ash stands to identify opportunities to increase stand diversity;
5. Follow site level guidelines for leave tree and snag retention;
6. Utilize the Department's ECS to identify and manage communities by mimicking the appropriate natural disturbances; and,
7. Utilize the MCBS data to identify and manage for biological diversity in areas identified as having high or outstanding biological significance.

**b. Maintain connectivity that permits the migration of plants and animals as climate changes the landscape.**

Maintaining native plant community spatial patterns where patches of vegetation are connected will allow the flow of plants, animals, and processes (e.g., seed dispersal) between suitable habitats. The ability of species to move to a new more hospitable site is a critical survival tactic. The following are some of the techniques that have been used during the planning phase to address this strategy:

1. Stands selected for patch management were located to increase their effective patch size or to increase connectivity between patches and adjacent NPCs; and,
2. ERF stands were grouped on the landscape and placed around old-growth stands and along riparian corridors.

The following are some methods for addressing this strategy during plan implementation:

1. Where available, MCBS sites of biodiversity significance are used as a means to identify, quantify, compare, and monitor NPC spatial patterns as they relate to AP SFRMP direction;
2. Classification of stands to NPC and application of ECS silvicultural interpretations provide a means to maintain NPC spatial patterns on managed lands;
3. Plan harvests to minimize road construction and landings; and,
4. Stand management incorporates actions that minimize the potential for invasive species establishment.

**c. Evaluate site conditions with respect to climate change when selecting tree species for regeneration.**

Use the *NPC Field Guide*, associated silvicultural references, existing tree distributions, and modeled future tree distributions when selecting the species most appropriate for the site.

**d. Use the concept of carbon sequestration to remove carbon dioxide (the most significant anthropogenic greenhouse gas) from the atmosphere.**

Climate models (e.g., *Hadley Centre for Climate Prediction and Research-UK*, *carbon cycle models*) predict that, as future atmospheric carbon dioxide concentrations increase, global

temperatures will increase. All vegetation has the ability to remove carbon dioxide through photosynthesis and store it as carbon. Forests and peatlands store carbon for long periods of time. The storage of carbon is called *carbon sequestration*.

**e. Apply the *MFRC Site-Level Guidelines* for tree species at the edge of their range (*Rationale for Guidelines Section, Wildlife Habitat, pages 26-35*).**

### 3.9 Visual Quality

#### **GDS-9A. Minimize management impacts on visual quality in sensitive areas.**

Scenic beauty is a primary reason people choose to spend their recreation and vacation time in or near natural areas. Where forests are near recreational trails, lakes, waterways, public roads, and highways, consider impacts of forest management activities to the visual quality of the site during and after management activities.

#### **GDS-9A - Strategies**

**a. Apply the *MFRC Site-Level Guidelines* on visual quality on all vegetative management activities.**

The MFRC guidelines contain many recommended forest management techniques that will minimize the impacts of vegetative management activities on visual quality. *Directions 2000 (Objective 3.3)*<sup>59</sup> states that the “DNR will apply the appropriate guidelines so that visual quality is not adversely impacted during forest management activities.” Several examples of the recommended techniques included in the guidelines are listed below:

1. Minimize visibility of harvest areas by limiting the apparent size of the harvest area;
2. Avoid management operations during periods of peak recreational use whenever possible;
3. Locate roads and trails to minimize visibility from nearby vantage points, such as scenic overlooks, streams, and lakes;
4. Encourage long-lived species and other visually important species (e.g., paper birch) along high visual quality identified roadways. This will minimize the frequency of management activities. It will also provide larger-crowned, larger-diameter trees that improve forest aesthetics; and,
5. Reduce visual penetration with appropriate curves in the road alignment.

DNR Forestry staff checks the application of visual quality guidelines as a part of timber sales supervision and inspections. Roads have been classified based on visual quality ratings. Classifications can be viewed on the DNR web site at:

[http://www.dnr.state.mn.us/forestry/visual\\_sensitivity/index.html](http://www.dnr.state.mn.us/forestry/visual_sensitivity/index.html)

**b. Provide for public notice on large scale wildlife habitat management projects that have the potential to negatively impact visual quality in the Subsection.**

<sup>59</sup> Minnesota Department of Natural Resources, *Directions 2000: The Strategic Plan*, Objective 3.3, p22.



### 3.10 Access to State Land

#### **GDS-10A. Access routes are well planned and minimize new construction.**

Access routes are needed to effectively manage stands identified for treatment during this 10-year plan. The overall density of access routes in specific geographic areas can be minimized through planning and cooperation with other landowners in the Subsection. The access routes that are selected must be developed in a way that protects or minimizes the negative effects on other natural resources.

#### **GDS-10A - Strategies**

##### **a. Use existing roads, access routes or corridors of disturbance where feasible.**

##### **b. Follow Minnesota statutes and guidelines and DNR policies for forest roads.**

1. Follow the *MFRC Site-Level Guidelines* for road design, construction, maintenance, reconstruction, and closure;
2. Follow the guidelines and policies relating to roads and trails in the *DNR Forestry Road Manual* and the *Forestry-Wildlife Habitat Management Guidelines (page 50)*; and,
3. Use the *DNR Site-Level Design and Development Guidelines for Recreational Trails* for guidance on post-sale treatment.

##### **c. Apply the department direction regarding access roads across EILC and other areas that have been reserved (or deferred) from treatment during the 10-year plan.**

Evaluate on a case-by-case basis (DNR Forestry administrative area review by Forestry, Fish and Wildlife, and Ecological and Water Resources staff) as access is needed in these areas, applying the following principles (in order):

1. Avoid access routes across EILC areas, if possible. For example:
  - Use other reasonable access routes that don't involve EILC stands if they are available (e.g., go around the EILC area if it is small); and,
2. If the only reasonable access to stands to be treated is across EILC areas, then strive to minimize impacts. For example:
  - Use seasonal/temporary access versus a permanent road. (Since EILC are in lowland areas, this road access would typically be seasonal winter roads.);
  - Use narrow corridors;
  - Use routes causing the least disturbance; and,
  - Use only during frozen ground conditions that support the equipment using it.

##### **d. Follow strategies identified under other General Direction Statements that apply to roads throughout the planning, development, and disposition of forest roads.**

- GDS-1F: Maintain or enhance biodiversity on MCBS sites of biodiversity significance.

- GDS-3.9A: Minimize management impacts on visual quality in sensitive areas.

**e. Complete a timber access plan.**

After the 10-year stand exam list was compiled, field personnel completed a timber access plan. The purpose of the timber access plan is to identify any new road and any temporary access needed to access stands identified in SFRMP for field visit and/or treatment. The new access plan will help in assessing road access/fragmentation/density concerns. It will also provide post-sale treatment intentions on the estimated new access/temporary access locations. Existing roads or previously used corridors of disturbance will be followed whenever feasible. For new roads and temporary access, the road classification (whether it is winter or summer access), miles of new road, and proposed post-sale treatment will be documented.

*Appendix O: New Access Needs* lists miles, season of use, and type of access for stands identified as needing new access during the planning period.

The proposed post-sale treatment information on new roads and trails can be used for planning the maintenance, closure (e.g., gate, sign, slash, or berm), abandonment, or reclamation (e.g., with natural or planted vegetation) of the access route. Limiting unplanned secondary usage should also be considered in post-sale road planning. The timber sale appraiser will refine the proposed road access and post-sale treatment plan as part of the design of the timber sale. Final adjustments may be made at the pre-sale meeting between the timber sale administrator and the permittee.

Most temporary roads will not be maintained after harvest is completed. These access routes should be used again for future forest management activities instead of disturbing new areas.

### 3.11 Cultural Resources

**GDS-11A. Cultural Resources will be protected.**

A cultural resource is an archaeological site, cemetery, historic structure, historic area, or traditional use area that is of cultural or scientific value. Cultural resources are remaining evidence of past human activities. To be considered important, a cultural resource generally has to be at least 50 years old. A cultural resource may be the archaeological remains of a 2,000 year-old Indian village, an abandoned logging camp, a portage trail, a cemetery, food gathering sites such as ricing camps and sugarbushes, or a pioneer homestead. They often possess spiritual, traditional, scientific, and educational values. In addition to federal and state laws that protect certain types of cultural resources, the *Voluntary Site-Level Forest Management Guidelines* provide information and recommendations to assist private and public land managers in taking responsible actions when cultural resources are encountered.

**GDS-11A - Strategies**

**a. Annual Stand Exam lists are reviewed by state archeologists; recommendations for mitigation are implemented as part of sale design.**

**b. Wildlife management projects are reviewed by DNR staff and, if appropriate, forwarded to a state archeologist for mitigation of potential negative effects.**

All land management activities on Wildlife Management Areas require a cultural resource evaluation as per Section 106 of the National Historic Preservation Act of 1966. This act requires state and federal agencies that receive federal funds to consider the effects of their actions on historic properties. Area Wildlife Managers are required to review all activities to determine if that activity is considered an undertaking (project that could affect historic property). Those activities considered an undertaking are submitted to a State Historic Preservation Office contract archeologist to determine if cultural resources are present that may be adversely impacted.

### **3.12 Natural Disturbance Events**

**GDS-12A. Natural disturbance events will be promptly evaluated to determine the management needed to address their impacts.**

By promptly evaluating known disturbance events (e.g., fire, wind, or insects and disease), land managers will be able to quickly recommend what, if any, management activities are necessary to mitigate the impacts of the event. Depending on the scale of the event and potential positive or negative impacts, management recommendations will range from no action to salvage harvesting and/or prescribed burning. Where quick action is needed to salvage harvest timber from damaged stands, the annual plan addition process with public review will be used.

#### **GDS-12A - Strategies**

**a. The AP Team will evaluate large-scale (100's to 1000's of acres) disturbance events to determine appropriate action.**

If large-scale disturbance events occur during the 10-year plan, the core team will assess the extent and significance of the event on the structure and condition of managed lands in the Subsection. The team will propose management actions to be implemented within the area impacted by the event and determine whether adjustments to the short-term harvest levels are needed.

When large-scale disturbance events involve multiple ownerships, the DNR will cooperate in assessment and implementation of management actions with other agencies and landowners, when possible. To better inform the public of planned large-scale salvage harvest, a press release will be completed that includes information on the disturbance and the planned management actions.

**b. Local land managers will evaluate and determine appropriate actions for small-scale (10s of acres) disturbance events.**

After small-scale disturbances, local DNR Forestry and Wildlife managers will do a timely evaluation of the disturbance area and take the appropriate action needed to address the situation.

### 3.13 Other Jurisdictions

#### **GDS-13A. Vegetation management will be coordinated across ownership boundaries.**

There is a patchwork of ownership in the AP, including land owned by counties, watershed districts, private landowners, federal and state agencies, and conservation organizations. Land managers often have different ideas and goals for the lands they manage. On the other hand, plant communities often cross property lines and wildlife species know no property boundaries. To maintain habitat connectivity and maintain large patches for wildlife, land managers must work together across ownerships toward common goals to manage the land. The team considered other planning efforts in the Subsection while developing this vegetation management plan.

#### **GDS-13A - Strategies**

- a. Land managers will work with local government units, federal agencies, state agencies, and conservation organizations to develop coordinated conservation plans.**
- b. Utilize existing coordinated conservation plans to guide and prioritize vegetation management.**

*Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife* and the *Conservation Area Plan for the Tallgrass Aspen Parkland* are just two of the existing conservation plans that serve to guide land managers in vegetation management.

- c. Land managers will contact and work with willing landowners adjacent to state-administered land and beyond, as appropriate, to coordinate and assist in vegetation management activities.**
- d. DNR staff collaborate via the Agency's Coordination Framework.**

## Chapter 4. Cover Type Management Recommendations

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### 4.1 Introduction

The purpose of this chapter is to provide data and management information by cover type. These management recommendations will also provide direction to field staff for on-the-ground management activities for stands in the various cover types.

Tables in Chapter 3 of this plan show the treatment level (acres), recommended conversion acreages, old forest percent, effective Extended Rotation Forest (ERF) percentage, and average treatment ages. Some information from the general direction statements (GDS) and strategies is incorporated into this chapter, but staff should be familiar with the full contents of the GDSs and strategies found in Chapter 3.

Information provided by cover type<sup>60</sup> includes:

- Current Condition
- Future Direction
- Harvest Methods and Regeneration
- Cover Type Conversion Management (as applicable)
- Stand Selection Criteria
- Stand Treatment Summary

Acreage figures in this chapter include state forest lands administered by the Divisions of Forestry and Fish and Wildlife (Section of Wildlife) that are available for forest management activities. State lands in state parks, designated old-growth stands, and Scientific and Natural Areas (SNAs) are not included as managed acres in this plan.

<sup>60</sup> Several cover type species in the AP Subsection have very limited acres (i.e. <1000 acres /cover type). These cover types were not included in the stand selection modeling due to their limited acreages. Cover type management recommendations for these cover types are described in section 4.7 of this chapter.

In addition to the cover type recommendations and other information in this plan, following is a list of some other publications that field personnel should refer to when managing state forest lands:

- Minnesota Forest Resources Council (MFRC) *Voluntary Site Level Forest Management Guidelines*  
[http://www.frc.state.mn.us/documents/council/site-level/MFRC\\_FMG&Biomass\\_2007-12-17.pdf](http://www.frc.state.mn.us/documents/council/site-level/MFRC_FMG&Biomass_2007-12-17.pdf)
- *Field Guide to Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass Aspen Parklands Province*. MN DNR. 2005.
- ECS silvicultural interpretations. MN DNR:  
[http://www.dnr.state.mn.us/forestry/ecs\\_silv/interpretations.html](http://www.dnr.state.mn.us/forestry/ecs_silv/interpretations.html)
- Aspen Parklands SFRMP *Preliminary Issues and Assessment*. MN DNR. 2009:  
[http://files.dnr.state.mn.us/forestry/subsection/aspenparklands/prelim\\_issues\\_assess.pdf](http://files.dnr.state.mn.us/forestry/subsection/aspenparklands/prelim_issues_assess.pdf)
- *Forest Development Manual*. MN DNR. 1994.
- *Forestry-Wildlife Habitat Management Guidelines*. MN DNR. 1985.
- Manager's Handbooks for Cover Types. North Central Forest Experiment Station. General Technical Reports. Various dates for the individual publications for cover types common in the north central states.
- *DNR Divisions of Forestry, Fish & Wildlife, Ecological Resources Interdisciplinary Forest Management Coordination Framework*  
[http://files-intranet.dnr.state.mn.us/user\\_files/2535/forestcoodinationframework12\\_14\\_07.pdf](http://files-intranet.dnr.state.mn.us/user_files/2535/forestcoodinationframework12_14_07.pdf)

Cover type determination is based on the stand composition at the time the stand was inventoried. The composition of a stand typically changes to some degree over time, sometimes resulting in a cover type change if the change is significant. *Appendix B: Common Tree Species and Cover Types in the Aspen Parklands Subsection* lists the tree species and cover types found in the Subsection. Stand composition may range from a single species to several species. In general, a species or species group needs to comprise 40 percent of the stand composition for the cover types to have its name. For more details, see *Appendix C: Key for Main Cover Type Determination*. Table 4.1a on page 4.4 of this chapter, shows the main cover types by acreage and age class.

A desired future forest composition (DFFC) goal is to decrease the cover type acreage of some cover types (aspen, balm of Gilead, red pine and ash/lowlands hardwoods). These cover type decreases will result in conversions through artificial (e.g., harvesting and planting), natural (e.g., fire), and intermediate (e.g., thinning) treatment methods to cover types such as lowland and upland brush, oak, and lowland and upland grass. Stands may not be fully converted to the desired cover type for many years because of a gradual increase in the desired species over time. On some aspen and balm of Gilead stands where cover type conversion is desired, partial harvest, less intensive site preparation techniques, and/or successive prescribed fires, may be appropriate for the conversion to lowland and upland brush, oak, and lowland and upland grass.

Minnesota DNR has moved over time toward the use of Native Plant Communities (NPCs) and associated ECS silvicultural interpretations as tools to help determine the most appropriate management for forest stands. Specific cover type management recommendations in this chapter will refer to this tool.

For most even-aged managed cover types, recommendations assume that balancing the distribution of the 10-year age classes is a long-term goal, even though it may take more than one rotation to achieve for most cover types. In some cover types (e.g., black spruce lowland) this will be very difficult to achieve due to the limited acreage for these cover types that exist in the AP Subsection.

Treatment acreages determined in this plan comprise a stand examination list or pool that will be field visited over the 10-year planning period. This SFRMP used the Remsoft Spatial Planning System (RSPS, Fredericton, NB, Canada), a forest estate and harvest schedule model based on linear programming, to generate a draft stand examination list. More detailed information about Remsoft and the model used here can be found in *Appendix I: Stand Selection Process Using Remsoft Woodstock-Stanley Harvest Scheduling Model*.

Stands on the list will be field visited based on the annual treatment acres recommended for each of the cover types. Forestry areas have direction to minimize acreage deviation from year to year; the 10-year average should equal the annual treatment acres. Management recommendations, preliminary objectives, and other issues that were assigned to a stand during the SFRMP process should be considered in the management of a stand. This information will be provided to appraisers after each annual harvest plan is assigned from the 10-year plan. Stands that are suitable for harvest will be appraised for a timber sale. As each new 10-year plan is developed, the treatment levels by decade and modeling will be re-evaluated.

For stands found not suitable for final harvest or intermediate treatment, inventory data will be updated (i.e., altered).

**Table 4.1a. Aspen Parklands Subsection commercial forest cover types by acres and age- class.<sup>61</sup>**

Cover type	Age classes and acres in each age class												
	1-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120+
Ash lowland hardwoods	3	93	472	112	171	388	780	334	452	21	40	95	0
A/BG “T” and “O” stands	7662	4893	2447	3760	3380	3652	2196	870	294	60	95	0	0
A/BG “S” stands	2866	1825	2827	4646	2592	1361	309	140	0	0	0	0	11
A/BG “R” stands	3512	2986	6509	7988	1649	926	625	332	46	21	0	0	0
A/BG “C” stands	2068	1805	3887	5716	1080	691	200	21	10	0	0	0	0
Black spruce, lowland SI=40+	0	65	0	21	10	440	0	0	0	0	0	0	0
Black spruce, lowland SI<40	24	0	9	0	81	54	374	87	132	19	0	140	240
Tamarack SI=40+	98	11	81	241	584	205	133	125	427	0	76	0	16
Tamarack SI<40	26	73	94	147	6	160	182	24	164	72	0	569	240

<sup>61</sup> Acreage totals have been rounded to the nearest whole number



A summary of the planned treatment acres for the Aspen parklands Subsection is found in Tables 3.5f-h in Chapter 3. Those tables are duplicated here as Tables 4.1b-d for convenience in reading the cover type management guidelines.

**Table 4.1b. Treatment levels for even-aged managed cover types by decade for AP SFRMP.**

Cover Type(s) / Group	Total Acres	FY 2012-2021	FY 2022-2031	FY 2032-2041	FY 2042-2051	FY 2052-2061
A/BG "T" stands	30,925	6,264	6,153	6,153	6,153	6,202
A/BG "O" stands	715	366	111	161	77	0
A/BG "S" stands	20,675	5,939	3,684	3,684	3,684	3,684
A/BG "R" & "C" stands	80,783	23,484	20,403	12,298	12,298	12,300
Tamarack SI $\geq$ 40	1,649	172	237	237	729	274
Tamarack SI < 40	1,253	74	268	294	271	346
Black Spruce, Lowland SI < 40	834	40	103	152	213	326
Black Spruce, Lowland SI $\geq$ 40	374	0	50	30	244	50
<b>Total</b>	<b>137,208</b>	<b>36,339</b>	<b>31,009</b>	<b>23,009</b>	<b>23,669</b>	<b>23,182</b>

**Table 4.1c. Treatment levels for uneven-aged managed cover types for AP SFRMP.**

Cover Type	Previous Decade <sup>62</sup> Volume Harvested	2012-2021 (1 <sup>st</sup> decade of plan implementation) Treatment Acres
Ash/Lowland Hardwoods <sup>63</sup>	250 cords (~25 acres)	2,062
Northern Hardwoods	50 cords (~5 acres)	0
White Pine	0	0

**Table 4.1d. Thinning treatment levels for AP SFRMP.**

Cover Type	Previous Decade <sup>61</sup> Volume Harvested	2012-2021 (1 <sup>st</sup> decade of plan implementation) Treatment Acres
Red Pine	500 cords (~50 acres)	3
Oak	50 cords (~5 acres)	108
White Pine	0 cords (~0 acres)	4

<sup>62</sup> Previous harvest levels are an approximation from DNR Forestry administrative area annual stand examination lists from FY2001 to FY2008, based on legal descriptions roughly corresponding to subsection boundaries.

<sup>63</sup> All ash stands will be site-visited during the first decade of the planning period.

## 4.2 Aspen/balm of Gilead/offsite aspen (A/BG)

### 4.2A Current condition

- a. Cover type acres:** In 2010, the A/BG cover types comprise approximately 89 percent (85,948 acres) of state managed forest lands in the Subsection. The A/BG cover types are combined for the SFRMP because these two species are commonly associated with each other and are managed under the same management prescriptions.
- b. Age-class distribution:** The current age-class distribution for A/BG stands are not balanced and do not reflect the desired age-class structure for even-aged managed cover types.
- c. Stand composition:** Mature aspen stands are typically comprised of a mixture of species, with aspen being the major component as measured by volume. These stands generally have few other secondary tree species including ash and bur oak. Shrub species including red osier dogwood, willow, and alder are common in the understory.
- d. Native plant communities:** To learn more about NPCs in which aspen is typically found in the Subsection, refer to the *NPC Field Guide*.

### 4.2B Future direction

- a. Cover type acres:** A composition goal for the next 50 years is to convert approximately 19 percent (16,227 acres) of the A/BG cover type across the Subsection to other cover types (lowland and upland brush, lowland and upland grass, and oak). In the first 10 years, the conversion goal for A/BG is approximately 9.5% (8,128 acres).

The quality of A/BG stands in the Subsection varies widely due to site and ecological conditions. The A/BG cover type was divided into five categories to help improve management of open landscape habitat, native plant communities, and forest health in accordance with the natural ecological transition of aspen species from the forests in the east to the prairies in the west. Historically, the prevalence and quality of the A/BG cover type decreased from east to west within the Subsection due primarily to frequent fires and drier climatic conditions.

The A/BG stands were divided up into the following five categories: “T”; “O”; “S”; “R”; and, “C”. Designations for specific A/BG stands were based primarily on area staff input, and adjusted by existing soil series data in combination with soil types expected to be associated with Native Plant Community classes. Area staff will use NPC data obtained from each site prior to establishing final management options for the individual stands.

These categories are defined as:

#### **T – Timber**

Stands that will be managed as a forested cover type and held to at least normal rotation (45 years). These stands generally have a higher site index, are usually associated with forested NPC classes, and are within areas desired to be managed for forest plant and wildlife species. Extended Rotation Forest (ERF) goals were derived from T stands.

**O – Conversion to other forested cover type**

Stands that will be converted to another forested cover type to better represent the ecological characteristics of the site (i.e. aspen to oak).

**S – Short rotation**

Stands that will be managed as a forested cover type, but harvested prior to normal rotation age (20 to 44 years). These stands generally have a lower site index, may or may not be associated with forested NPC classes, and are within areas desired to be managed for early successional forest plant and wildlife species. It should be noted that for this 10-year planning cycle, stands that would not meet age of merchantability (35 years) were not selected for examination.

**R – Regeneration**

Stands that will be managed as a short rotation cover type (less than 20 years). These stands generally have very low site indexes, are usually not associated with forested NPC classes, and are within areas desired to be managed for open landscape plant and wildlife species.

**C – Conversion to non-forested cover type**

Stands that will be converted or restored to a non-forested cover type (i.e., upland/lowland grass, upland/lowland brush). These stands have often invaded prairie or oak savannah habitats and the management goal is to greatly reduce or eliminate aspen/balm of Gilead from the site.

**Table 4.2a. Recommended A/BG cover type acres by aspen category by selected year.**

<b>Aspen Category</b>	<b>2010</b>	<b>2020</b>	<b>2060</b>
“T” Stands	28,560	28,560	28,560
“O” Stands	749	349	0
“S” Stands	16,576	16,576	16,576
“R” Stands	24,595	24,595	24,595
“C” Stands	15,478	7,750	0

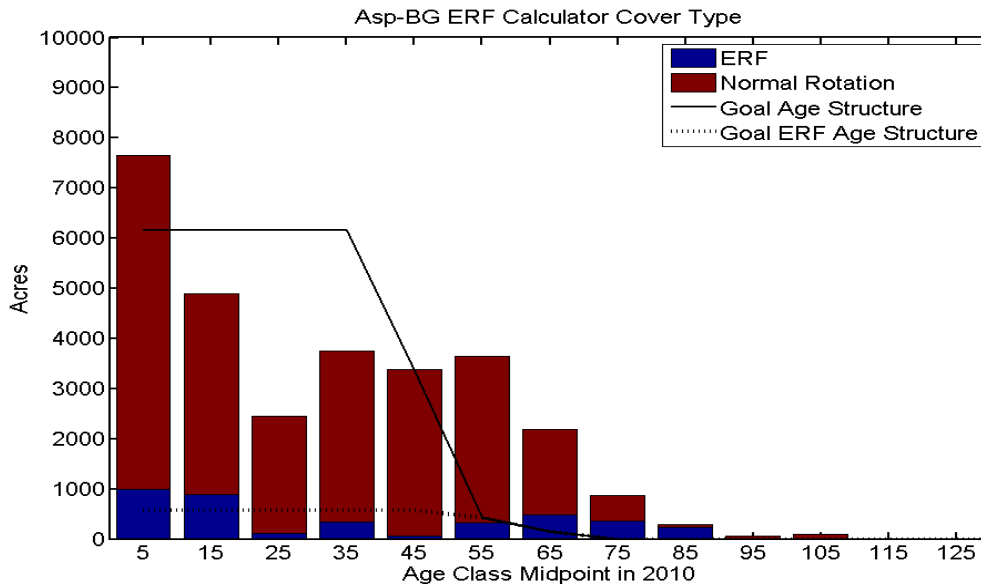
**4.2B.1 Future direction of A/BG “T” and “O” stands**

**a. Cover type acres:** In 2010, the A/BG “T and O” cover type comprises 30 percent (29,309 acres) of state timberland in the Subsection. A composition goal for the next 50 years is to convert approximately 2.4% (749 acres) of the A/BG “T and O” cover type across the Subsection to the oak cover type. In the first 10 years, the reduction goal for A/BG “T and O” type is 1.4% (400 acres).

**b. Age-class distribution:** Improve the balance among age classes. The Extended Rotation Forest (ERF) goal for the “T” cover type is to have 3 percent of the acres over Normal Rotation Age (NRA), with a declining age-class distribution from the NRA (45 years) out to the Maximum Rotation Age (MRA) (65 years). Figure 4.2a illustrates the tapering off of the age-class distribution after NRA.

In the Subsection, 30.7 percent (9,001 acres) of the A/BG “T and O” cover type is over the recommended normal rotation age of 45 years (Old Forest). In the future, it is desired to maintain 3% of the “T and O” cover type as effective ERF.

**Figure 4.2a. Current and desired age-class distribution for A/BG “T and O” stands.**



**c. Stand composition:** The desired future within-stand composition will range from pure aspen stands to a more diverse stand structure and/or mixed forest that includes other hardwoods such as oak, ash and birch, and conifers such as white spruce, balsam fir, white cedar and tamarack. As a guiding principle the future composition will maintain the range of species in the appropriate amounts that would normally be present in the associated NPC at a stand’s current age as described by the Department’s ECS system.

#### 4.2C.1 Harvest methods and regeneration for A/BG “T and O” stands

**Even-aged management direction:** The A/BG “T and O” cover type will be managed on an even-aged basis for pulpwood and bolts. The goal is to move towards a balanced age-class structure while maintaining or improving site productivity, forest wildlife habitat, and biodiversity.

**b. Final harvest:** A/BG stands to be maintained in the cover type will be managed using clearcut or clearcut with reserves as the final harvest method. Use natural stand boundaries or natural features such as topography or soil type to delineate timber sale boundaries. Use harvest regulations and methods that favor maintaining or increasing within-stand diversity while retaining aspen or balm of Gilead as the main cover type. One of the strategies to accomplish this would be to reserve or partially reserve from harvest patches or individuals of non-aspen species. These reserve trees will maintain the within-stand species diversity as well as add structural diversity for the newly regenerating stand. Reserve trees may also function as a seed source that could aid in increasing the abundance of these other species in the new stand.

Harvest some larger blocks (100+ acres), where appropriate, using consolidated or natural stand boundaries. Small harvest blocks (less than 40 acres) will continue to be used. Using a range of harvest sizes will provide for various wildlife habitat needs.

**c. Even-aged management prescriptions:** The following are the most common prescriptions that will be used on A/BG timber sales:

- Clearcut-Sprouting
- Clearcut with Reserves – Sprouting

Additional coding of objectives in the DNR's Forest Information System (FORIST) will be used to track accomplishments towards increasing within-stand diversity and mixed forest conditions. See *Appendix G: SFRMP Additional Field Names and Codes* for detailed information about the coding of management objectives in the Silviculture and Roads Module (SRM) of FORIST.

**d. Regeneration methods after final harvest:** Aspen and balsam of Gilead stands regenerate naturally through root sprouting (suckering) and seeding. The recommended minimum stocking of aspen regeneration two years after harvest is 4,000+ stems per acre scattered throughout the stand.<sup>64</sup> For some wildlife species, higher stem densities are desired. Usually, most clearcut stands regenerate at greater than 10,000 stems per acre. If stocking is below the desired level, consider conversion to another cover type or increase stocking by planting or seeding other species.

#### 4.2D.1 Cover type conversion management for A/BG “T and O” stands

**a. Conversion Goals:** Natural resource managers recognize that conversion goals can take more than a rotation age to accomplish. Over the next 50 years, it is recommended that approximately 750 acres of the A/BG “T and O” cover type be converted to the oak cover type (see Table 4.2a to see conversion goals by decade). The 10-year conversion goal out of A/BG “T and O” and into the oak cover type is 400 acres. The decision of whether or not to convert a stand to another cover type will be determined when the stand is field visited. The outcome of a NPC-ECS field evaluation will determine the appropriate species conversions.

Conversion of aspen to the oak cover type will be accomplished using a range of management options, including:

**On sites where it is determined that conversion to oak is the goal:**

1. Allowing natural succession to occur on sites where the within-stand composition contains a high percentage of oak;
2. Using aspen harvest to release existing oak where it is a dominant or co-dominant canopy tree; and,
3. Using partial harvest of aspen to release existing understory oaks Using post-harvest treatments such as herbicide application, mechanical site preparation, or prescribed burning followed by hand planting or artificial seeding, to establish oaks on the site.

<sup>64</sup> Manager's handbook for aspen in the North Central States. Gen. Tech. Rep. NC-36. St. Paul, MN. USDA, Forest Service, North Central Forest Experiment Station.

#### 4.2E.1 Stand selection criteria for A/BG “T and O” stands

**a. Normal rotation forest:** The Aspen Parklands SFRMP does not identify high-risk, low volume stands for treatment. The Remsoft model selected A/BG "T and O" stands above merchantable age for treatment based on the multiple objectives of balancing age classes, maximizing volume and creating an even flow of volume. For a more detailed description of harvest-level calculations, see GDS 5A in Chapter 3.

**b. Extended rotation forest:** The long-term goals for retention of acres over NRA in these cover types, while providing a declining age-class structure out to the MRA are listed in table 3.1a-b, (Chapter 3). The harvest level will be based on various harvest ages beyond the NRA out to MRA.

**c. Thinning:** Aspen and balm of Gilead stands were not considered as candidates for thinning, except where a thinning prescription was part of a strategy to accomplish conversion goals.

#### 4.2F.1 Stand treatment summary for A/BG “T and O” stands

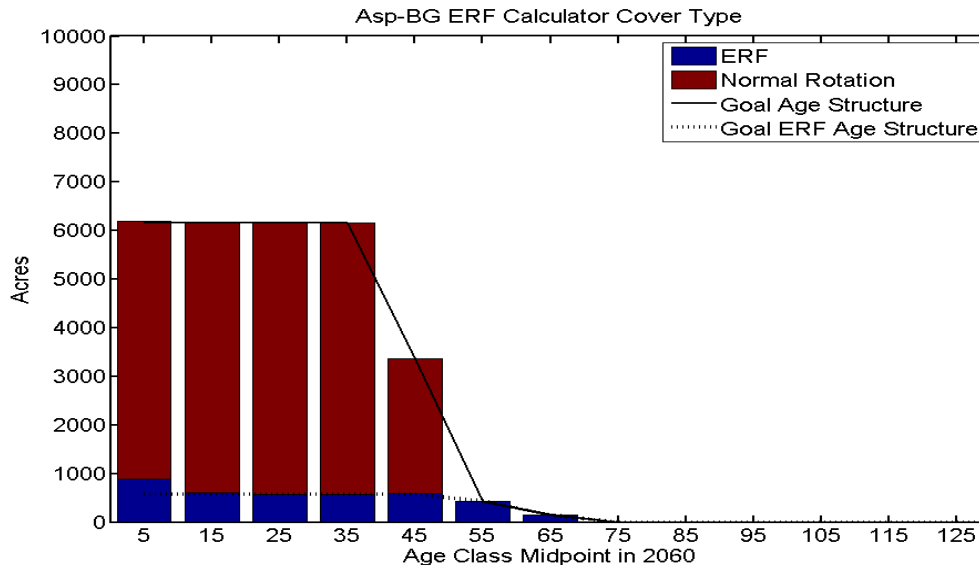
Table 4.2b shows the modeled treatment levels (acres) for the next five decades.

**Table 4.2b. A/BG “T” and “O” treatment level (acres) per decade.**

Cover type	Decade				
	1	2	3	4	5
A/BG “T” stands	6,264	6,153	6,153	6,153	6,202
A/BG “O” stands	366	111	161	77	0

Based on the modeling of these treatment levels, by the end of the fifth decade, the cover type should be approaching the projected age-class distribution as shown in Figure 4.2b.

**Figure 4.2b. Projected age-class distribution for A/BG “T” & “O” stands in 2060.**

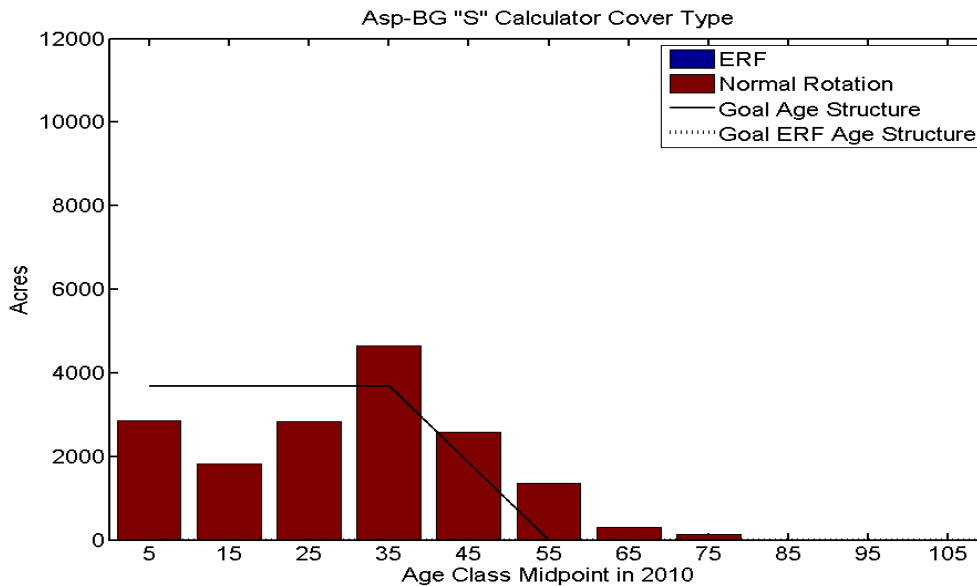


#### 4.2B.2 Future direction of A/BG “S” stands

**a. Cover type acres:** In 2010, the Short Rotation “S” A/BG cover type comprises 17 percent (16,576 acres) of state managed acres in the Subsection. A composition goal for the next 50 years is to maintain the 16,576 acres of the A/BG “S” cover type across the Subsection.

In the Subsection, 18.7 percent (3,098 acres) of the A/BG “S” cover type is over the recommended normal/maximum rotation age of 45 years. The goal is to have 100 percent of the managed acres between age 0 and the normal/maximum rotation age. ERF/old forest percentage guidelines do not apply to the “S” cover type.

**b. Age-class distribution:** Improve the balance among age classes. The goal for this cover type is to have 0 percent of the acres over the normal/maximum rotation age. This cover type does not have a declining age-class distribution goal beyond the normal/maximum age (45 years). Figure 4.2c shows the current age-class distribution for the A/BG “S” stands.

**Figure 4.2c. Current and desired age-class distribution for A/BG “S” stands.**

**c. Stand composition:** The desired future within-stand composition will range from pure aspen stands to a slightly more diverse stand structure that includes other hardwoods such as balm of Gilead, oak, ash and elm (see GDS 1B and 3A). As a guiding principle the future composition will maintain the range of species in the appropriate amounts that would normally be present in the associated NPC at a stand's current age as described by the Department's ECS system.

#### 4.2C.2 Harvest methods and regeneration for A/BG “S” stands

**a. Even-aged management direction:** The A/BG “S” cover type will be managed on an even-aged basis for pulpwood and biomass. The goal is to move towards a balanced age-class structure while maintaining or improving forest wildlife habitat, biodiversity and site productivity.

**b. Final harvest:** A/BG stands to be maintained in the cover type will be managed using clearcut or clearcut with reserves as the final harvest method. Use natural stand boundaries, burn unit boundaries or natural features such as topography or soil type to delineate timber sale boundaries. Use harvest regulations and methods that favor maintaining or increasing wildlife habitat and maintaining or increasing stand diversity while retaining aspen or balm of Gilead as the main cover type. One of the strategies to accomplish this would be to reserve from harvest most existing individuals of other hardwood species. These reserve trees will maintain the within-stand species diversity as well as add structural diversity for the newly regenerating stand. Reserve trees may also function as a seed source that could aid in increasing the abundance of these hardwood species in the new stand.

Harvest some larger blocks (100+ acres), where appropriate, using consolidated or natural stand boundaries. Small harvest blocks (less than 40 acres) may continue to be used where appropriate. Using a range of harvest sizes will provide for various wildlife habitat needs.



Many stands in the “S” cover type are within prescribed burn units. Although it is not the specific intent to use prescribed fire as a silvicultural treatment in “S” stands, it is not practical or feasible to modify burn unit boundaries to remove “S” stands from the effects of fire. Where “S” stands do occur within prescribed unit boundaries, coordination between the Division of Forestry and Section of Wildlife is important to ensure that prescribed burning does not conflict with planned harvests as well as the “S” cover type management goals. One way this potential conflict can be addressed is by considering any planned prescribed burning when annually selecting stands for exam, as well as considering planned timber harvests when planning prescribed burning. The timing of prescribed burning as well as the ignition pattern and fire intensity can also be modified so as to minimize negative impacts on “S” stands.

Likewise, harvests of “S” stands within prescribed burn units should be appraised and planned so as to minimize conflicts with prescribed burning efforts. This includes appropriate slash treatment, the length of timber permits, notification to prospective timber purchasers about wood quality as it relates to previous burns, and disclaimers regarding any planned prescribed burns.

**c. Even-aged management prescriptions:** The following are the most common prescriptions that will be used on A/BG “S” timber sales:

- Clearcut-Sprouting
- Clearcut with Reserves – Sprouting

**d. Regeneration methods after final harvest:** Aspen and balm of Gilead stands regenerate naturally through root sprouting (suckering) and seeding. The recommended minimum stocking of aspen regeneration two years after harvest is 4,000+ stems per acre scattered throughout the stand.<sup>65</sup> For some wildlife species, higher stem densities are desired. Usually, most clearcut stands regenerate at greater than 10,000 stems per acre. If stocking is below the desired level, consider conversion to another A/BG management type or open-land type as appropriate for the native plant community.

#### 4.2D.2 Cover type conversion management for A/BG “S” stands

**a. Conversion goals:** Over the next 50 years, there is no planned increase or decrease in the 16,576 acres of the A/BG “S” cover type. Depending on site conditions, it is possible that these stands could be converted to another A/BG management type, oak savannah or open-land type.

The decision of whether or not to convert a stand to another cover type will be determined when the stand is field visited.

#### 4.2E.2 Stand selection criteria for A/BG “S” stands

**a. Normal rotation forest:** A priority in this landscape over the next 10 years will be to select stands over age 35. As mentioned previously, balancing age classes and creating an even flow of volume are also a priority. For a more detailed description of harvest-level calculations, see GDS 5A in Chapter 3.

<sup>65</sup> Manager’s handbook for aspen in the North Central States. Gen. Tech. Rep. NC-36. St. Paul, MN. USDA, Forest Service, North Central Forest Experiment Station.

**b. Extended rotation forest:** It is the desire to maintain A/BG “S” stands in an early successional forested condition by using a normal and maximum rotation age of 45. There are no ERF goals for this cover type group. It is the long-term goal to treat all stands prior to the normal/maximum rotation age.

**c. Thinning:** A/BG “S” stands were not considered as candidates for thinning.

#### 4.2F.2 Stand treatment summary for A/BG “S” stands

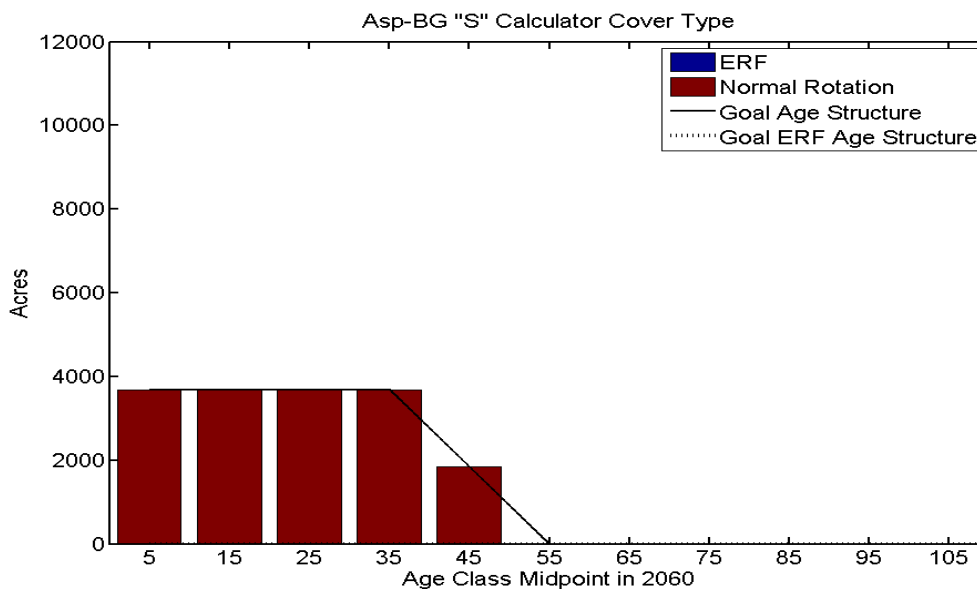
Table 4.2c shows the modeled treatment levels (acres) for the next five decades.

**Table 4.2c. A/BG “S” stands treatment summary by decade**

Cover type	Decade				
	1	2	3	4	5
A/BG “S” stands	5,939	3,684	3,684	3,684	3,684

Based on the modeling of these treatment levels, by the end of the fifth decade, the cover type should be approaching the projected age-class distribution as shown in Figure 4.2d.

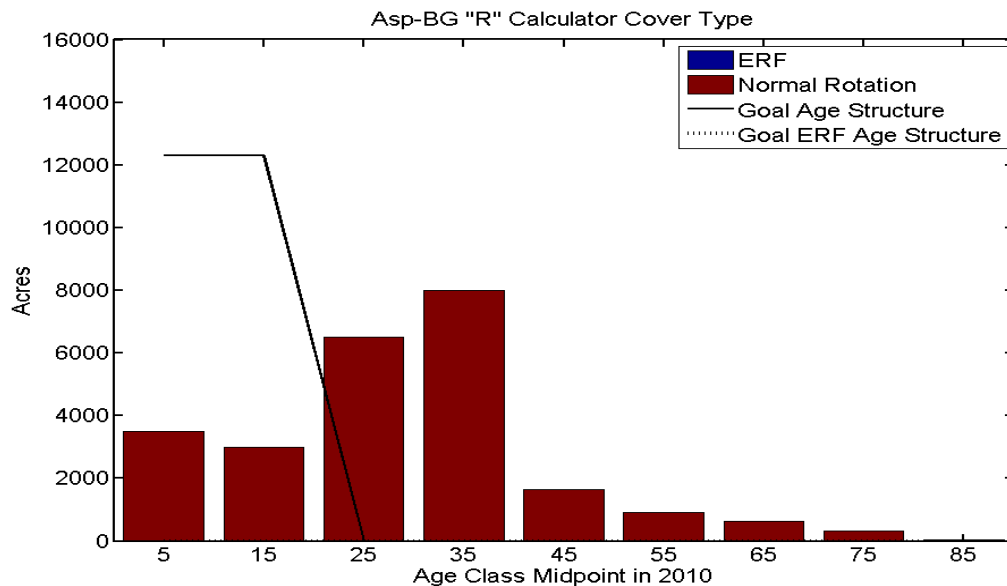
**Figure 4.2d. Projected age-class distribution for the A/BG “S” stands in 2060.**



#### 4.2B.3 Future direction of A/BG “R” stands

- a. Cover type acres:** The 10- and 50-year cover type goal for the A/BG “R” stands is to maintain the existing acreage (24,595 acres).
- b. Age-class distribution:** The age-class distribution for “R” stands will be balanced across the first 20 years. This balanced age-class structure will be met after two planning cycles (20 years).

**Figure 4.2e. Current and desired age-class distribution for A/BG “R” stands.**



- c. Stand composition:** The goal is to keep these stands in a younger age-class with little emphasis on changes in species composition. These stands may shift to another cover type due to management (e.g., prescribed fire or shorter harvest rotation).

#### 4.2C.3 Harvest methods and regeneration for A/BG “R” stands

- a. Even-aged management direction:** These stands will be managed on a very short rotation (20 years or less) primarily for wildlife habitat with opportunities for woody biomass and pulpwood.
- b. Final harvest:** These stands will initially be managed using clearcuts as the final harvest method. Once regenerated, treatment methods may include biomass collection, shearing and prescribed burning. Natural stand boundaries or natural features such as topography or soil type will be used to delineate treatment boundaries.
- c. Even-aged management prescriptions:** The following are the most common prescriptions that will be used on A/BG “R” timber sales:
- Clearcut-Sprouting

- Clearcut with reserves-Sprouting

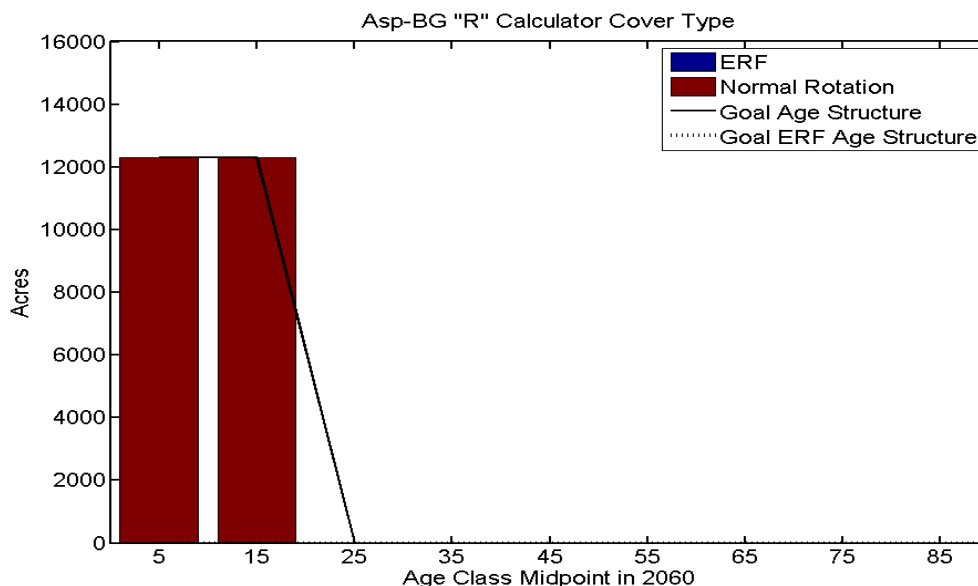
**d. Regeneration methods after final harvest:** These stands will be left to naturally regenerate after any harvest event. Little emphasis will be placed on future stocking rates for the A/BG cover type.

**Table 4.2d. A/BG “R” treatment summary by decade**

Cover type	Decade				
	1	2	3	4	5
A/BG “R” stands	15,616	12,793	12,298	12,298	12,300

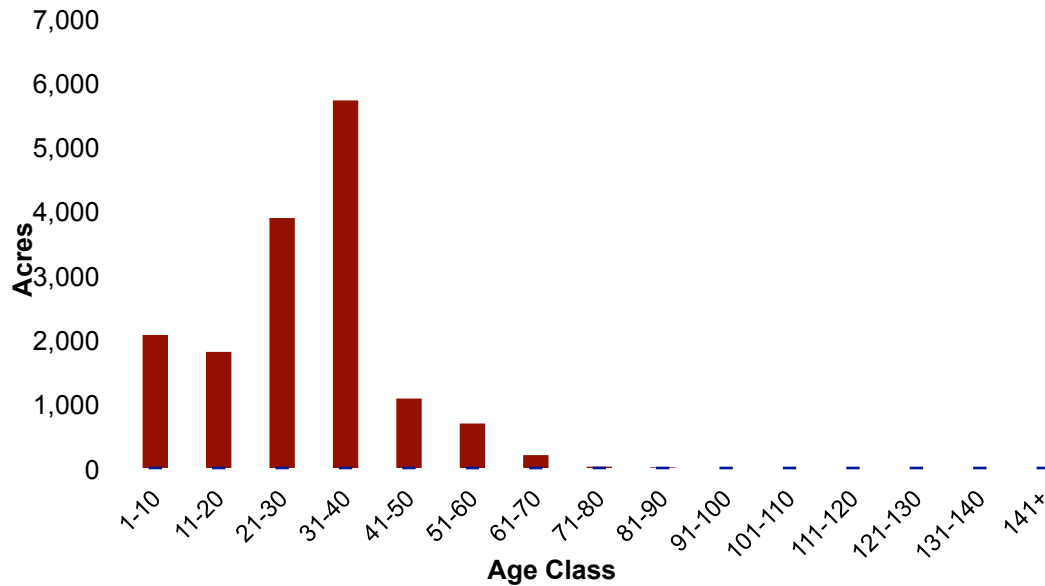
Based on the modeling of these treatment levels, by the end of the third decade, the cover type should be approaching the projected age-class distribution as shown in Figure 4.2f.

**Figure 4.2f. Projected age-class distribution for the A/BG “R” stands in 2060.**



#### 4.2B.4 A/BG “C” stands

**a. Cover type acres:** The “C” stands are those aspen stands that have been targeted for conversion out of aspen and into another non-forested cover type including upland brush, lowland brush, upland grass, and lowland grass. There are currently 15,478 acres in the A/BG “C” category. The 10-year goal is to convert 7,728 acres and then convert the remaining acres in the second decade.

**Figure 4.2g. Current age-class distribution for A/BG “C” stands.****Figure 4.2h. Age-class distribution for A/BG “C” stands in 2020\*.**

\*Note: There is no age class distribution for A/BG “C” stands past the second decade of the planning period due to the fact that all conversions are due to take place in the first two decades of implementing the plan.

#### 4.2C.4 Harvest methods and regeneration for A/BG “C” stands

**a. Final harvest:** The harvest of stands during the first decade will focus on utilization of the mature wood through clearcuts as the final harvest method. Conversion of the “C” stands is expected to be completed during the second decade and may include timber harvests, prescribed fire, hydro-axing, shearing, or other management techniques. Once converted, these areas will be maintained in an open state through prescribed fire, hydro-axing, or shearing.

#### 4.2D.4 Cover type conversion management for A/BG “C” stands

**a. Conversion goals:** Natural resource managers recognize that conversion goals can take more than a rotation age to accomplish. Over the next 50 years, it is recommended that approximately 15,478 acres of the A/BG cover type be converted to non-forested cover types (see Table 4.2a to see conversion goals by decade). Depending on site conditions, these stands will be converted to: oak savannah; upland or lowland brush; or upland or lowland grass.

The 10-year conversion goal out of A/BG and into a non-forested cover type is 7,728 acres. The decision of whether or not to convert a stand to another cover type will be determined when the stand is field visited. The outcome of a NPC-ECS field evaluation will determine the appropriate species conversions. Conversion of aspen to the desired cover types will be accomplished using a range of management options, including:

**On sites where it is determined that conversion to upland or lowland brush or prairie is the goal:**

1. Where aspen is of merchantable age or will be within the first two decades of the plan, utilize commercial timber harvests followed by prescribed burning on a 3-5 year return interval.
2. In locations where aspen will not be of merchantable age within the first two decades of the plan or is inoperable to commercial timber harvest operations, utilize mechanical treatment and/or prescribed burning on a 3-5 year return interval.

**On sites where it is determined that conversion to oak savannah is the goal:**

1. Where aspen is of merchantable age or will be within the first two decades of the plan, utilize commercial timber harvests reserving any oak, followed by prescribed burning on a 3-5 year return interval.
2. In locations where aspen will not be of merchantable age within the first two decades of the plan or is inoperable to commercial timber harvest operations, utilize mechanical treatment reserving any oak and prescribed burning on a 3-5 year return interval.

**Table 4.2e. A/BG “C” stands treatment summary by decade.**

Cover type	Decade				
	1	2	3	4	5
A/BG “C” stands	7,868	7,610	0	0	0

Based on the modeling of these treatment levels, by the end of the second decade, all “C” stands should be converted out of the A/BG cover type.

## 4.3 Ash/Lowland Hardwoods

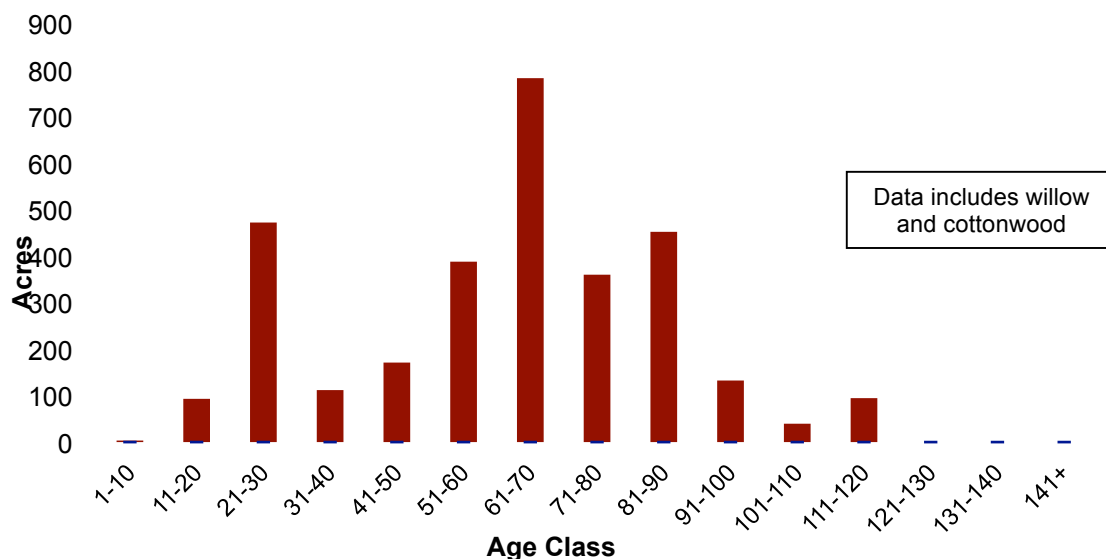
### 4.3A Current condition

**a. Cover type acres:** In 2010, the ash and lowland hardwoods (ash/LH) cover type comprised 3.2 percent (3,101 acres) of state-managed acres in the Subsection. These cover types are combined into one management category for this SFRMP because these two cover types are commonly associated with each other and are managed under the same management prescriptions.

Due to small amounts of acres and similarity of ecological communities, both willow (140 acres) and cottonwood (153 acres) are also included in the ash/lowland hardwood cover type.

**b. Age-class distribution:** The current age-class distribution of this cover type reflects a mature forest with little acreage in the younger and very old age classes, with the exception of the 21-30 age class (see Figure 4.3a). These cover types are managed using uneven-aged treatments, thus a balanced age class is not a goal. In a regulated uneven-aged stand, each age class would occupy an equal amount of ground space per acre.

**Figure 4.3a. Current (2010) age-class distribution of ash/lowland hardwood stands.**



**c. Stand composition:** Natural, mature ash/LH stands range from pure or nearly pure black ash stands to mixed stands that include elm, boxelder, silver maple, green ash, cottonwood, basswood, balm of Gilead and aspen.

**d. Native plant communities:** Aspen Parklands NPCs, in which ash/LH are typically found, include MHw36, FFn57, FFn67, WFn55 and WFW54.

#### 4.3B Future direction

**a. Cover type acres:** A decrease of 300 acres is proposed for the ash/LH cover types over the next 50 years. The 10-year goal for the cover type is to maintain the current acreage.

**Limiting factor:** Emerald ash borer (EAB) was discovered in Minnesota in 2009; the extent to which Minnesota ash populations will be affected is yet to be determined. The Department's ash management guidelines are under development. Ash cover type acres are expected to decline as EAB infestations eventually spread across the state.

**b. Age-class distribution:** Continue to move these cover types toward an uneven-aged structure with trees representing all age classes in nearly equal spatial proportions.

**c. Stand composition:** As a guiding principle, the future composition will maintain the range of species in the appropriate amounts that would normally be present in the associated NPC at a stand's current age as described by the Department's ECS system. If emerald ash borer becomes established in this Subsection, ash may someday have diminishing occurrence in these stands. Pure or nearly pure black ash stands will become rare and will likely become non-forested communities. But mixed stands that once included black ash mixed in with balm of Gilead or other species may remain mixed lowland hardwood forest.

#### 4.3C Stand selection criteria

The ash/LH cover type will generally be managed on an uneven-aged basis and in accordance with ash management guidelines with considerations for the emerald ash borer. Whether or not a stand will be managed will be determined following the site visit. The draft Department ash management guidelines state that better sites offer more flexibility in management. While all ash stands will be assessed during this planning period, focus first on better sites, site index 55 and above. Management opportunities are more limited on stands between SI 45 and SI 55. Visit these sites only as opportunities arise to group them with better stands for treatment. Resources should not be spent on stands with SI <45. Other lowland hardwood types will be added to this site visit pool based on local Area knowledge.

#### 4.3D Stand treatment summary

The plan identifies 2,064 acres for possible treatment during this 10-year planning period. Based on additional field evaluations (e.g., re-inventory) of ash/LH stands during this planning period, additional acres may be added for treatment if the stands meet the harvest criteria.



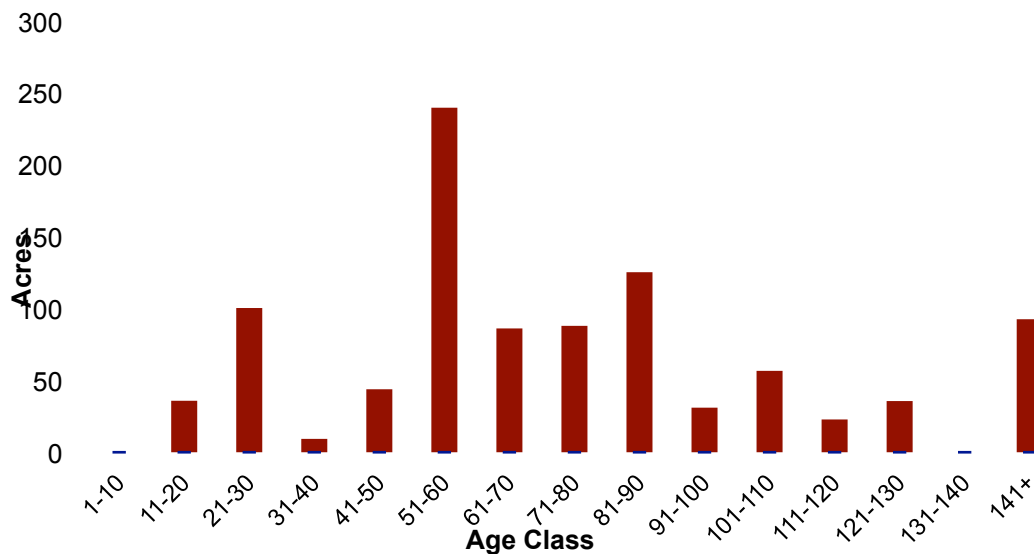
## 4.4 Oak

### 4.4A Current condition

**a. Cover type acres:** In 2010, the oak (O) cover type comprised 1.0 percent of state-managed acres in the Subsection (967 acres). Oak is commonly found as a component of other cover types such as aspen, offsite aspen, northern hardwoods, and lowland hardwoods.

**b. Age-class distribution:** The current age-class distribution of the O cover type is skewed towards middle-aged stands.

**Figure 4.4a. Current (2010) age-class distribution for the oak cover type.**



**c. Stand composition:** Natural oak stands range from nearly pure oak to mixed stands and are more likely to occur as younger woodlands, not mature forest. In the AP Subsection, bur oak is generally the only oak species present. The most common secondary species in the O cover type are: quaking aspen, balm of Gilead, American elm, green ash and basswood. Please note that oak savannah would likely be typed upland grass or brush under CSA rules.

**d. Native plant communities:** Information about Aspen Parklands NPCs in which oak stands are typically found, is located in the *NPC Field Guide* and in the ECS silvicultural interpretations. Consult these references when determining sites appropriate for oak emphasis.

### 4.4 B Future direction

**a. Cover type acres:** The long-term goal is to increase the O cover type acreage from the “O” stands in the aspen/balm of Gilead cover type group by 749 acres (+77.5%) and in native plant communities where oak species are excellent to good competitors. Field evaluation (including NPC information) will be used to confirm which “O” stands can be converted to oak or find other appropriate stands. All of the increase is planned to come from the partial harvesting of aspen and balm of Gilead stands with a significant oak component or from natural succession of these cover types. The main goal in this cover type is to provide wildlife habitat and sustain mast production over time. A secondary goal is to increase the oak component in other cover types where it is currently found or NPC information suggests it is an appropriate species to emphasize.

**b. Age-class distribution:** Currently 56 percent of the cover type is in 50 to 90-year age classes, with some acreage in the younger and older age classes. All oak stands were designated as ERF, so they will be managed on longer rotations between 80 and 170 years old. The primary goal is to create more young and middle-aged oak stands through conversion efforts and to maintain what is currently on the landscape.

**c. Stand composition:** The primary goal is to maintain or restore a stand structure, tree density, and mix of species, including prairie grasses and forbs, shrubs, and/or tree species, appropriate to the stand’s NPC.

#### 4.4C Harvest methods and regeneration

**a. Even-aged management direction:** The O cover type is shade intolerant and therefore these stands are typically managed on an even-aged basis. Group selection methods may be utilized in non-oak cover types to increase the presence of the oak component in those cover types.

**b. Final harvest:** No final harvest is planned within this 10-year management period but sites could be added based on field evaluations by the area personnel and following procedures identified in the *Coordination Framework*. The goal of a final harvest would be to increase the younger component of the cover type and then evaluate regeneration methods. Oak stands could be managed using shelterwood, seed tree, clearcut, or clearcut with reverses as the final harvest method.

**c. Intermediate treatment:** Thinning will produce best results if started before age 50. After that, the growth rate may not improve the merchantable products but could still capture products and improve wildlife habitat. When thinning has begun, re-entry can be as often as every 10 years, but should be related to the stocking tables (see *Manager’s Handbook for Oaks in the North Central States*, Appendix IV<sup>66</sup>). Attempt to retain trees from all size-classes to retain mast production and availability to wildlife over time. Retain the older forest characteristics within stands, when appropriate, by retaining a component of large old trees, coarse woody debris, and snags.

**d. Intermediate prescriptions:** The following are the most common prescriptions that will be applied:

- Shelterwood with Reserves-Interim Cut
- Selective Thinning

<sup>66</sup> [http://files.dnr.state.mn.us/forestry/ecssilviculture/ncsm/ncsm\\_oak.pdf](http://files.dnr.state.mn.us/forestry/ecssilviculture/ncsm/ncsm_oak.pdf)

**e. Regeneration methods:** The preferred method of regenerating oak stands is a shelterwood system to establish advance regeneration. Large-gap group selection methods in non-oak stands may be utilized to help increase the oak component. It is recommended that harvest methods and sale regulations protect advance regeneration and account for the site's NPC classification. Prescribed burning may be used to maintain or enhance these fire-dependent stands and also encourage natural regeneration.

Some control of understory competition may be necessary after the shelterwood harvest or prior to planting, or where there is competition from aspen sprouting.

Advance reproduction must be well-distributed and relatively tall (2-4 feet tall) in order to compete successfully with other woody vegetation in the new stand. Where advance reproduction is not well-distributed or not very tall, some success has been achieved with mowing of seedlings, which can help minimize competition and allow for more rapid growth of oak seedlings. Once advance reproduction is adequate, the overstory may be removed.

Protection of the seedlings from herbivory may be required. Various methods have been tried, such as bud caps and use of fencing (both semi-permanent barrier fencing and electric fencing).

#### **4.4D Stand selection**

During this 10-year planning period, stands will be selected for treatment by area field staff based on stand management objectives.

### **4.5 Black Spruce Lowland**

#### **4.5A Current condition**

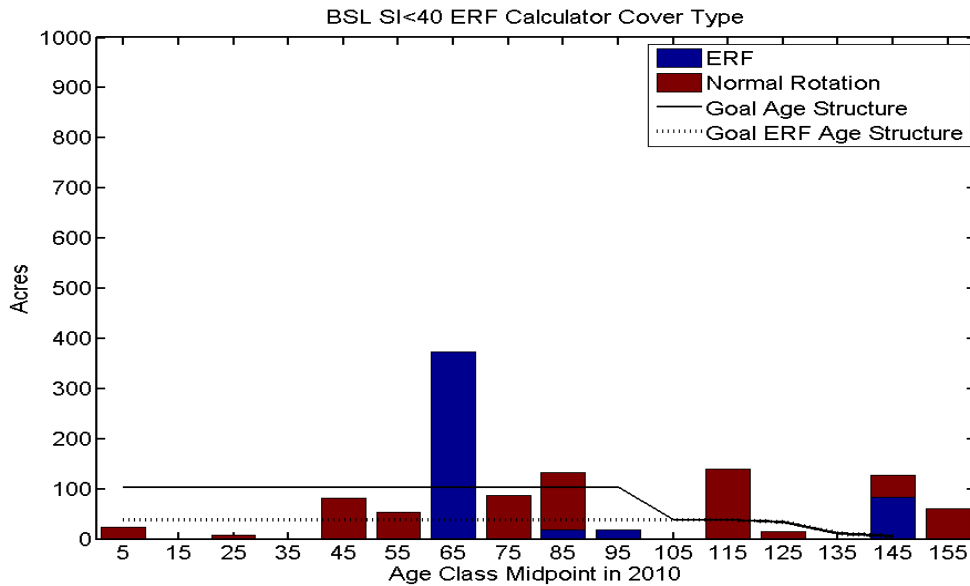
**a. Cover Type Acres:** In 2010, the lowland black spruce (BSL) cover type comprised 1.8 percent (1,697 acres) of the state-managed acres in the Subsection.

**b. Age-class distribution:** The current age-class distribution of the BSL cover type does not reflect the desired balanced age-class structure for even-aged managed cover types. Lowland black spruce has been divided into two site index groups ( $<40$  and  $\geq 40$ ) for determining harvest rotation ages and allowable treatment acres. Of the BSL cover type, 1,161 acres are currently site index  $<40$  and 536 acres are site index  $\geq 40$ . The current age-class distribution predominantly represents the 50-70 age classes, with lesser amounts in each of the younger and older age classes.

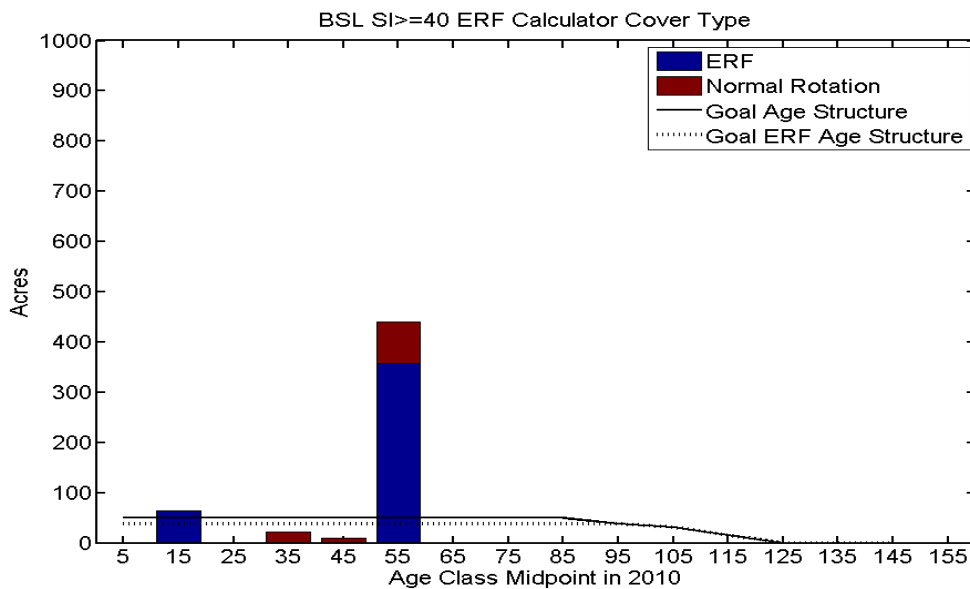
Black spruce has had markets and has been harvested for many years, but variable markets and limited amount of resource on state lands has produced an asymmetrical age-class distribution.

It is important to understand that black spruce occupies sites having a broad range of productivity. Trees on the poorer sites take many years to produce marketable products in harvestable quantities (see Figures 4.5a and 4.5b below).

**Figure 4.5a. Current and desired age-class distribution for low SI (<40) BSL cover type.**



**Figure 4.5b. Current and desired age-class distribution for high SI ( $\geq 40$ ) BSL cover type.**



**c. Stand composition:** Natural, mature BSL stands range from pure or nearly pure stands to mixed stands. Secondary species in the BSL cover type include tamarack, balsam fir, cedar, and birch.

**d. Native plant communities:** Information about Aspen Parklands NPCs in which lowland black spruce is typically found is located in the *NPC Field Guide*, and in the ECS silvicultural interpretations. Consult these references when managing lowland black spruce.

#### 4.5B Future direction

**a. Cover type acres:** The 50-year goal is that the BSL cover type acreage will remain similar to the current level. No deliberate losses or gains of the BSL cover type are recommended, although minor changes may occur due to inventory updates.

**b. Age-class distribution:** A goal is to move the age class distribution toward a balanced structure. The older age classes will be managed with enough ERF stands to provide adequate tapering of the age-class distribution out to the maximum age. It is important to note that in the Aspen Parklands, the BSL cover type occurs in relatively few, large acreage stands, making it impossible to create a perfectly balanced age class distribution through time.

**c. Stand composition:** The future stand composition goal in the BSL cover type is to maintain the range of species in the appropriate amounts that would normally be present in the associated NPC at a stand's current age as described by the Department's ECS system.

#### 4.5C Stand management

**a. Even-aged management direction:** The BSL cover type will be managed on an even-aged basis for pulpwood while accounting for wildlife habitat and biodiversity.

**b. Final harvest:** BSL stands will be treated through even-aged management using clearcuts or clearcuts with reserves. Efforts were made during the development of the 10-year stand selection list to identify larger blocks for harvest using natural stand boundaries.

Maintain secondary component species in BSL stands such as tamarack, white cedar, balsam fir, and paper birch. This can be accomplished through reserving seed trees, islands or clumps of mature trees, advance regeneration, or harvesting to promote sprouting of deciduous species.

**Limiting factors:** The spread of eastern dwarf mistletoe to regenerating stands of black spruce is a primary silvicultural concern in the management of this cover type. The following recommendations for harvest and post sale treatment are recommended to limit its spread:

1. Black spruce reserve trees are not recommended due to the possibility of spreading dwarf mistletoe infection to the regenerating stand.
2. All clearcuts should kill all live black spruce greater than 5 feet in height.
3. If the site is to be burned prescriptively, slash should be distributed evenly across the site.
4. Design timber sales boundaries to include mistletoe pockets plus a 2-chain (132 feet) buffer of non-infected black spruce.

**c. Harvest prescriptions:**

The following are the most common prescriptions that will be used on black spruce timber sale acres:

- Clearcut, followed by natural seeding
- Clearcut with Reserves, followed by natural seeding
- Clearcut, followed by artificial seeding
- Clearcut with Reserves, followed by artificial seeding

**d. Regeneration methods:**

Natural seeding or artificial seeding will be used to regenerate BSL stands after harvest. To reduce dwarf mistletoe infection in newly regenerating stands:

1. Use prescribed fire or winter shearing to remove all residual infected trees if they are not removed during timber harvest.
2. Regenerate densely stocked stands of black spruce because mistletoe spreads more slowly and causes less damage in them than open stands.

**4.5D Stand selection criteria**

The Remsoft harvest-scheduling model was used to optimize BSL stand selection based on the even-aged cover type scenario (see *Appendix I: Stand Selection Process Using Remsoft Woodstock-Stanley Harvest Scheduling Model*).

Lowland conifer stands that have been designated as ecologically important lowland conifers (EILC) will be reserved from harvest during this 10-year plan period or until such time that a DNR old-growth lowland conifer policy is developed, but they will be included in harvest-level calculations.

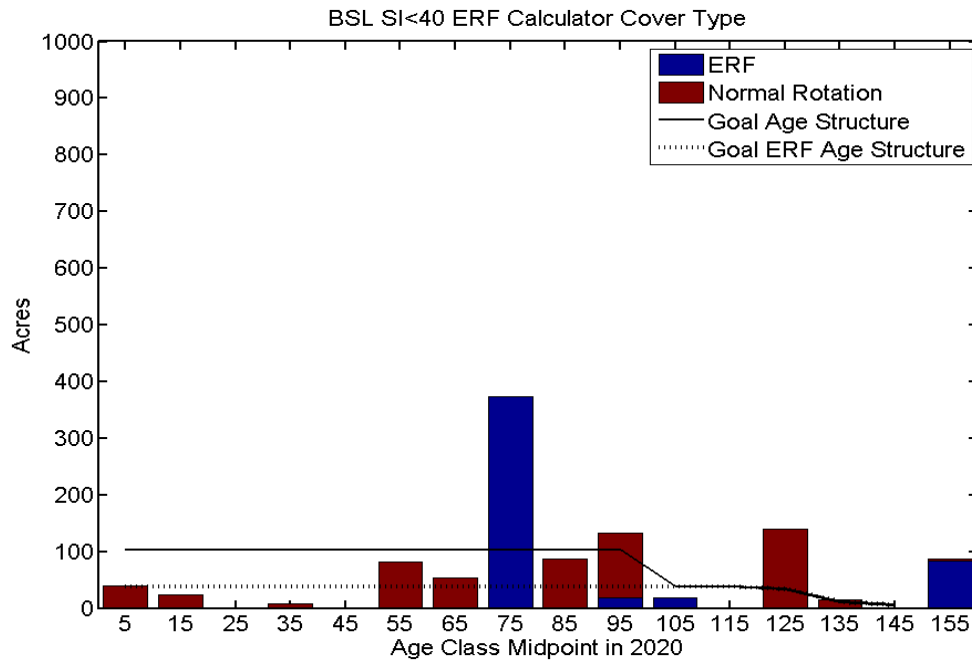
**a. Normal rotation forest:** Two site-index groups were used, with two corresponding NRAs. The objective is to move the age classes in each of the site index groups toward a more balanced structure. Table 3.9b in GDS-9A shows normal and maximum rotation ages for BSL by site index group.

**b. Extended rotation forest:** The selection of older-aged stands will be emphasized to help move the subset of ERF stands toward a desirable declining age-class structure. However, there are relatively few BSL stands in the cover type with over 40% of the total cover type acreage in just two large (>300 acre) stands. ERF in the BSL cover type was also chosen to compliment patch management and older forest complexes. One of the two large BSL stands was chosen as ERF, causing the ERF percentage of the BSL cover type to appear unusually large.

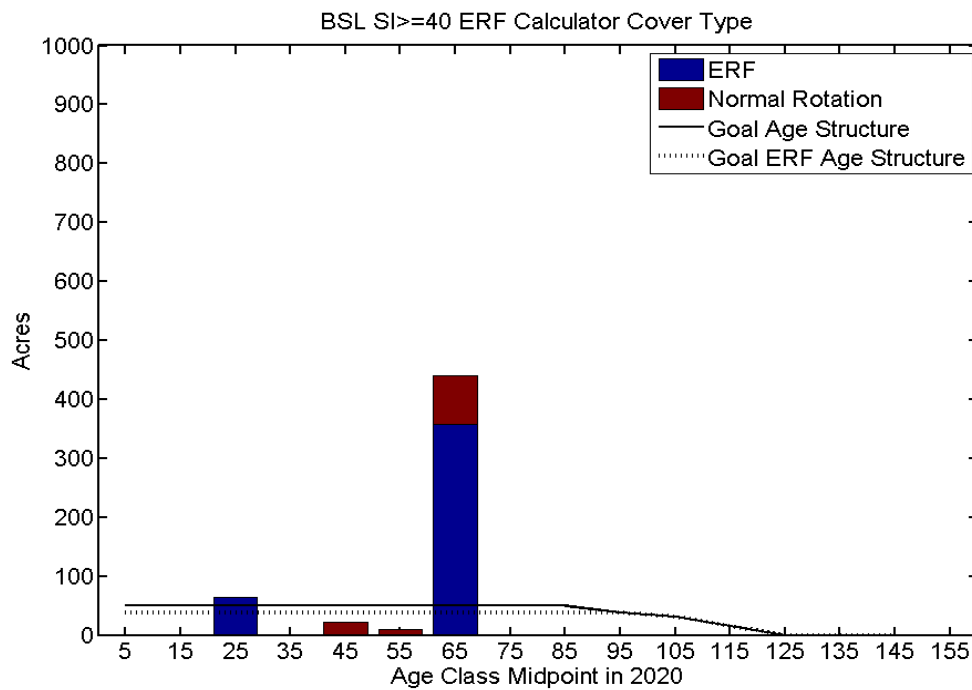
**4.5E Stand treatment summary**

Tables in GDS-9A of this plan show the modeled treatment levels (acres), old-forest percentages, effective ERF percentages, and the average treatment ages for the next five decades. There is variation from decade to decade because of the current age-class distribution and the number and sizes of stands in the cover type. Based on modeling of treatment levels, only 40 acres of BSL were selected for examination during the first decade of this plan.

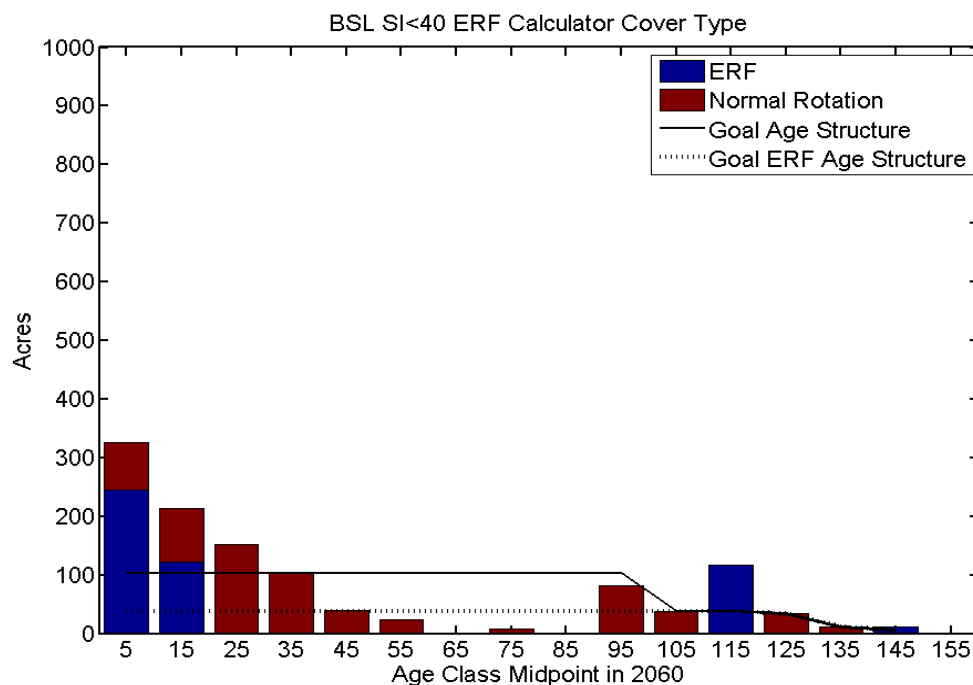
**Figure 4.5c. Projected age-class distributions for the low SI (<40) BSL cover type in 2020.**



**Figure 4.5d. Projected age-class distributions for the high SI ( $\geq 40$ ) BSL cover type in 2020.**

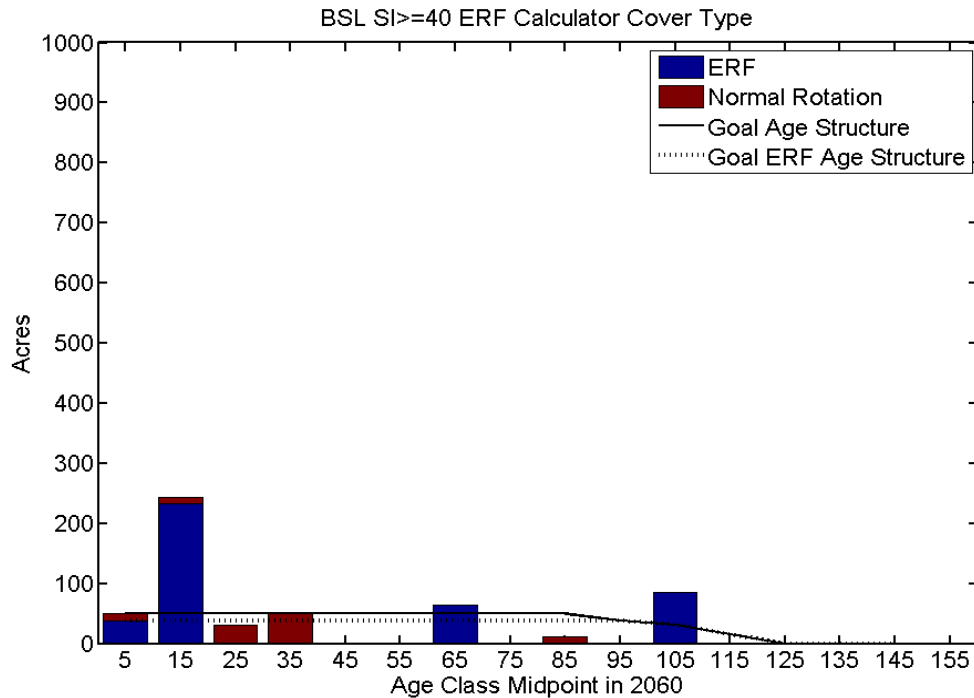


**Figure 4.5e. Projected age-class distributions for the low SI (<40) BSL cover type in 2060**



**Figure 4.5f. Projected age-class distributions for the high SI ( $\geq 40$ ) BSL cover type in 2060.**





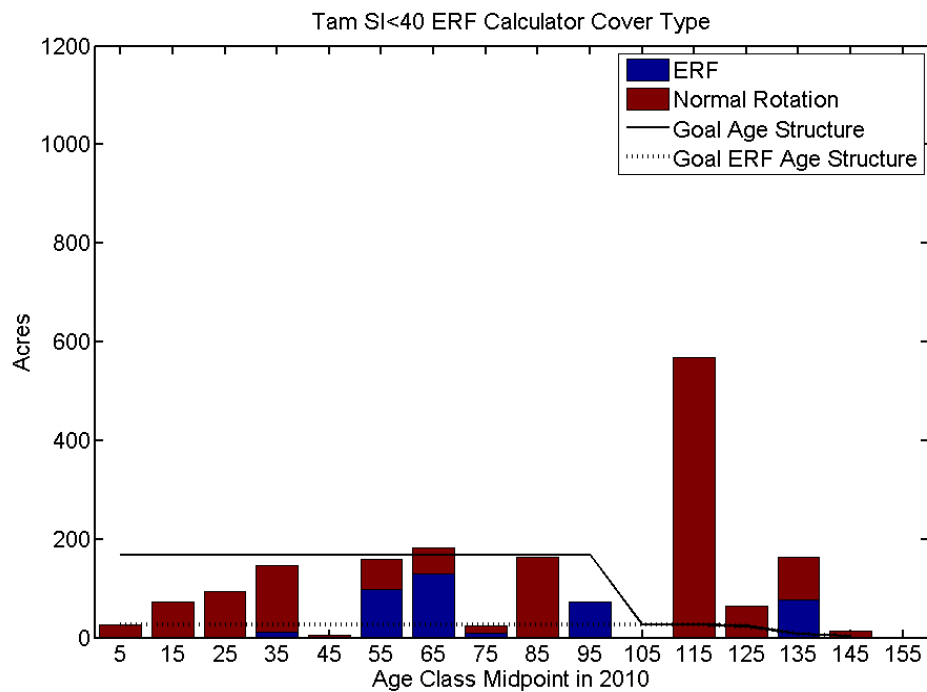
## 4.6 Tamarack

### 4.6A Current condition

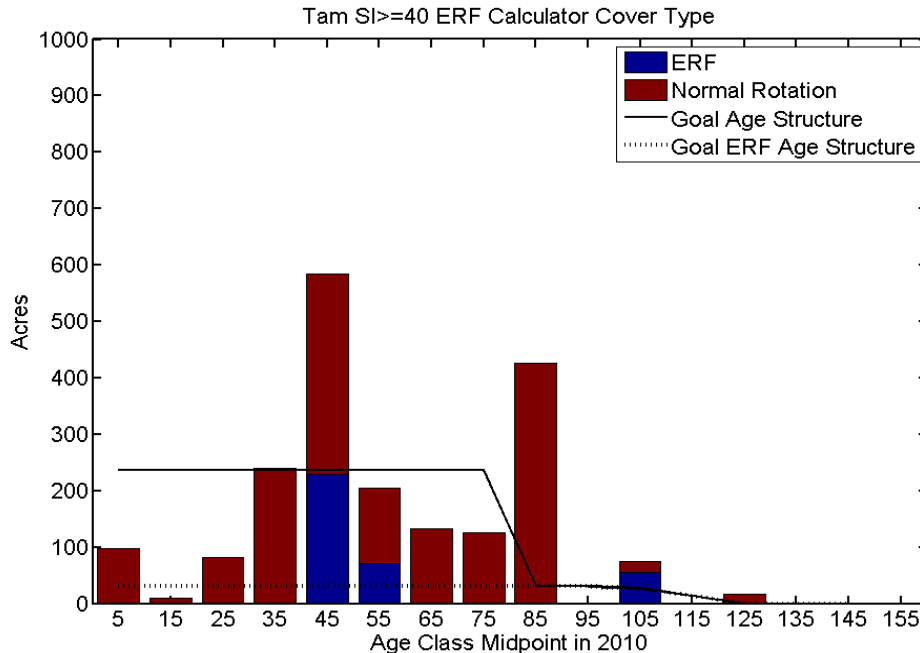
**a. Cover type acres:** In 2010, the tamarack cover type comprised 3.9 percent (3,754 acres) of the state-managed acres in the Subsection.

**b. Age-class distribution:** The current age-class distribution of the tamarack cover type does not reflect the desired balanced age-class structure for even-aged managed cover types.

**Figure 4.6a. Current and desired age-class distributions for low SI (<40) tamarack.**



**Figure 4.6b. Current and desired age-class distributions for high SI ( $\geq 40$ ) tamarack.**



**c. Stand composition:** Natural, mature tamarack stands range from pure or nearly pure stands to mixed stands. Secondary species in the cover type include black spruce, balsam fir, cedar, and birch.

**d. Native plant communities:** Information about Aspen Parklands native plant communities in which tamarack is typically found is located in the *NPC Field Guide*, and in the ECS silvicultural interpretations. Consult these references when managing tamarack.

#### 4.6B Future direction

**a. Cover type acres:** The 50-year goal is that the tamarack cover type acreage will be to maintain the current acreage in the cover type. No deliberate losses or gains of the cover type are recommended, although minor changes will occur due to inventory updates.

**b. Age-class distribution:** A goal is to move the age classes toward a balanced structure out to NRA, with a tapering age-class distribution out to the MRA. The older age classes will be managed with enough older stands (ERF) deferred from treatment to provide an adequate tapering age-class distribution out to the maximum age. The ERF goal for the high and low site index classes of this cover type is to have 5 percent of the acres over NRA at any one time.

**c. Stand composition:** The future stand composition goal in the tamarack cover type is to maintain the range of species in the appropriate amounts that would normally be present in the associated NPC at a stand's current age as described by the Department's ECS system.

#### 4.6C Stand management

**a. Even-aged management direction:** The tamarack cover type will be managed primarily by even-aged management methods for pulpwood while accounting for forest wildlife habitat and biodiversity.

**b. Final harvest:** Tamarack stands will be treated through even-aged management using clearcuts or clearcuts with reserves. Leaving about 10 wind-firm and vigorous tamarack trees with open-grown form (full crown) per acre is recommended for successful natural seeding. In areas of larch bark beetle outbreak, artificial seeding is recommended. Where possible, maintain secondary species such as white cedar, paper birch, and balsam fir. This can be accomplished by reserving seed trees, reserve islands, or clumps of mature trees or advance regeneration. Efforts were made during the development of the 10-year stand selection list to designate larger blocks for harvest, using natural stand boundaries.

**c. Harvest prescriptions:** The following are the most common prescriptions that will be used on tamarack timber sale acres:

- Clearcut, followed by natural seeding
- Clearcut with Reserves, followed by natural seeding
- Clearcut, followed by artificial seeding
- Clearcut with Reserves, followed by artificial seeding

**d. Regeneration methods:** Natural seeding and artificial seeding are the methods used to regenerate tamarack stands. Artificial seeding may be an option for maintaining secondary species, especially for black spruce, which is not recommended as a mature reserve tree due to the possibility of spreading dwarf mistletoe to black spruce regeneration. Artificial seeding is dependent upon availability of tamarack seed which can be difficult to obtain.

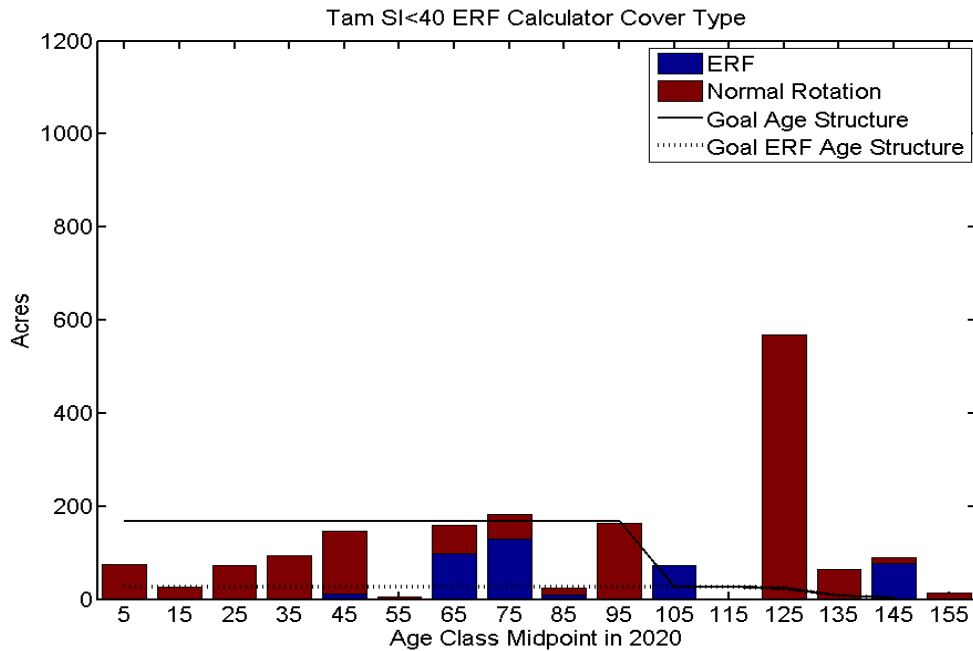
#### 4.6D Stand selection criteria

The Remsoft harvest-scheduling model was used to optimize tamarack stand selection based on the even-aged cover type scenario. Details about the modeling process can be found in *Appendix I: Stand Selection Process Using Remsoft Woodstock-Stanley Harvest Scheduling Model*. Normal and maximum rotation ages for cover types are in Table 3.5a in Chapter 3.

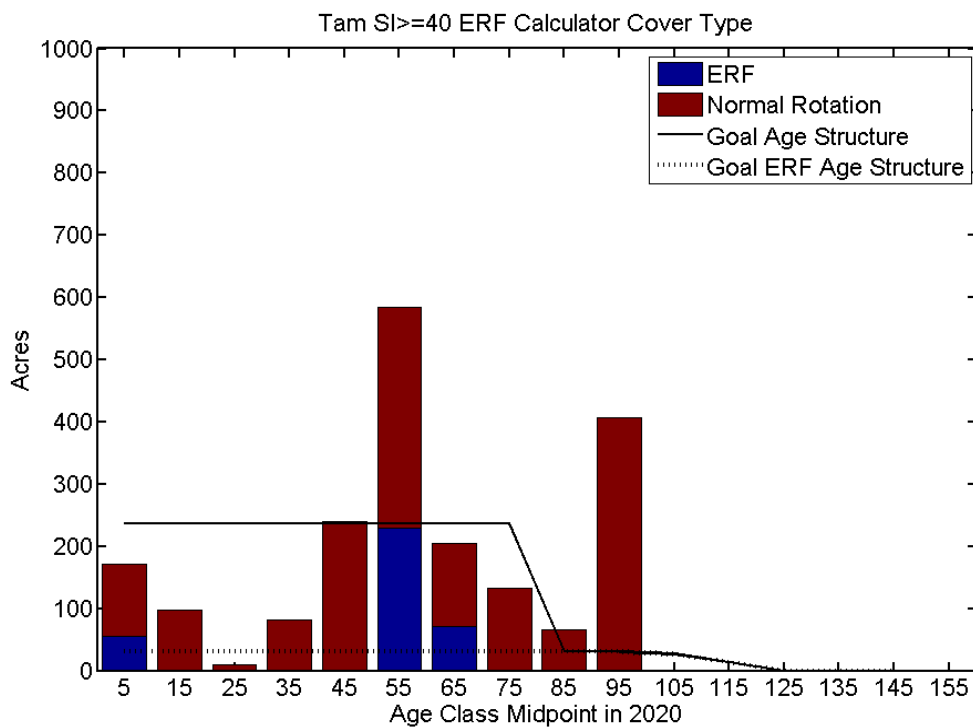
Lowland-conifer stands that have been designated as EILC will be reserved from harvest during this 10-year plan period or until such time as a DNR old-growth lowland-conifer policy is developed, but they will be included in harvest-level calculations.

1. **Normal rotation forest:** Two site-index groups were used with two corresponding NRAs. The objective is to move the age classes in each of the site-index groups toward a more balanced structure.
2. **Extended rotation forest:** The selection of older-age stands will be emphasized to help move the subset of ERF stands towards a desirable declining age-class structure. The long-term goal is to retain 5 percent of the cover type over the NRA and to provide a declining age-class structure out to the maximum harvest age.

**Figure 4.6c. Projected age-class distribution for low SI (<40) tamarack in 2020.**



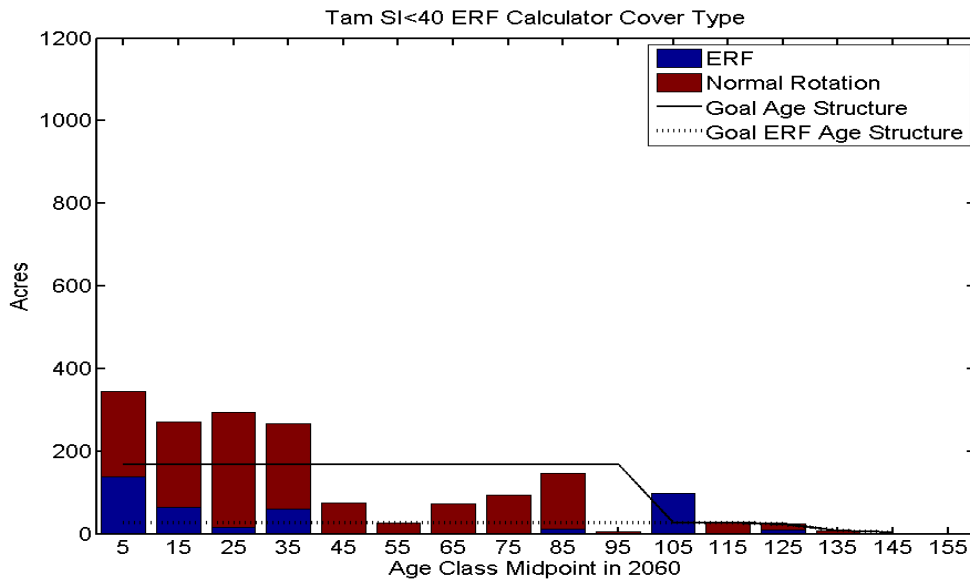
**Figure 4.6d. Projected age-class distributions for high SI ( $\geq 40$ ) tamarack in 2020.**



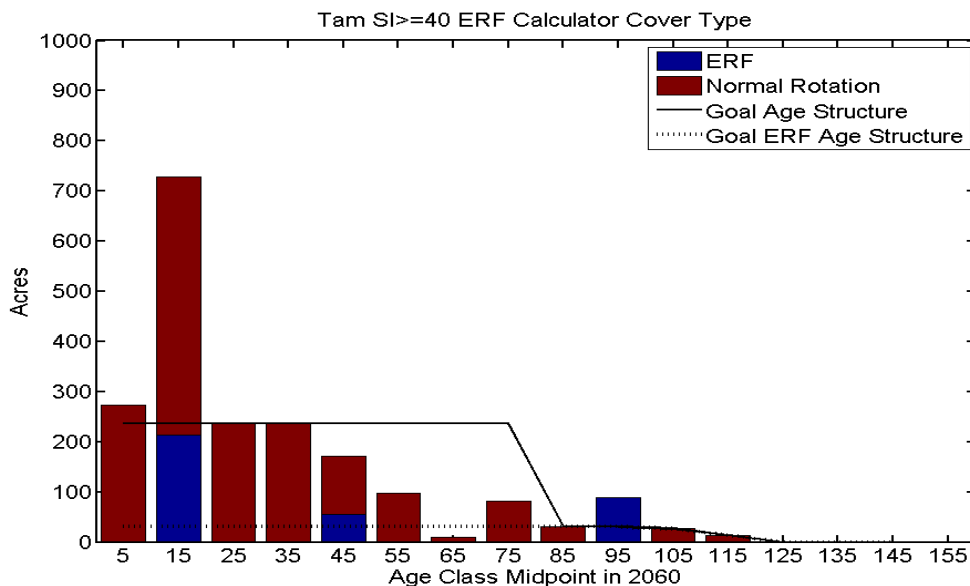
#### 4.6E Stand treatment summary

Tables in GDS-9A of Chapter 3 show the modeled treatment levels (acres), old forest percentage, effective ERF percentage, and the average treatment ages for the next five decades. There is variation from decade to decade because of the current age-class distribution of the cover type. Based on modeling of treatment levels by decade, Figures 4.6e and 4.6f show the projected age-class distributions in 2060 for the tamarack cover type.

**Figure 4.6e. Projected age-class distributions for low SI (<40) tamarack in 2060.**



**Figure 4.6f. Projected age-class distributions for high SI ( $\geq 40$ ) tamarack in 2060.**



## 4.7 Paper Birch, Northern Hardwoods, White Pine, Norway Pine, Jack Pine, Black Spruce Upland, White Spruce, Balsam Fir, and White Cedar

Due to the limited acreage for the cover types described in this section the Remsoft model was not used to select stands for treatment during this planning period. Area Forestry and Wildlife staff have been provided Table 4.7 and a description of cover type management directions for each cover type.

**Table 4.7. Non-modeled cover type management.**

	Paper Birch	Northern Hardwoods	White Pine	Red Pine	Jack Pine	White Spruce	Balsam Fir	White Cedar
Type Acres	94 acres	233 acres	4 acres	80 acres	166 acres	148 acres	98 acres	215 acres
0-20 years	0 acres	4 acres	1 acre	1 acre	101 acres	0 acres	0 acres	0 acres
21-50 years	82 acres	53 acres	3 acres	79 acres	30 acres	148 acre	26 acres	0 acres
51+ years	12 acres	175 acres	0 acres	0 acres	35 acres	0 acres	72 acres	215 acres
Stand Composition or Origin	natural	natural	plantations	plantations	natural and artificial regeneration	plantations	natural	natural
50 year DFFC	94 acres	233 acres	4 acres	0 acres	166 acres	148 acres	98 acres	515 acres
Future Age Class Dist.	maintain or improve	maintain or improve	NA	NA	maintain or improve	NA	maintain or improve	maintain or improve
Future Stand Composition	NA	NA	increase diversity (oak)	convert type (oak)	NA	increase diversity (oak/aspen)	NA	NA
Mgmt. Direction	Even age	Uneven age	Thin	Thin->Final	Even age	Thin	Even age	Even age
Final Harvest Method	Clearcut w/ reserves	Shelterwood	Clearcut	Clearcut	Clearcut w/reserves	Clearcut w/reserve	Clearcut w/reserves	Clearcut w/reserves
Regeneration Methods	natural seeding and sprouting	natural seeding and sprouting	natural seeding	NA	natural or artificial	natural seeding	natural seeding	natural seeding
Preferred Selection Criteria	select if above normal	select if above 80	select all	select all	select if above normal	select all	select if above normal	as I&D requires
ERF	56 acres ERF	NA	All ERF	0 acres ERF	0 acres ERF	0 acres ERF	47 acres ERF	All ERF

## 4.8 Brushland (upland and lowland)

### 4.8A Current condition

**a. Cover-type acres:** In 2010 the current upland or lowland brush cover type comprised 89,820 acres of the state-managed acres in the Subsection.

**b. Age-class distribution:** Unlike commercial forest types, information on the age of upland and lowland brush cover type stands is not collected through Cooperative Stand Assessment (CSA) or monitored consistently. Generally, stand age for these brush types would be considered the time since the last major natural disturbance or management activity (shearing, mowing, prescribed burning, or herbicide treatment). Managed brushlands are generally 0-20 years old and a portion of unmanaged brushlands may be older than 30 years.

One potential surrogate for stand age is the shrub density information collected through CSA. The 1990 Draft of the Long Range Plan for Brushland Habitats (MNDNR Division of Fish and Wildlife) thought brush density was indicative of stand openness and consequently, the successional stage. Stands in advanced stages of succession should be dominated by high or medium density brush; high density would also indicate decadence.

In this Subsection, brush density codes were available for 41,471 acres of the brush acreage. Sixty-three percent of this acreage had moderate brush density and 33% was listed as heavy density.

**c. Stand composition:** Species composition and density of upland and lowland brush cover types can be highly variable and is dependent on NPC, natural disturbances, management history, presence of invasive or exotic species, drainage, etc. In this Subsection, most of the acreage is lowland brush (82,692 acres), which is generally dominated by willow and alder species. Upland brush stands tend to be more variable in shrub composition but often include American hazelnut.

**d. Native plant communities:** Information about Aspen Parklands NPCs in which upland and lowland brush stands are typically found is located in the *NPC Field Guide*. Consult this reference when determining sites appropriate for upland and lowland brush emphasis.

### 4.8B Future direction

**a. Cover type acres:** Brushland acres will increase as “C” stands selected from the A/BG cover type group are treated and converted. The 50-year goal for grass, brush and oak savannah is to increase these types by 15,563 acres from the A/BG cover type “C” stands. Approximately half of this increase will occur in the first decade. The exact increase in brushland habitat will depend upon site specific goals based upon an evaluation of NPC information.

**b. Age-class distribution:** Managed upland and lowland brush stands are generally burned, mowed, grazed, or could support a biomass harvest on a 5 to 20-year rotation to promote vigorous growth and maintain open landscapes. A significant portion of the upland and lowland brush acres in this Subsection will have an older age structure due to access problems, low shrub densities, and/or wildlife habitat goals. Future timing of management



activities may be adjusted on a site specific basis if new ecological information suggests a longer or shorter interval would be more appropriate.

**c. Stand composition:** The future stand composition goal in brushlands is to maintain the range of species in the appropriate amounts that would normally be present in the associated NPC.

#### **4.8C Stand management**

**a. Management direction:** Currently, brushlands are primarily managed for wildlife habitat through treatments such as shearing followed by a prescribed fire a year later. Biomass harvest may play an important role in management of these sites in the near future. Existing management treatments and new biomass harvest techniques should be evaluated to prevent loss of species richness, loss of soil function and other negative impacts to these sites.

**b. Final harvest methods:** For any planned biomass harvest in brushlands, follow the biomass harvesting guidelines contained in the MFRC voluntary site-level forest management guidelines. These biomass guidelines contain guidance on reserve areas, type of structural habitat components to retain, and operational considerations when shearing or harvesting brush. A recent Brushland resource assessment in Minnesota estimated an average high density brush site contains 8.3 dry tons/acre while a medium density site contains 5.3 dry tons/acre.

#### **4.8D Stand selection criteria**

**a. Preferred stand selection criteria:**

For initial biomass harvest sites, consider offering larger sites with good access and high to medium density brush that are closer to biomass markets.

### **4.9 Openland (upland and lowland grass)**

#### **4.9A Current condition**

**a. Cover type acres:** In 2010 the current upland or lowland brush cover type comprised 91,263 acres of the state-managed acres in the Subsection.

**b. Age-class distribution:** Age classes for upland and lowland grass cover types are not collected and monitored as timber cover types are. Stand age for grasses generally refers to the timing between burning, mowing, or grazing and is currently tracked differently by each land manager. Age class can also refer to the time since planting for restored or enhanced stands.

**c. Stand composition:** Species composition for upland and lowland grass stands can be highly variable and is dependent upon: Presence or absence of non-native species; Whether or not it is a virgin (untilled) native grassland; Years since restoration or enhancement; Hydrology; Soils; etc. Virgin native prairie stands, for example, can have more than 200 different grass and forb species; whereas a wet prairie invaded by reed canarygrass may have fewer than 20. Tree and shrub species have become much more

common on upland and lowland grasslands in this Subsection since human settlement due primarily to encroachment from reduced fire prevalence and interval.

**d. Native plant communities:** Information about Aspen Parklands NPCs in which upland and lowland grass stands are typically found is located in the *NPC Field Guide*. Consult this reference when determining sites appropriate for upland and lowland grass emphasis.

#### 4.9B Future direction

**a. Cover type acres:** Grassland acres will increase as “C” stands selected from the A/BG cover type are treated and converted. The 50-year goal for grass, brush, and oak savannah is to increase these types by 15,478 acres from the A/BG cover type “C” stands. Approximately half of this increase will occur in the first decade. The exact increase in grass, brush, and oak savannah will depend upon site specific goals based upon an evaluation of NPC information.

**b. Age-class distribution:** Managed upland and lowland grass stands are generally burned, mowed, or grazed on a 3 to 5-year rotation to promote vigorous growth and stimulate seed production. Future timing of management activities may be adjusted on a site specific basis if new ecological information suggests a longer or shorter interval would be more appropriate.

**c. Stand composition:** The future stand composition goal in grasslands is to maintain the range of species in the appropriate amounts that would normally be present in the associated NPC as described by the Department’s ECS system.

#### 4.9C Stand management

**a. Management direction:** Grasslands are primarily managed for wildlife habitat and for their intrinsic value. Prescribed fire rotation intervals and timing should be evaluated on a site by site basis to prevent loss of species richness. Managers often harvest seed from native and restored/enhanced grasslands to generate revenue or to restore/enhance other grassland sites. A closely monitored grazing program should also be considered as a management tool when feasible. Restorations and enhancement projects should strive to plant at least a 25 species grass/forb mixture. Each site should be evaluated to assess proper management practices to help maximize diversity.

**b. Timing of harvest:** Recent research evaluating the use of grasslands for biofuel production may lead to increased consumptive demand on these cover types. Additional information is needed to determine the long-term implications of fire timing/intervals and seed and biomass removal from grasslands.

**c. Management methods:** Grasslands should be managed through grazing, haying, seed collection, mechanical treatment and prescribed burning. Where using prescribed fire, managers should continue to follow a 3 to 5-year rotation until site specific information indicates a more suitable interval. Seed harvest is often conducted the fall following a spring fire. Intense, short-duration, rotational grazing by bison is preferred, but difficult to accomplish. Managers primarily use cattle on a rotational grazing system, resting the grasslands from 1-3 years. Biomass harvest prescriptions are currently being investigated to determine impacts to long-term maintenance of grasslands.

## Chapter 5. Public Comments on Preliminary Issues and Assessment

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### 5.1 Background

A public comment period on the *Preliminary Issues and Assessment* document was initiated on September 15, 2009 and ended on September 30, 2009. Comments were accepted via letter, e-mail, or fax. A list of individuals and organizations that submitted comments can be found at the end of this chapter.

The comments submitted are listed below. Comments were read and considered by subsection team members during work on General Direction Statements (GDSs), Strategies, Cover Type Management Recommendations, and Stand Selection. The team's responses to specific comments are listed after each comment.

### 5.2 Specific Comments and Responses

1. **Comment:** Is there a current plan to create a state or federal park in the Aspen Parklands Subsection?

**Response:** The AP Team is not aware of any current plans to create additional state or federal parks in the Aspen Parklands Subsection. The team notes that within the subsection there are currently two state parks: Lake Bronson and Old Mill.

2. **Comment:** Care should be taken regarding timing of biofuel harvests, and retention of nutrients on sites following any biofuel harvests, thus minimizing any negative impacts on wildlife and ensuring the sites will be able to regenerate properly.

**Response:** The AP Team shares these potential concerns over biomass harvests. The team notes that the science behind biomass harvest is very new and evolving. There are currently numerous studies being conducted in an attempt to identify the proper amounts of biomass which can be removed vs. retained on sites where biomass is harvested. As the science evolves, the DNR will carefully consider the evidence in order to ensure that biomass harvest sites are managed properly. In addition, the DNR has developed site level guidelines for the harvest of biomass which will help address these concerns.

The team also notes that currently there is not a demand for potential biomass generated under this plan. Due to the lack of markets at this time, the team believes that the science of biomass harvests will be significantly advanced prior to any actual harvests in the Subsection taking place.

The timing of biomass harvests will minimize negative impacts on wildlife associated with the harvest site. Harvests are expected to be conducted during frozen ground periods.

### **5.3 List of Individuals Who Submitted Comments**

The following individuals/organizations have submitted comments on the *Preliminary Issues and Assessment* document.

1. Gary and Cindy Nelson
2. Dave Bennett – United States Fish and Wildlife Service; Refuge Manager, Rydell and Glacial Ridge National Wildlife Refuge

## Chapter 6. Appendices

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## 6.1 Appendix A. Ecological Classification System (ECS)

### 6.1A - Definition

The Ecological Classification System (ECS) is part of a nationwide mapping initiative developed to improve our ability to manage all natural resources on a sustainable basis.

The ECS is a method to identify, describe, and map units of land with different capabilities to support natural resources. This is done by integrating climatic, geologic, hydrologic, topographic, soil, and vegetation data.

In Minnesota, the classification and mapping is divided into six levels of detail (see Figure 6.1 for a map of Ecological Provinces, Sections, and Subsections of Minnesota. These levels are:

**Province:** Largest units representing the major climate zones in North America, each covering several states. Minnesota has four provinces: eastern broadleaf forest, Laurentian mixed forest, prairie parkland and tallgrass aspen parklands.

**Section:** Divisions within provinces that often cross state lines. Sections are defined by the origin of glacial deposits, regional elevation, distribution of plants and regional climate. Minnesota has 10 sections (e.g., Lake Agassiz, Aspen Parklands).

**Subsection:** County-sized areas within sections that are defined by glacial land-forming processes, bedrock formations, local climate, topographic relief, and the distribution of plants. Minnesota has 24 subsections (e.g., Aspen Parklands).

**Land type association:** Landscapes within subsections, characterized by glacial formations, bedrock types, topographic roughness, lake and stream patterns, depth to ground water table, and soil material (e.g., Bronson Lake Plain).

**Land type:** The individual elements of land type associations, defined by recurring patterns of uplands and wetlands, soil types, plant communities, and fire history (e.g., fire-dependent xeric pine-hardwood association).

**Community:** Unique combinations of plants and soils within land types, defined by characteristic trees, shrubs and forbs, elevation, and soil moisture (e.g., Mesic Aspen-Oak Woodland).

### 6.1B - Purpose of an Ecological Classification System

- Define the units of Minnesota's landscape using a consistent methodology.
- Provide a common means for communication among a variety of resource managers and with the public.
- Provide a framework to organize natural resource information.

- Improve predictions about how vegetation will change over time in response to various influences.
- Improve our understanding of the interrelationships between plant communities, wildlife habitat, timber production, and water quality.

#### **6.1C - End Products**

- Maps and descriptions of ecological units for provinces through land types.
- Field keys and descriptions to determine which communities are present on a parcel of land.
- Applications for management for provinces through communities.
- Mapping of province, section, subsection, and land type association boundaries is complete throughout Minnesota.

For more information on ECS visit: <http://www.dnr.state.mn.us/ecs/index.html>

**Figure 6.1. Ecological Provinces, Sections, and Subsections of Minnesota, 1999.**





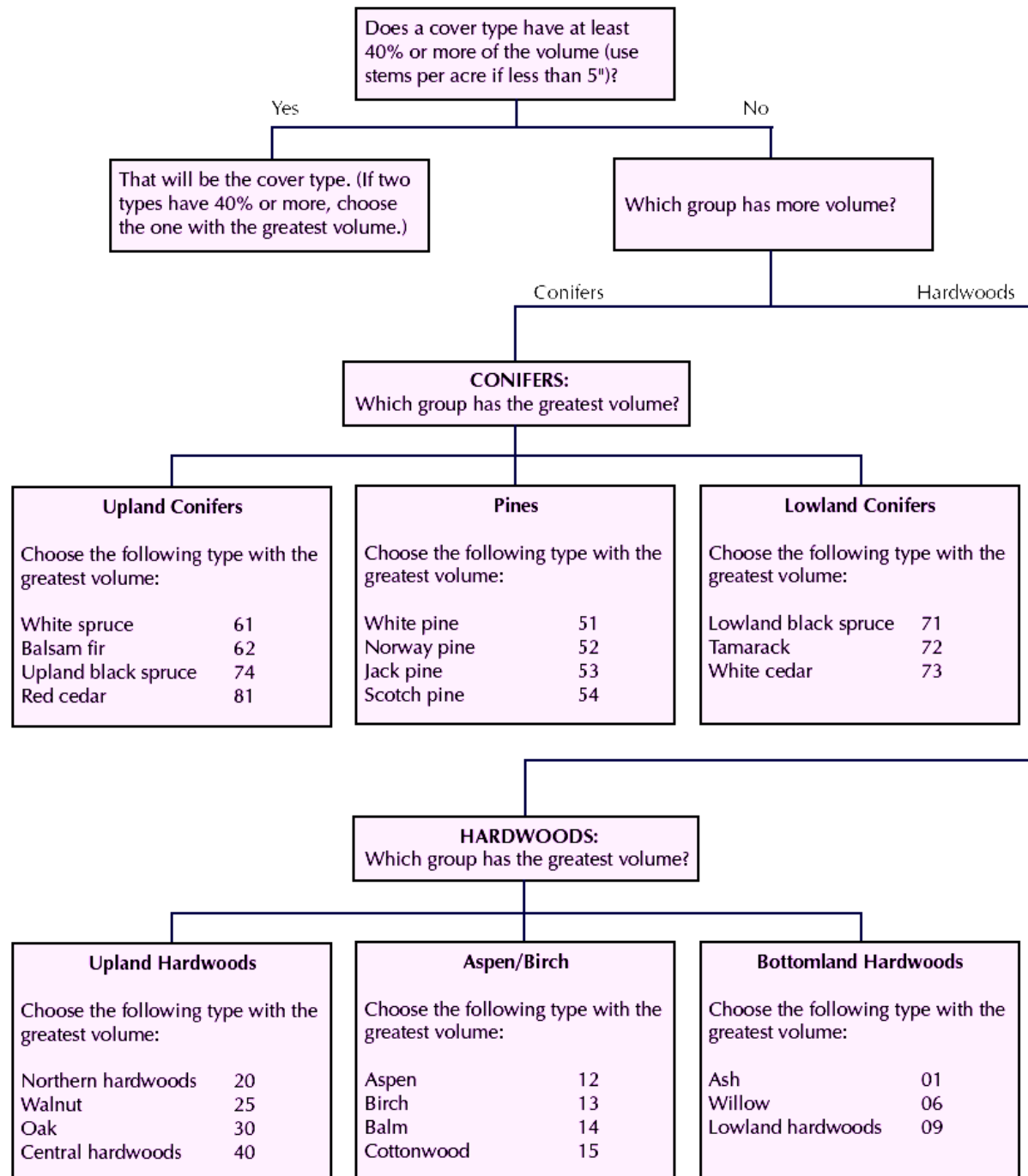
## 6.2 Appendix B. Common Tree Species and Cover Types.

**Table 6.2. Common Tree Species and Cover Types in the Aspen Parklands Subsection.**

Common name	Latin name	Cover Type Code
Quaking Aspen	<i>Populus tremuloides</i>	A
Offsite Aspen		Ax
balm of Gilead (Balsam Poplar)	<i>Populus balsamifera</i>	BG
Balsam Fir	<i>Abies balsamea</i>	BF
Paper Birch	<i>Betula papyrifera</i>	Bi
Black Spruce	<i>Picea mariana</i>	BSL (lowland)
		BSU (upland)
Cottonwood	<i>Populus deltoides</i>	Cot
Hybrid Poplar	<i>Populus spp.</i>	HP
Jack Pine	<i>Pinus banksiana</i>	JP
Lowland Hardwoods		LH
Black Ash	<i>Fraxinus nigra</i>	Ash
Green Ash	<i>Fraxinus pennsylvanica</i>	Ash
American Elm	<i>Ulmus Americana</i>	
Silver Maple	<i>Acer saccharinum</i>	
Box Elder	<i>Acer negundo</i>	
Northern Hardwoods		NH
Sugar Maple	<i>Acer saccharum</i>	
Red Maple	<i>Acer rubrum</i>	
Basswood	<i>Tilia Americana</i>	
Yellow Birch	<i>Betula alleghaniensis</i>	
Ironwood	<i>Ostrya virginiana</i>	
Oak (often included with NH)		O
Northern Red Oak	<i>Quercus rubra</i>	
Bur Oak	<i>Quercus macrocarpa</i>	
Offsite Oak		Ox
Red Pine (Norway Pine)	<i>Pinus resinosa</i>	NP
Stagnant Spruce		Sx
Tamarack	<i>Larix laricina</i>	T
White Cedar	<i>Thuja occidentalis</i>	C
White Pine	<i>Pinus strobes</i>	WP
White Spruce	<i>Picea glauca</i>	WS
Willow	<i>Salix spp.</i>	Wil
<b>Other common cover types</b>		
Lowland Grass		LG
Upland Grass		UG
Lowland Brush		LB
Upland Brush		UB
Marsh		Mh
Muskeg		Ms

## 6.3 Appendix C. Key for Main Cover Type Determination

# Key for Main Cover Type Determination




Some of the types may switch between groups depending on the physiographic class.

Number after cover type name is the cover type code.

From: Cooperative Stand Assessment (CSA) Users' Manual, DNR Division of Forestry, 2001.

## 6.4 Appendix D. Stand Silvicultural Prescription Worksheet



### STAND SILVICULTURAL PRESCRIPTION WORKSHEET - NW Region

Field Inspection by:

Date:  (Ctrl and ; enters today's date)

Forestry Area:

1. SRM Stand IDs:  <----- Acres
2. ECS:
 

☐ LTA –  
☐ Native Plant Community –  
☐ Growth Stage –
3. Soils: Soil type  or enter Soil Name:
4. Relevant General Goals from Mgmt. Plan:
5. Past Management Practices:
6. Present Conditions:
 

☐ General Composition & Structure

☐ Age (Main Species)   
☐ Site Index   
☐ Volumes

☐ Basal Area   
☐ Understory/Advance Regeneration

☐ Landscape Context
7. Forest Health:
8. Desired Future Stand Condition:
9. Prescription:

SRM Action	Approximate Year of Action	Acres	
(required)	Next site visit		

10. SRM Objective Codes:

View Mgmt Objective Definitions

11. Remarks/prescription rationale:

**Review :**  
 Prescription Writer:   
 Area Silviculture Program Forester:   
 Area Timber Program Forester:

Date:   
 Date:   
 Date:

## **6.5 Appendix E. Ecologically Important Lowland Conifers (EILC): Stand Designation Process**

### **6.5A - EILC Background**

As directed by policy each SFRMP process is required to identify EILC. The objective of this designation is to withhold from treatment for the 10 years of SFRMP implementation, adequate amounts of EILC across the subsections, so that the best representations can eventually be evaluated.

Subsection Planning Teams are directed to prepare criteria to define EILC, identify cover types in their subsections which reflect EILC characteristics and determine an adequate acreage for each EILC cover type sufficient to conserve the characteristics of the EILC.

Ecologically important lowland conifers are defined as stands of black spruce, tamarack, and cedar, including stagnant lowland conifers that are examples of high quality native plant communities (NPCs) that are representative of lowland conifer NPCs found in the subsections. The designated EILC stands will be reserved from treatment during the 10-year planning period.

EILC are reserved from treatment, for the period of time covered by the subsection plan, based on the ecologically important habitat or natural community type they represent. These reserved stands should be reviewed for continued protection at the beginning of the next cycle of subsection planning based on the Old Growth Guidelines or other guidelines in place at that future date.

### **6.5B - EILC Designation Process**

An EILC SFRMP work group convened to prepare a draft of the EILC designation. The EILC work group prepared background information, draft datasets, designation criteria and applied the EILC designation criteria to the appropriate cover types to identify specific EILC stands as policy directed. Area staff were also consulted for suggestions for EILC designation. The draft EILC designation was presented and approved by the AP SFRMP Planning Team. The AP SFRMP Planning Team adopted the following as presented by the EILC Work Group.

The total acreage of stands designated EILC is a function of:

- EILC percentage goal for the subsections; and,
- EILC Stand Designation Criteria

The suggested EILC percentage goal was determined to be 8% based on the total acres of old growth goal within the subsection, divided by the total acres of all old growth types within the subsection working boundary. The derived percentage was then doubled to produce the suggested EILC percentage goal as outlined in the instructions given by the DNR SFRMP Guidebook IV. This 8% goal was used by the AP EILC work group as a starting point in their selection of potential EILC stands. The following criteria were used to determine a starting point for EILC selection. Final selections were made by the team based on this. It is important to note that although the final EILC percentage was higher than the goal, the team determined that the uniqueness and relative rarity (<7000 acres) of lowland conifer NPCs in the subsection warranted additional EILC selection.

### 6.5C - Aspen Parklands EILC Stand Designation Criteria

Includes at least one of the following for lowland conifer stands:

- at least 100 years old;
- identified as biologically important due to natural heritage element occurrence points;
- compliment existing old growth or EILC candidate stands;
- stands large enough to maintain ecological function over time;
- partially or wholly within MCBS areas of high or outstanding biodiversity significance (HCVF candidate areas); and/or,
- compliment AP patch management goals and/or AP ERF stands

Table F.1 details the EILC acres selected for the AP Subsection.

**Table 6.5. EILC Acres Selected by Cover Type.**

Cover type	Black Spruce Lowland SI<40	Black Spruce Lowland SI>= 40	Tamarack SI<40	Tamarack SI>= 40	White Cedar	Total
Acres by cover type	315.3	0	821.9	450.8	70.6	1658.6
Percentage of cover type	27.17%	0%	46.76%	22.59%	32.88%	29.28%

## 6.6 Appendix F. Cover Type Conversion Goal Process

The process to set 10 and 50-year cover type acreage goals for the Aspen Parklands subsection started with Priority Open Landscape Area designation. Area wildlife staff began the designation process by reviewing DNR Wildlife's 2002 "An Assessment of Open Landscapes for Management of Brushland Wildlife Habitat in Northern and Central Minnesota" report which included LTA summaries for the Aspen Parklands subsection. Staff also reviewed other spatial and descriptive information by subsection or LTAs. This information included pre-settlement vegetation (from Marshner's map); bearing tree, corner, and line note information from the original public land survey; current land cover; current forest inventory data; forest management activities; habitat management history including burn units, shearing projects, etc.; detailed county soil survey information including classification and drainage class; NPC occurrence by LTA; openland species occurrences including records from the natural heritage database and locations of surveyed sharp-tailed grouse leks; management emphasis areas; conservation lands; and, boundaries of public natural resource management units (i.e. WPAs, SNAs, etc.).

Based on the above information, local field knowledge, and management objectives for particular areas, wildlife staff nominated all or portions of LTAs as Priority Open Landscape Areas. These Priority Open Landscape Areas were classified as either Openland (a habitat consisting of an open complex of vegetation with <1/3 total cover by shrubs and/or trees) or Brushland (a habitat consisting of a semi-open complex of vegetation with >1/3 total cover by shrubs and/or 1/3-2/3 total cover by trees). These nominated areas and associated management recommendations received interdisciplinary review and finally SFRMP team approval. The final product of this effort was a management agreement and designation map (see: Priority open landscape area and special management area designations map in *Appendix M: Maps*).

The next step in the cover type acreage goal process was identifying all aspen, balm of Gilead, and offsite aspen stands as T, O, S, R, and C stands (see aspen/balm of Gilead section of Chapter 4). "C" stands were to be converted to a grass or brush cover type. Area forestry and wildlife staff initially identified these aspen management areas with some interdisciplinary review based on the information, designations, and area input mentioned above. After an initial SFRMP team review of the aspen management areas, an interdisciplinary DFFC subgroup was formed to set cover type acreage goals and address some questions and concerns about the amount of "C" stands (18,878 acres) and their ecological appropriateness. This subgroup used an existing shapefile of soils information for the Aspen Parklands subsection to evaluate the Area's "C" and "R" selections. Soils queries were developed for NPCs that could have become an A, Bg, or AX stand and may be appropriate to convert back to an LG, UG, LB, or UB cover type. The DFFC subgroup used NPC scores based on this information and the CSA Cover Density codes to compromise on a lower C stand acreage (~15,500 acres) and increase the R stand acreage to account for the change.

The SFRMP team approved these changes to the C stand acreage and the following cover type acreage goals: the initial treatment of all C stand acreage will occur in the first 2 decades of the plan with approximately equal portions in each decade, approximately half of the O stand acreage will be treated in the first decade to increase the oak cover type acreage, over the next 50 years convert approximately 300 acres of ash/lowland hardwood to white cedar targeting MHn44c, WFn53, and WFn55 NPCs, the 80 acres of NP will be

converted after the first 10 years of the plan likely to non-forested cover types, and WS acreage will be moved out of plantation into appropriate NPCs.

## 6.7 Appendix G. SFRMP Additional Field Names and Codes

**Table 6.7. Non-standard FIM Field Names and Codes Used in the Aspen Parklands Subsections FIM Shapefile.**

Field Name and Codes	Description
<b>UNIQUE_ID</b>	<b>Unique identifier for each polygon in the shapefile</b>
<b>ADMIN</b>	<b>Land Administrator</b>
Wildlife	Section of Wildlife
Forestry	Division of Forestry
<b>ECS_NAME</b>	<b>“Working” Subsection stand is assigned to</b>
<b>NEW_AGE_10</b>	<b>Stand age modeled forward to 2010</b>
<b>NAGE_CLASS</b>	<b>NEW_AGE_10 grouped into 10 year age periods</b>
<b>INOPERABLE</b>	<b>1 = Inoperable – Land in the process of being sold during plan</b>
<b>MAN_ACRES</b>	<b>Stand Acres available for management</b>
<b>PAT_NOM</b>	<b>F = future patch, P = patch, Y = Young age, I = Intermediate age, O = Old age, 1 = Size Class 1 (&gt; 640 acres), 2 = Size Class 2 (251- 640 acres), 3 = Size Class 3 (101 – 250 acres), UD = Upland Deciduous, LC = Lowland Conifer</b>
<b>PAT_NAME</b>	<b>Provides a name to identify each patch in the shapefile. All stands within a patch have the same name. A null value indicates stand is not managed as a patch. The type of patch can be determined from the codes used in the PAT_NOM field.</b>
<b>SMA</b>	<b>Special Management Areas – Codes may be used in combination</b>
EMA	Elk Management Area
RGMA	Ruffed Grouse Management Area
OLMA	Open Landscape Management Area
<b>ERF</b>	<b>Extended Rotation Forest (ERF). Value of 9 = ERF</b>
<b>ERF_OBJ</b>	<b>ERR Objective codes, multiple may be assigned.</b>
A	Adjacent to areas being managed as old forest on other ownerships or DNR units (e.g., state parks, SNAs)
C	Part of a corridor linking other old forest areas.
D	Within a deer yard or other special management area
E	Within a targeted ECS LTA (i.e., with ability or history of supporting older forest)
L	Part of a large patch



Field Name and Codes	Description
N	Within an area containing rare and distinctive species or native plant communities
O	Within an OFMC or otherwise adjacent to designated old growth stands
R	Within or adjacent to a riparian area
V	Within a visually sensitive travel corridor or view shed
W	White pine policy
X	Other
<b>ERF_REAS</b>	<b>Main reason why ERF was selected for this stand.</b>
<b>EILC</b>	<b>Ecologically important lowland conifers – Reserve during this 10-year plan. Value of 9 = EILC</b>
<b>EILCREAS</b>	<b>Reasons why EILC was selected for this stand.</b>
<b>ASPMGMTFLD</b>	<b>Special aspen/balm of Gilead cover type management classification assigned by DNR Field Staff</b>
C	Covert to non forested cover type
O	Conversion to other forested cover type
R	Keep as a regenerated cover type state less than 20 years
S	Keep as a forested cover type younger than normal rotation age
T	Keep as a forested cover type that will be held to normal rotation age or older
<b>ASPCMNTFLD</b>	<b>Special aspen/balm of Gilead cover type management classification comment provided by DNR Field Staff</b>
<b>ASPMGMTMDL</b>	<b>Special aspen/balm of Gilead cover type management classification assigned by AP SFRMP Team to meet agreed plan goals.</b>
C	Covert to non forested cover type
O	Conversion to other forested cover type
R	Keep as a regenerated cover type state less than 20 years
S	Keep as a forested cover type younger than normal rotation age
T	Keep as a forested cover type that will be held to normal rotation age or older
<b>ASPCMNTMDL</b>	<b>Special aspen/balm of Gilead cover type management classification comment based on model rule needs.</b>
<b>OG_SMZ</b>	<b>Old Growth Special Management Zone. Value of 9 = OG_SMZ</b>
<b>OFMC</b>	<b>Old Forest Management Complex. Value of 9 = OFMC</b>
<b>CRITERIA</b>	<b>Not used in this plan</b>

Field Name and Codes	Description
<b>PRESCRIP</b>	<b>Preliminary assigned stand prescription</b>
1111	Clearcut with Reserves
1810	Commercial Thinning
9100	SFRMP On-Site Visit
<b>T_ACRES</b>	<b>Treatment acres. If stand has a valid PRESCRIP field, then this is the number of acres in the stand to be treated. May be less than MAN_ACRES due to only a partial stand treatment.</b>
<b>SE_YEAR</b>	<b>Planned year (FY) to complete the stand examination/appraisal</b>
<b>MGMT_CT</b>	<b>Cover type to manage for in the future (Cover type code) – Preliminary estimate. 15 aspen stands were selected to convert to oak forest in during the plan. An additional goal of approximately 7900 acres of Aspen/balm of Gilead is planned to be converted to an open cover type (grass or brush) based on ECS evaluation.</b>
<b>OBJECTIVE</b>	<b>Coding used to assign preliminary objectives to stands. Multiple codes may be assigned.</b>
MA1	Maintain similar species mix and stand structure
PAT2	Increase patch size.
COV??	Convert stand to cover type "XX" (from FIM cover type codes)
<b>FOR_COM</b>	<b>Forestry comments regarding the stand management</b>
<b>WLD_COM</b>	<b>Wildlife comments regarding the stand management. In addition to comments added by Wildlife staff during the stand swapping meetings, this field was also calculated for stands that overlapped Wildlife burn units, Special Management Areas and TNC study plot comment for the Karlstad Area.</b>
<b>ECO_COM</b>	<b>Ecological and Water Resources comments regarding the stand management. In addition to comments added by Eco staff during the stand swapping meetings, this field was also calculated for stands that overlapped rare features, HCVF, Site of Outstanding or High Biodiversity Significance and significant native plant communities.</b>
<b>FSH_COM</b>	<b>Not used in this plan.</b>
<b>COMMENT</b>	<b>General comments assigned to a stand during the planning process. In addition to general comments during stand swapping, this field was also calculated with stands for patch descriptions.</b>
<b>JT_VISIT</b>	<b>If coded, joint field visit desired by personnel from other Divisions. Stands may be tagged during the 10-year stand selection process or during annual harvest plan reviews.</b>
FSH	Not used in this plan.
WLD	Contact Area Wildlife personnel prior to the field visit. Wildlife

Field Name and Codes	Description
	personnel will tag stands with WLD that they want to do a joint site visit.
ECO	Contact Ecological and Water Resources (EWR) representative prior to the field visit. EWR personnel will tag stands with ECO that they want to do a joint site visit.
<b>NEW ACCESS NEEDS</b>	<b>Coding for new access needs in SFRMP. Only assigned to stands where new access is needed.</b>
<b>NA_TYPE</b>	<b>Type of new access – Only Temporary Access assigned in this plan.</b>
Temporary Access Route	No plans to keep access open for future management. <b>Temporary access route</b> will be abandoned and the site reclaimed so that evidence of a travel route is minimized.
<b>NA_MILE</b>	<b>New access miles only (estimate to nearest 0.1 mile)</b>
<b>NA_SW</b>	<b>New access season of use. S = summer; W = winter</b>
<b>NA_POST</b>	<b>Post management activity road treatment – Only A used in this plan.</b>
A	Abandon (applies to all new temporary access routes)
<b>RD_PERMIT</b>	<b>New access requires – Only Z used in this plan.</b>
Z	Access information assigned to another near-by stand

## 6.8 Appendix H. Priority Open Landscape Areas: Aspen Parklands SFRMP

One part of the SFRMP process is to identify areas that may be appropriate for openland management and designate Priority Open Landscape Areas. In cases where designating most of or an entire Land Type Association (LTA) is inappropriate, Special Management Areas (SMAs) can be delineated as subunits within LTAs. General management goals within designated portions of a LTA or SMAs differ from that of the rest of the LTA. Listed in the Table 6.8 below are LTAs with recommended Priority Open Landscape Areas designation (see accompanying spreadsheet/shapefile).

**Table 6.8. Recommended Priority Open Landscape Designations for the Aspen Parklands Subsection.**

LTA	% LTA in Openland	% LTA in Brushland	LTA Designation or Special Management Area (SMA)
Beach Ridges (223Na01)	55.2%	44.8%	LTA
New Folden Lake Plain (223Na02)	90.6%	9.4%	LTA
Strandquist Lake Plain (223Na03)	66.5%	33.5%	LTA
Thief River Falls Lake Plain (223Na04)	100%	0%	LTA
Goodridge Lake Plain (223Na05)	76.7%	20.1%	LTA
Mud Lake Plain (223Na06)	100%	0%	LTA
Blooming Valley Lake Plain (223Na07)	100%	0%	LTA
Bronson Lake Plain (223Na08)	28.4%	71.6%	LTA
Landcaster Lake Plain (223Na09)	100%	0%	LTA
Berner Lake Plain (223Na10)	40.5%	42.4%	LTA
Fourtown Peatlands (223Na11)	100%	0%	LTA
Ross Peatlands (223Na12)	81.8%	18.2%	LTA
Roseau Lake Plain (223Na14)	100%	0%	LTA
Gentilly Lake Plain (223Na15)	100%	0%	LTA
Roseau River Lake Plain (223Na16)	89.7%	0%	LTA
Brooks Lake Plain (223Na17)	100%	0%	LTA
Dohrman Ridge (223Na18)	0%	94.2%	LTA
Thief Lake Peatlands (223Na19)	34.4%	14.2%	SMA
Duxby Lake Plain (223Na25)	100%	0%	LTA

### 6.8A - Management Agreement

Most of the land area designated in these LTAs and SMAs for openlands management is on private land. On state lands in this subsection, the intent is these designations will guide vegetation management and planning.

These Priority Open Landscape Areas were classified as either Openland (a habitat consisting of an open complex of vegetation with <1/3 total cover by shrubs and/or trees) or

Brushland (a habitat consisting of a semi-open complex of vegetation with >1/3 total cover by shrubs and/or 1/3-2/3 total cover by trees). These definitions can be found on pages 14-15 of Wildlife's 2002 Assessment of Open Landscapes. The intent is the openlands management recommendations listed under private land and public land headings below will be followed more closely in Openland portions of Priority Open Landscape Areas.

It is important to note that wooded or forested cover types can be appropriate in both Brushlands and Openlands, especially in riparian areas or riverine systems depending on the NPC.

As per the Forest Management Coordination Framework, project desires on Wildlife and Forestry lands will be run past the other Divisions for discussion/approval—also, communication re: project desires and work on other lands will occur as directed by policy.

### **Private Land:**

- 1) When landowners within an openland SMA or LTA request DNR advice in managing their land, or in some cases contacted by DNR, we are asking that they be advised of the potential, where appropriate, to enhance the openland habitat on their property. Staff involved in the DNR's Private Lands Program and Forest Stewardship Program can provide assistance. As an example, the Private Land Specialists can work on openlands management plans and/or seek public funds for openlands management projects.
- 2) Due to negative effects on openlands species, we ask that tree planting within an openland SMA or LTA generally be discouraged. DNR Private Land Specialists are working with local Soil and Water Conservation Districts to provide guidance to their programs. It is recognized that the ultimate decision resides with the landowners: the main goal here is to insure they understand what potential their land has for open landscape species and the negative impacts of tree planting on those species.

### **Public Land:**

- 1) Use of shorter rotation ages for species normally managed under even-aged harvest systems (e.g. aspen, balsam of Gilead, birch) will be generally encouraged.
- 2) ERF designation should be avoided in designated Openland SMA's and LTA's, although ERF may be appropriate in riparian areas and other special circumstances.
- 3) Snags and leave trees will generally be discouraged to the extent possible in cover types that are usually managed with even-aged harvest systems (e.g. aspen, balsam of Gilead, birch). MN Forest Resources Council *MFRC Site-Level Guidelines* allow for flexibility in snag/leave tree application where open landscape concerns are documented. Individual site implementation will be discussed during annual stand review meetings. Where a decision is made that snags and or leave trees may occur within an openlands LTA/SMA, we are likely to suggest that they be left in clumps, and preference be given to placement on the edge of sales.
- 4) Attempts may be made to increase the average size of harvest areas within designated LTAs and SMAs in an attempt to increase the size of young patches—

primarily within stands in cover types usually managed with even-aged harvest systems.

- 5) Foresters may be encouraged to drop slightly below normal rotation ages on some stands to increase patch size and create younger patches. Some aspen stands in Brushland areas will be managed above merchantable and below normal rotation age.
- 6) Conifer planting within Priority Open Landscape Areas on public lands will generally be discouraged to prevent harm to openlands species.
- 7) Conversion of forested cover types to non-forested ones will occur in Priority Open Landscape Areas, but will occur primarily on lands classified as Openlands.
- 8) Direction from the “Interdisciplinary Forest Management Coordination Framework” will apply with respect to coordination on potential open lands management projects on public lands. Forestry and Ecological and Water Resources will be coordinated with prior to implementation of proposed open lands projects within the SMA, with project review and approval requirements from the policy applied where needed (e.g. where wildlife may desire an openlands project on forestry administered land).

To view a map of priority open landscape areas please see: Priority open landscape area and special management area designations map in *Appendix M: Maps*.

## 6.9 Appendix I. Stand Selection Process Using Remsoft Woodstock-Stanley Harvest Scheduling Model

### 6.9A. Goal and Objectives

The goal of this project is to incorporate landscape-level information about existing spatial patterns and forest conditions into stand treatment designations. (i.e. to create a 10-year stand treatment list.)

### 6.9B. Process

The stand treatment lists were generated using Remsoft Spatial Planning System (RSPS, Fredericton, NB, Canada), a forest estate and harvest schedule model based on linear programming (LP). LP is an optimization technique where an algorithm searches for the “best” solution – “best” being that the solution satisfies a mathematical objective. For subsection planning the objective is to maximize total cordwood volume harvested relative to a set of management constraints or goals at the subsection level. In the SFRMP a 50-year planning horizon, consisting of 10 5-year planning periods, was used throughout. Only the initial 10 years were used to create the stand treatment list and the remaining 40 years served as a check on longer-term goals and sustainability.

RSPS was initialized using a subset of FIM variables and stands: Only age, cover type, and site index were used. Growth and yield were determined using published volume equations from Walters and Ek (1993, Whole Stand Yield and Density Equations for Fourteen Forest Types in Minnesota, *Northern Journal of Applied Forestry*, 10:75-85). These stand-level equations allow for the calculation of merchantable gross volume, basal area, and quadratic mean diameter at any given age. Due to the nature of the subsection the only cover types included in the RSPS were Aspen, balsam of Gilead, Tamarack and Black Spruce. No other cover types were modeled because their acreage amounts were inconsequential. For example, the team decided not to include the four acres of white pine in the model. However, stands from the non-modeled cover types were added “manually” to the 10-year treatment list based on the plan’s management recommendations for each cover type.

The tables shown below detail the model constraints that were used to generate the 10-year stand exam list:

**Table 6.9a. Model constraints that were used to generate the 10-year stand exam list.**

Cover Type(s)	Group	System	Stand Exam List	Merchant-able Age	NRA	MRA	DFFC EERF % <sup>2</sup>	% EERF in 1st Bar > NRA <sup>2</sup>
Ash/Lowland Hardwoods <sup>1</sup>		Uneven-aged	Model					
Aspen/balm of Gilead/Offsite Aspen*	"T" stands	Even-aged	Model	35	45	65	3.0%	67.0%
	"O" stands	Even-aged		35	45	65		
	"S" stands	Even-aged	Model	35	45	45	0.0%	NA
	"R" stands	Even-aged	Model	31/5	45/20	45/20	0.0%	NA
	"C" stands	Even-aged	Model	31/NA	45/NA	45/NA	NA	NA
Black Spruce, Lowland	SI < 40	Even-aged	Model	80	100	160	11.0%	30.0%
Black Spruce, Lowland	SI ≥ 40	Even-aged	Model	70	90	120	16.0%	45.0%
Tamarack	SI < 40	Even-aged	Model	70	100	160	5.0%	30.0%
Tamarack	SI ≥ 40	Even-aged	Model	50	80	120	5.0%	30.0%
Balsam Fir		Even-aged	Area Staff	40	50	60		
Birch		Even-aged	Area Staff	35	45	55		
Lowland or Upland Grass/Lowland or Upland Brush	Grass/Brush	NA	Area Staff					
Hybrid Poplar		Even-aged	Area Staff					
Jack Pine		Even-aged	Area Staff	35	50	70		
Northern Hardwoods		Uneven-aged	Area Staff					
Northern White Cedar		Uneven-aged	Area Staff					
Oak		Even-aged	Area Staff	35	80	170		
Red Pine		Even-aged	Area Staff	30	100	150		
White Pine		Even-aged	Area Staff					
White Spruce		Even-aged	Area Staff	30	70	100		



**Table 6.9b. Model constraints that were used to generate the 10-year stand exam list.**

Cover Type(s)	Group	DFFC Age-Class Distribution <sup>3</sup>	Current ERF Acres	Current Acres	10-year DFFC Acres	10-year DFFC % (+ or -)	50-year DFFC Acres	50-year DFFC % (+ or -)
Ash/Lowland Hardwoods <sup>1</sup>		NA		3,101	3,101	0.0%	2,801	-9.7%
Aspen/balm of Gilead/Offsite Aspen*	"T" stands	Yes	3,809	28,560	28,560	-1.4%	28,560	-2.6%
	"O" stands			749	349		0	
	"S" stands	Yes	0	16,576	16,576	-13.6%	16,576	-27.3%
	"R" stands	Yes	0	24,595	24,595		24,595	
	"C" stands	No	0	15,478	7,750		0	
Black Spruce, Lowland	SI < 40	Yes	495	1,161	1,161	0.0%	1,161	0.0%
Black Spruce, Lowland	SI ≥ 40	Yes	422	536	536		536	
Tamarack	SI < 40	Yes	397	1,758	1,758	0.0%	1,758	0.0%
Tamarack	SI ≥ 40	Yes	357	1,996	1,996		1,996	
Balsam Fir		No	47	98	98	0.0%	98	0.0%
Birch		No	56	94	94	0.0%	94	0.0%
Lowland or Upland Grass/Lowland or Upland Brush	Grass/Brush	NA		181,083	188,816	4.3%	196,646	8.6%
Hybrid Poplar		No	0	5	0	-100.0%	0	-100.0%
Jack Pine		No	0	166	166	0.0%	166	0.0%
Northern Hardwoods		NA		233	233	0.0%	233	0.0%
Northern White Cedar		NA	215	215	215	0.0%	515	139.5%
Oak		No	967	967	1,367	41.4%	1,716	77.5%
Red Pine		No	0	80	80	0.0%	0	-100.0%
White Pine		No	4	4	4	0.0%	4	0.0%
White Spruce		No	0	148	148	0.0%	148	0.0%
Total			6,767	277,603	277,603		277,603	

## 6.10 Appendix J. Native Plant Communities in the AP Subsection

**Table 6.10a. Statewide Heritage Conservation Ranks (S-Ranks) for Native Plant Communities.**

<b>NPC S-Rank</b>	<b>Definition</b>
S1	Critically imperiled.
S2	Imperiled.
S3	Rare or uncommon.
S4	Widespread, abundant, and apparently secure, but with cause for long-term concern.
S5	Demonstrably widespread, abundant and secure.

In the tables below, S-ranks are separated by a slash if there is more than one possible NPC Type or Subtype with a unique S-rank. Those with an S-rank of S1S2 or S2S3 indicate a community which may yet be classified as either of the two types because of uncertainty.

**Table 6.10b. Known Native Plant Communities Classes of the Aspen Parklands subsection.**

<b>NPC Class Code</b>	<b>Plant Community Classification</b>	<b>Potential S-rank(s) for NPC Types and Subtypes</b>
APn81	Northern Poor Conifer Swamp	4/5
APn91	Northern Poor Fen	3/4/5
FDw24	Northwestern Dry-Mesic Oak Woodland	2/3
FDw34	Northwestern Mesic Aspen-Oak Woodland	3/4
FDw44	Northwestern Wet-Mesic Aspen Woodland	3/4
FFn57	Northern Terrace Forest	3
FPn63	Northern Cedar Swamp	3/4
FFn67	Northern Floodplain Forest	3
FPn71	Northern Rich Spruce Swamp (Water Track)	3
FPn73	Northern Rich Alder Swamp	5
FPs63	Southern Rich Conifer Swamp	S2S3
FPw63	Northwestern Rich Conifer Swamp	3
LKi32	Inland Lake Sand/Gravel/Cobble Shore	1/2
LKi54	Inland Lake Clay/Mud Shore	1/3/4
MHs38	Southern Mesic Oak-Basswood Forest	3
MHn44	Northern Wet-Mesic Boreal Hardwood-Conifer Forest	2/3/4
MHw36	Northern Wet-Mesic Hardwood Forest	2
MRn83	Northern Mixed Cattail Marsh	2

<b>NPC Class Code</b>	<b>Plant Community Classification</b>	<b>Potential S-rank(s) for NPC Types and Subtypes</b>
MRp93	Prairie Bulrush-Arrowhead Marsh	1
OPp91	Prairie Rich Fen	3
OPp93	Prairie Extremely Rich Fen	1/2
RVx32	Sand/Gravel/Cobble River Shore	3/4
RVx54	Clay/Mud River Shore	2/3
UPn12	Northern Dry Prairie	1/2
UPn13	Northern Dry Savanna	1/2
UPn23	Northern Mesic Prairie	2
UPn24	Northern Mesic Savanna	1/2
WFn53	Northern Wet Cedar Forest	3/4
WFn55	Northern Wet Ash Swamp	3/4
WFW54	Northwestern Wet Aspen Forest	4
WMn82	Northern Wet Meadow / Carr	4/5
WMP73	Prairie Wet Meadow/Carr	3
WMS83	Southern Seepage Meadow/Carr	2/3
WMS92	Southern Basin Wet Meadow/Carr	2
WPn53	Northern Wet Prairie	2/3

**Table 6.10c. Known Native Plant Communities Types of the Aspen Parklands subsection.**

<b>NPC Type Code</b>	<b>Plant Community Classification</b>	<b>Potential S-rank(s) for NPC Types and Subtypes</b>
APn81b	Poor Tamarack - Black Spruce Swamp	4
APn91a	Low Shrub Poor Fen	5
FDw24a	Bur Oak - (Prairie Herb) Woodland	2
FDw24b	Bur Oak - (Forest Herb) Woodland	3
FDw34a	Aspen - (Prairie Herb) Woodland	3
FDw44a	Aspen - (Cordgrass) Woodland	3
FDw44b	Aspen - (Chokecherry) Woodland	4
FFn57a	Black Ash - Silver Maple Terrace Forest	3
FPS63a	Tamarack Swamp (Southern)	S2S3
FPw63a	Tamarack - Black Spruce Swamp (Aspen Parkland)	3
MHW36a	Green Ash - Bur Oak - Elm Forest	2
OPp91a	Rich Fen (Mineral Soil)	3

<b>NPC Type Code</b>	<b>Plant Community Classification</b>	<b>Potential S-rank(s) for NPC Types and Subtypes</b>
OPp91b	Rich Fen (Peatland)	3
OPp91c	Rich Fen (Prairie Seepage)	3
OPp93a	Calcareous Fen (Northwestern)	2
UPn12a	Dry Barrens Prairie (Northern)	1
UPn12b	Dry Sand - Gravel Prairie (Northern)	2
UPn12c	Dry Sand - Gravel Brush-Prairie (Northern)	1
UPn13b	Dry Barrens Oak Savanna (Northern)	S1S2
UPn13c	Dry Sand - Gravel Oak Savanna (Northern)	1
UPn23a	Mesic Brush-Prairie (Northern)	2
UPn23b	Mesic Prairie (Northern)	2
UPn24b	Aspen Openings (Northern)	2
WFn53b	Lowland White Cedar Forest (Northern)	3
WFn55c	Black Ash - Mountain Maple Swamp (Northern)	4
WFn54a	Lowland Black Ash - Aspen - Balsam Poplar Forest	4
WMn82a	Willow - Dogwood Shrub Swamp	5
WMn82b	Sedge Meadow	4/5
Wmp73a	Prairie Meadow/Carr	3
Wms83a	Seepage Meadow/Carr	3
WPn53a	Wet Seepage Prairie (Northern)	2
WPn53b	Wet Brush-Prairie (Northern)	3
WPn53c	Wet Prairie (Northern)	3
WPn53d	Wet Saline Prairie (Northern)	2

For more information please see the “Field Guide to the Native Plant Communities of Minnesota: The Prairie Parklands and Tallgrass Aspen Parklands Provinces”<sup>67</sup>

<sup>67</sup> Minn. DNR, 2005, *Field Guide to Native Plant Communities of Minnesota: The Prairie Parkland and Tallgrass Aspen Parklands Province*. Ecological Land Classification Program, Minnesota County Biological Survey, Natural Heritage and Nongame Research Program. Minnesota Department of Natural Resources St. Paul, MN 55155.

## **6.11 Appendix K. Wildlife Species List/Habitat Relationships for the Aspen Parklands Subsection**

<b>Table</b>	<b>Page</b>
Table 6.11a. Wildlife Species List/Habitat Relationships – Mammals .....	6.27
Table 6.11b. Wildlife Species List/Habitat Relationships – Birds.....	6.29
Table 6.11c. Wildlife Species List/Habitat Relationships – Amphibians and Reptiles. ....	6.38

This page contains a standard table header format, column/row format, content description and selected species examples for the following tables: Amphibians and Reptiles, Birds, and Mammals.

[illegible][illegible]

SPECIES GROUP:	Notes a common species group to search by.
Species common name:	Species common name as standardized through NatureServe located at < <a href="http://www.natureserveexplorer.org">www.natureserveexplorer.org</a> >.
Habitat feature:	C = Cavity, D = Dead/down material, M = Mast, R = Riparian, S = Snag, V = Vernal pool
Habitat relationships:	Y = species utilizes noted land cover type for at least part of its habitat needs (i.e. patch size or buffer distance not noted in this simplified matrix)
Forest size class/successional stage:	Y = species utilizes noted age class/successional stage for at least part of its habitat needs.

**DISCLAIMER:** Information and data listed in these tables has been produced by ongoing wildlife species assessment efforts conducted under the *Minnesota Gap Analysis Project (MN-GAP)*. This effort and related tables noted here are initial products that are currently in various stages of literature and expert review. Review and comments on these tables and contents is encouraged. Please contact the MNDNR Division of Wildlife at 218-833-8620 for comments or suggested revisions.

**Table 6.11a. Wildlife Species List/Habitat Relationships – Mammals**

		Mammal habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
		Non-Forest land cover types>>>								Forest land cover types>>>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
SPECIES GROUP	Species common name	habitat Feature	Barren	Urban/ Dev.	Ag./Grass	Shrub	Aquatic	Upland Coniferous Forest	Lowland Coniferous Forest	Upland Deciduous Forest	Lowland Deciduous Forest												Forest size class																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
																								High intensity urban	Low intensity urban	Transportation	Cropland	Grassland	Prairie	Upland shrub	Lowland deciduous shrub	Lowland evergreen shrub	Water	Floating aquatic	Sedge Meadow	Broadleaf sedge/Cattail	Jack Pine	Red Pine	White Pine mix	Balsam Fir mix	White Spruce	Upland Black Spruce	Up. N. White Cedar	Upland Conifer	Up. coniferous/deciduous mix	Lowland Black Spruce	Stagnant black spruce	Tamarack	Stagnant tamarack	Low. N. White Cedar	Stagnant N. White Cedar	Stagnant conifer	Aspen/White Birch	Bur/White Oak	Red Oak	Maple/Basswood	Upland deciduous mix	Black Ash	Silver Maple	Cottonwood	Lowland deciduous mix	Low. deciduous/coniferous mix	Seeding	Sapling	Pole timber	Saw timber	Uneven																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Northern Short-tailed Shrew	D			Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y</

Mammal	Habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type Non-Forest land cover types>>>	Forest land cover types>>>
American Badger		
American Beaver		
American Bittern		
American Coot		
American Crow		
American Goldeneye		
American Great Crested Newt		
American Osprey		
American Pipit		
American Robin		
American Shrike Tit		
American Woodcock		
Belted Kingfisher		
Belted Plover		
Belted Sandpiper		
Belted Sparrow		
Belted Vireo		
Belted Wren		
Belted Yellowthroat		
Belted Zebra Finch		
Belted Zebra Gull		
Belted Zebra Hawk		
Belted Zebra Owl		
Belted Zebra Snake		
Belted Zebra Tortoise		
Belted Zebra Turtle		
Belted Zebra Frog		
Belted Zebra Salamander		
Belted Zebra Lizard		
Belted Zebra Insect		
Belted Zebra Plant		
Belted Zebra Fungus		
Belted Zebra Mammal		
Belted Zebra Bird		
Belted Zebra Reptile		
Belted Zebra Amphibian		
Belted Zebra Fish		
Belted Zebra Invertebrate		
Belted Zebra Microorganism		
Belted Zebra Other		

51 Mammal species



**Table 6.11b. Wildlife Species List/Habitat Relationships – Birds**

Chapter 6.11. Appendix K

**Table 6.11b. Wildlife Species List/Habitat Relationships – Birds (continued).**

		Bird habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type>>>														Forest land cover types>>>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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				Urban/ Dev.		Ag./Grass		Shrub		Aquatic		Upland Coniferous Forest				Lowland Coniferous Forest		Upland Deciduous Forest		Lowland Deciduous Forest																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		Barren		High intensity urban		Low intensity urban		Transportation		Cropland		Grassland		Prairie		Upland shrub		Lowland deciduous shrub		Lowland evergreen shrub		Water		Floating aquatic		Sedge Meadow		Broadleaf sedge/Cattail		Jack Pine		Red Pine		White Pine mix		Balsam Fir mix		White Spruce		Upland Black Spruce		Up. N. White Cedar		Upland Conifer		Up. coniferous/deciduous mix		Lowland Black Spruce		Stagnant black spruce		Tamarack		Stagnant tamarack		Low. N. White Cedar		Stagnant N. White Cedar		Stagnant conifer		Aspen/White Birch		Bur/White Oak		Red Oak		Maple/Basswood		Upland deciduous mix		Black Ash		Silver Maple		Cottonwood		Lowland deciduous mix		Low. deciduous/coniferous mix																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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**Table 6.11b. Wildlife Species List/Habitat Relationships – Birds (continued).**

		Bird habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type>>														Forest land cover types>>>																												
SPECIES GROUP	Species Common Name	Habitat feature	Non-Forested types>>>														Forest land cover types>>>																											
			Barren	Urban/ Dev.	Ag./Grass	Shrub		Aquatic		Upland Coniferous Forest			Lowland Coniferous Forest	Upland Deciduous Forest	Lowland Deciduous Forest																													
			High intensity urban	Low intensity urban	Transportation	Cropland Grassland	Prairie	Upland shrub	Lowland deciduous shrub	Lowland evergreen shrub	Water	Floating aquatic	Sedge Meadow	Broadleaf sedge/Cattail	Jack Pine	Red Pine	White Pine mix	Balsam Fir mix	White Spruce	Upland Black Spruce	Up. N. White Cedar	Upland Conifer	Up. coniferous/deciduous mix	Lowland Black Spruce	Stagnant black spruce	Tamarack	Stagnant tamarack	Low. N. White Cedar	Stagnant N. White Cedar	Stagnant conifer	Aspen/White Birch	Bur/White Oak	Red Oak	Maple/Basswood	Upland deciduous mix	Black Ash	Silver Maple	Cottonwood	Lowland deciduous mix	Low. deciduous/coniferous mix				
CRANES																																												
	Sandhill Crane					Y	Y	Y		Y	Y	Y	Y	Y																														
PLOVERS																																												
	Killdeer	R	Y	Y		Y	Y	Y	Y																																			
SANDPIPERS																																												
	American Avocet							Y			Y	Y	Y	Y																														
	Spotted Sandpiper	R	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y																														
	Upland Sandpiper					Y	Y	Y	Y	Y			Y	Y																														
	Marbled Godwit					Y	Y	Y					Y	Y																														
	Common Snipe								Y	Y	Y		Y	Y												Y	Y		Y	Y														
	American Woodcock						Y		Y	Y																	Y	Y		Y	Y	Y	Y	Y										
	Wilson's Phalarope						Y	Y			Y	Y	Y	Y																														
JAEGER, GULLS AND TERNS																																												
	Forster's Tern										Y	Y	Y	Y																														
	Black Tern										Y	Y	Y	Y																														
PIGEONS AND DOVES																																												
	Mouming Dove			Y		Y	Y								Y	Y	Y	Y	Y	Y	Y	Y	Y																					
CUCKOOS																																												
	Black-billed Cuckoo							Y	Y																																			
	Yellow-billed Cuckoo							Y	Y																																			
OWLS																																												
	Great Horned Owl	CS		Y			Y	Y							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y																				
	Barred Owl	C													Y	Y	Y	Y	Y	Y	Y	Y	Y	Y																				
	Long-eared Owl						Y						Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y															
	Short-eared Owl					Y	Y	Y		Y	Y			Y	Y																													
	Northern Saw-whet Owl	C						Y							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y											Y	

Bird habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type>>  
Non-Forested types>>> Forest land cover types>>>

Chapter 6.11. Appendix K

**Table 6.11b. Wildlife Species List/Habitat Relationships – Birds (continued).**

SPECIES GROUP Species Common Name		Bird habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type>>> Non-Forested types>>&													
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Bird habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type>>  
Non-Forested types>>> Forest land cover types>>>

Chapter 6.11. Appendix K

**Table 6.11b. Wildlife Species List/Habitat Relationships – Birds (continued).**

		Bird habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type>>>																											
		Non-Forested types>>>>										Forest land cover types>>>>																	
		Urban/ Dev.		Ag./Grass		Shrub		Aquatic		Upland Coniferous Forest				Lowland Coniferous Forest		Upland Deciduous Forest		Lowland Deciduous Forest											
		High intensity urban Low intensity urban Transportation		Cropland Grassland Prairie		Upland shrub Lowland deciduous shrub Lowland evergreen shrub		Water Floating aquatic Sedge Meadow Broadleaf sedge/Cattail		Jack Pine Red Pine White Pine mix Balsam Fir mix White Spruce Upland Black Spruce Up. N. White Cedar Upland Conifer		Up. coniferous/deciduous mix		Lowland Black Spruce Stagnant black spruce Tamarack Stagnant tamarack Low. N. White Cedar Stagnant N. White Cedar Stagnant conifer		Aspen/White Birch Bur/White Oak Red Oak Maple/Basswood Upland deciduous mix		Black Ash Silver Maple Cottonwood Lowland deciduous mix Low. deciduous/coniferous mix											
SPECIES GROUP																													
Species Common Name																													
Habitat feature																													
TOWHEES AND SPARROWS																													
Eastern Towhee	M						Y	Y						Y															
Chipping Sparrow				Y			Y							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y						Y
Clay-colored Sparrow							Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y							Y
Vesper Sparrow						Y	Y	Y	Y					Y															Y
Lark Sparrow				Y		Y	Y	Y	Y					Y															
Savannah Sparrow						Y	Y	Y	Y	Y	Y			Y	Y														
Baird's Sparrow							Y	Y																					
Grasshopper Sparrow				Y		Y	Y	Y	Y					Y															
Le Conte's Sparrow						Y	Y	Y		Y	Y			Y	Y														
Nelson's Sharp-tailed sparrow							Y	Y		Y	Y																		
Song Sparrow							Y	Y						Y															
Lincoln's Sparrow									Y					Y															
Swamp Sparrow						Y			Y	Y				Y	Y	Y	Y		Y										Y
White-throated Sparrow							Y	Y						Y		Y	Y		Y										Y
Dark-eyed Junco							Y							Y		Y	Y												Y
GROSBEAKS																													
Rose-breasted Grosbeak	M			Y															Y	Y	Y	Y	Y						
Indigo Bunting							Y	Y											Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
BLACKBIRDS AND ORIOLES																													
Bobolink						Y	Y	Y	Y	Y	Y			Y															
Red-winged Blackbird	R					Y	Y		Y	Y	Y	Y																	
Western Meadowlark						Y	Y	Y	Y	Y																			
Yellow-headed Blackbird	R									Y				Y	Y														
Brewer's Blackbird	R			Y		Y	Y	Y	Y	Y	Y			Y	Y				Y	Y	Y	Y					Y		
Common Grackle				Y		Y	Y	Y		Y	Y																		
Brown-headed Cowbird						Y	Y	Y	Y																				
Orchard Oriole							Y	Y	Y																				
Baltimore Oriole	MR			Y																									



**Table 6.11b. Wildlife Species List/Habitat Relationships – Birds (continued).**

SPECIES GROUP Species Common Name			Habitat feature		Bird habitat relationships by Minnesota Gap Analysis Project (MN-GAP) land cover type>>>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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					Barren	Urban/ Dev.	Ag./Grass	Shrub	Aquatic	Upland Coniferous Forest	Lowland Coniferous Forest	Upland Deciduous Forest	Lowland Deciduous Forest	Low. deciduous/coniferous mix	Forest size class																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
					High intensity urban	Low intensity urban	Transportation	Cropland	Grassland	Prairie	Upland shrub	Lowland deciduous shrub	Lowland evergreen shrub	Water	Floating aquatic	Sedge Meadow	Broadleaf sedge/Cattail	Jack Pine	Red Pine	White Pine mix	Balsam Fir mix	White Spruce	Upland Black Spruce	Up. N. White Cedar	Upland Conifer	Up. coniferous/deciduous mix	Lowland Black Spruce	Stagnant black spruce	Tamarack	Stagnant tamarack	Low. N. White Cedar	Stagnant N. White Cedar	Stagnant conifer	Aspen/White Birch	Bur/White Oak	Red Oak	Maple/Basswood	Upland deciduous mix	Black Ash	Silver Maple	Cottonwood	Lowland deciduous mix	Low. deciduous/coniferous mix	Seedling	Sapling	Pole timber	Saw timber	Uneven																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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**Table 6.11c. Wildlife Species List/Habitat Relationships – Amphibians and Reptiles.**

[illegible]

## 6.12 Appendix L. Terrestrial Vertebrate Species List, Status and Trends.

### Terrestrial Vertebrate Wildlife Species, Legal Status and Trends Aspen Parklands ECS Subsection

**Information Source:** The following information has been summarized from ongoing efforts of the Minnesota Gap Analysis Project (MN-GAP), a project to provide a statewide assessment on the conservation status of native vertebrate species and natural land cover types.

**Species Criteria:** Species criteria for Mn-GAP includes the following: 1) Be known to breed in Minnesota (evidence of breeding 5 of the past 10 years) and be a regularly occurring non-accidental, 2) Be listed as state endangered, threatened, or special concern or as federally endangered or threatened, 3) Be listed as a furbearer, big game, small game, or migratory bird in Minnesota, and, 4) Be an exotic species in Minnesota that impacts native species or is of management interest.

**Species Group:** Notes one of four major species groups - Amphibians, Birds, Mammals, and, Reptiles.

**Species Common and Scientific Names:** Notes standard MN-GAP protocol based on NatureServe and its related searchable plant, animal and ecological database called NatureServe Explorer located at [www.natureserveexplorer.org](http://www.natureserveexplorer.org). Names that are \* are animals whose populations are rare, declining or vulnerable to decline and are below levels desirable to ensure their long term health and stability.

**Minnesota Legal Status:** E = State Endangered; T = State Threatened; SC = State Species of Special Concern; BG = Big Game; SG = Small Game; F = Furbearer; MW = Migratory Waterfowl; UB = Unprotected Bird; PB = Protected Bird; PWA = Protected Wild Animal; UWA = Unprotected Wild Animal. Note: A species may have more than one Minnesota Legal Status notation.

**Federal Legal Status:** T = Federal Threatened; E = Federal Endangered; P = Federal Protection by the Migratory Bird Treaty Act or Bald Eagle Protection Act or CITES.

**Trend:** For Birds only, notes one of the following statewide population trends as referenced from USGS Breeding Bird Survey data: -- Significant decline; - Non-significant decline; \* No trend noted; + Non-significant increase; ++ Significant increase.

**Range Status:** Notes a species range modifier to this ECS Subsection: B = Breeding or PR = Permanent Resident. Also, an (L) may be listed with these range codes if the species has a limited distribution in the Subsection due to specific habitat needs. Note: These range notations by ECS subsections represent the current occurrence of these wildlife species based on ECS subsections. Animal distributions are dynamic and revisions may be made as new information becomes available.

**DISCLAIMER:** Information and data listed in these tables has been produced by ongoing wildlife species assessment efforts conducted under various programs within the MNDNR Division of Fish and Wildlife, Wildlife Management Section. These efforts and related tables noted here are initial products that are currently in various stages of literature and expert review. Review and comments on these tables and contents is encouraged. Please contact the MNDNR Division of Wildlife at 218-833-8620 for comments or suggestions.

Range Status	Species Common Name	Scientific Name	Federal Legal Status	MN Legal Status	Population Trend
<b>AMPHIBIANS</b>					
PR	Tiger Salamander	<i>Ambystoma tigrinum</i>			
PR	Mudpuppy *	<i>Necturus maculosus</i>			
PR	Eastern Newt	<i>Notophthalmus viridescens</i>			
PR	American Toad	<i>Bufo americanus</i>		PWA	
PR	Canadian Toad	<i>Bufo hemiophrys</i>		PWA	
PR	Cope's Gray Treefrog	<i>Hyla chrysoscelis</i>		PWA	
PR	Gray Treefrog	<i>Hyla versicolor</i>		PWA	
PR	Western Chorus Frog	<i>Pseudacris triseriata</i>		PWA	
PR	Northern Leopard Frog	<i>Rana pipiens</i>		PWA	
PR	Wood Frog	<i>Rana sylvatica</i>		PWA	

<b>REPTILES</b>					
PR	Snapping Turtle *	<i>Chelydra serpentina</i>		PWA, SC	
PR	Painted Turtle	<i>Chrysemys picta</i>		PWA	
PR	Prairie Skink	<i>Eumeces septentrionalis</i>			
PR	Redbelly Snake	<i>Storeria occipitomaculata</i>			
PR	Plains Garter Snake	<i>Thamnophis radix</i>			
PR	Common Garter Snake	<i>Thamnophis sirtalis</i>			
PR	Smooth Green Snake *	<i>Liochlorophis vernalis</i>			

<b>BIRDS</b>					
B	Common Loon *	<i>Gavia immer</i>	P	PB	nt
B	Pied-billed Grebe	<i>Podilymbus podiceps</i>	P	PB	--
B	Horned Grebe *	<i>Podiceps auritus</i>	P	PB, T	
B	Red-necked Grebe *	<i>Podiceps grisegena</i>	P	PB	
B	Eared Grebe *	<i>Podiceps nigricollis</i>	P	PB	
B	Western Grebe *	<i>Aechmophorus occidentalis</i>	P	PB	nt
B	Clark's Grebe	<i>Aechmophorus clarkii</i>	P	PB	nt
B	Double-crested Cormorant	<i>Phalacrocorax auritus</i>	P	UB	+
B	American Bittern *	<i>Botaurus lentiginosus</i>	P	PB	--
B	Least Bittern *	<i>Ixobrychus exilis</i>	P	PB	
B	Great Blue Heron	<i>Ardea herodias</i>	P	PB	-
B	Great Egret	<i>Ardea albus</i>	P	PB	++
B	Green Heron	<i>Butorides virescens</i>	P	PB	+
B	Black-crowned Night-Heron *	<i>Nycticorax nycticorax</i>	P	PB	nt
B	Trumpeter Swan *	<i>Cygnus buccinator</i>	P	PB, MW, T	
B	Canada Goose	<i>Branta canadensis</i>	P	PB, MW	++
B	Wood Duck	<i>Aix sponsa</i>	P	PB, MW	+
B	Green-winged Teal	<i>Anas crecca</i>	P	PB, MW	nt
B	Mallard	<i>Anas platyrhynchos</i>	P	PB, MW	-
B	Northern Pintail *	<i>Anas acuta</i>	P	PB, MW	nt

Range Status	Species Common Name	Scientific Name	Federal Legal Status	MN Legal Status	Population Trend
B	Blue-winged Teal	<i>Anas discors</i>	P	PB, MW	--
B	Northern Shoveler	<i>Anas clypeata</i>	P	PB, MW	nt
B	Gadwall	<i>Anas strepera</i>	P	PB, MW	nt
B	American Wigeon	<i>Anas americana</i>	P	PB, MW	
B	Canvasback	<i>Aythya valisineria</i>	P	PB, MW	nt
B	Redhead	<i>Aythya americana</i>	P	PB, MW	nt
B	Ring-necked Duck	<i>Aythya collaris</i>	P	PB, MW	+
B	Lesser Scaup *	<i>Aythya affinis</i>	P	PB, MW	nt
B	Common Goldeneye	<i>Bucephala clangula</i>	P	PB, MW	nt
B	Bufflehead	<i>Bucephala albeola</i>	P	PB, MW	
B	Hooded Merganser	<i>Lophodytes cucullatus</i>	P	PB, MW	nt
B	Ruddy Duck	<i>Oxyura jamaicensis</i>	P	PB, MW	nt
B	Bald Eagle *	<i>Haliaeetus leucocephalus</i>	P/T	PB, SC	nt
B	Northern Harrier *	<i>Circus cyaneus</i>		PB	-
B	Sharp-shinned Hawk	<i>Accipiter striatus</i>		PB	nt
B	Cooper's Hawk	<i>Accipiter cooperii</i>		PB	nt
B	Broad-winged Hawk	<i>Buteo platypterus</i>		PB	+
B	Swainson's Hawk *	<i>Buteo swainsoni</i>		PB	nt
B	Red-tailed Hawk	<i>Buteo jamaicensis</i>		PB	++
B	American Kestrel	<i>Falco sparverius</i>		PB	--
B	Merlin	<i>Falco columbarius</i>		PB	nt
PR	Gray Partridge	<i>Perdix perdix</i>		PB, SG	--
PR	Ruffed Grouse	<i>Bonasa umbellus</i>		PB, SG	--
PR	Greater Prairie Chicken *	<i>Tympanuchus cupido</i>		PB, SG, SC	nt
PR (L)	Sharp-tailed Grouse *	<i>Tympanuchus phasianellus</i>		PB, SG	nt
PR	Wild Turkey	<i>Meleagris gallopavo</i>		PB, SG	nt
B	Yellow Rail *	<i>Coturnicops noveboracensis</i>		PB, SC	
B	Virginia Rail *	<i>Rallus limicola</i>		PB, SG	nt
B	Sora	<i>Porzana carolina</i>		PB, SG	-
B	American Coot	<i>Fulica americana</i>		PB, SG	--
B	Sandhill Crane	<i>Grus canadensis</i>		PB	++
B	Killdeer	<i>Charadrius vociferus</i>		PB	-
B	American Avocet	<i>Recurvirostra americana</i>		PB	
B	Spotted Sandpiper	<i>Actitis macularia</i>		PB	-
B	Upland Sandpiper *	<i>Bartramia longicauda</i>		PB	-
B	Marbled Godwit *	<i>Limosa fedoa</i>		PB, SC	-
B	Wilson's Snipe				
B	American Woodcock	<i>Scolopax minor</i>		PB, SG	nt
B	Wilson's Phalarope *	<i>Phalaropus tricolor</i>		PB, T	nt
B	Forster's Tern *	<i>Sterna forsteri</i>		PB, SC	nt
B	Black Tern *	<i>Chlidonias niger</i>		PB	--

Range Status	Species Common Name	Scientific Name	Federal Legal Status	MN Legal Status	Population Trend
PR	Rock Dove	<i>Columba livia</i>		PB	--
B	Mourning Dove	<i>Zenaida macroura</i>		PB	--
B	Black-billed Cuckoo *	<i>Coccyzus erythrophthalmus</i>		PB	-
B	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>		PB	--
PR	Great Horned Owl	<i>Bubo virginianus</i>		UB	--
PR	Barred Owl	<i>Strix varia</i>		PB	+
B	Long-eared Owl	<i>Asio otus</i>		PB	
B	Short-eared Owl *	<i>Asio flammeus</i>		PB, SC	nt
B	Northern Saw-whet Owl	<i>Aegolius acadicus</i>		PB	
B	Common Nighthawk *	<i>Chordeiles minor</i>		PB	--
B	Whip-poor-will *	<i>Caprimulgus vociferus</i>		PB	nt
B	Chimney Swift	<i>Chaetura pelagica</i>		PB	-
B	Ruby-throated Hummingbird	<i>Archilochus colubris</i>		PB	+
B	Belted Kingfisher	<i>Ceryle alcyon</i>		PB	+
B	Red-headed Woodpecker *	<i>Melanerpes erythrocephalus</i>		PB	--
B	Yellow-bellied Sapsucker *	<i>Sphyrapicus varius</i>		PB	-
PR	Downy Woodpecker	<i>Picoides pubescens</i>		PB	++
PR	Hairy Woodpecker	<i>Picoides villosus</i>		PB	++
B	Northern Flicker	<i>Colaptes auratus</i>		PB	--
PR	Pileated Woodpecker	<i>Dryocopus pileatus</i>		PB	++
B	Olive-sided Flycatcher	<i>Contopus cooperi</i>		PB	-
B	Eastern Wood-Pewee *	<i>Contopus virens</i>		PB	-
B	Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>		PB	nt
B	Alder Flycatcher	<i>Empidonax alnorum</i>		PB	-
B	Willow Flycatcher *	<i>Empidonax traillii</i>		PB	-
B	Least Flycatcher *	<i>Empidonax minimus</i>		PB	--
B	Eastern Phoebe	<i>Sayornis phoebe</i>		PB	++
B	Great Crested Flycatcher	<i>Myiarchus crinitus</i>		PB	-
B	Western Kingbird	<i>Tyrannus verticalis</i>		PB	--
B	Eastern Kingbird	<i>Tyrannus tyrannus</i>		PB	--
B	Horned Lark	<i>Eremophila alpestris</i>		PB	-
B	Purple Martin	<i>Progne subis</i>		PB	--
B	Tree Swallow	<i>Tachycineta bicolor</i>		PB	+
B	Northern Rough-winged Swallow *	<i>Stelgidopteryx serripennis</i>		PB	--
B	Bank Swallow	<i>Riparia riparia</i>		PB	--
B	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		PB	+
B	Barn Swallow	<i>Hirundo rustica</i>		PB	-
PR	Gray Jay	<i>Perisoreus canadensis</i>		PB	-
PR	Blue Jay	<i>Cyanocitta cristata</i>		PB	++
PR	Black-billed Magpie	<i>Pica pica</i>		UB	++
PR	American Crow	<i>Corvus brachyrhynchos</i>		PB	++
PR	Common Raven	<i>Corvus corax</i>		PB	+

Range Status	Species Common Name	Scientific Name	Federal Legal Status	MN Legal Status	Population Trend
PR	Black-capped Chickadee	<i>Poecile atricapillus</i>		PB	++
PR	White-breasted Nuthatch	<i>Sitta carolinensis</i>		PB	++
B	House Wren	<i>Troglodytes aedon</i>		PB	-
B	Winter Wren *	<i>Troglodytes troglodytes</i>		PB	+
B	Sedge Wren *	<i>Cistothorus platensis</i>		PB	++
B	Marsh Wren *	<i>Cistothorus palustris</i>		PB	-
B	Golden-crowned Kinglet	<i>Regulus satrapa</i>		PB	-
B	Eastern Bluebird	<i>Sialia sialis</i>		PB	++
B	Veery *	<i>Catharus fuscescens</i>		PB	--
B	Hermit Thrush	<i>Catharus guttatus</i>		PB	+
B	American Robin	<i>Turdus migratorius</i>		PB	+
B	Gray Catbird	<i>Dumetella carolinensis</i>		PB	+
B	Brown Thrasher *	<i>Toxostoma rufum</i>		PB	--
PR	European Starling	<i>Sturnus vulgaris</i>		UB	-
B	Cedar Waxwing	<i>Bombycilla cedrorum</i>		PB	+
B	Blue-headed Vireo	<i>Vireo solitarius</i>		PB	+
B	Yellow-throated Vireo	<i>Vireo flavifrons</i>		PB	+
B	Warbling Vireo	<i>Vireo gilvus</i>		PB	-
B	Red-eyed Vireo	<i>Vireo olivaceus</i>		PB	++
B	Nashville Warbler	<i>Vermivora ruficapilla</i>		PB	-
B	Yellow Warbler	<i>Dendroica petechia</i>		PB	+
B	Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>		PB	--
B	Yellow-rumped Warbler	<i>Dendroica coronata</i>		PB	++
B	Palm Warbler	<i>Dendroica palmarum</i>		PB	nt
B	Black-and-white Warbler	<i>Mniotilta varia</i>		PB	-
B	American Redstart	<i>Setophaga ruticilla</i>		PB	-
B	Ovenbird *	<i>Seiurus aurocapillus</i>		PB	++
B	Connecticut Warbler *	<i>Oporornis agilis</i>		PB	+
B	Mourning Warbler	<i>Oporornis philadelphia</i>		PB	--
B	Common Yellowthroat	<i>Geothlypis trichas</i>		PB	-
B	Scarlet Tanager	<i>Piranga olivacea</i>		PB	-
B	Rose-breasted Grosbeak *	<i>Pheucticus ludovicianus</i>		PB	-
B	Indigo Bunting	<i>Passerina cyanea</i>		PB	--
B	Eastern Towhee	<i>Pipilo erythrophthalmus</i>		PB	-
B	Chipping Sparrow	<i>Spizella passerina</i>		PB	++
B	Clay-colored Sparrow	<i>Spizella pallida</i>		PB	-
B	Vesper Sparrow	<i>Poocetes gramineus</i>		PB	--
B	Lark Sparrow	<i>Chondestes grammacus</i>		PB	nt
B	Savannah Sparrow	<i>Passerculus sandwichensis</i>		PB	-
B	Baird's Sparrow *	<i>Ammodramus bairdii</i>		PB, E	

Range Status	Species Common Name	Scientific Name	Federal Legal Status	MN Legal Status	Population Trend
B	Grasshopper Sparrow *	<i>Ammodramus savannarum</i>		PB	--
B	Le Conte's Sparrow *	<i>Ammodramus leconteii</i>		PB	+
B	Nelson's Sharp-tailed sparrow *	<i>Ammodramus nelsoni</i>		PB, SC	
B	Song Sparrow	<i>Melospiza melodia</i>		PB	-
B	Lincoln's Sparrow	<i>Melospiza lincolni</i>		PB	-
B	Swamp Sparrow *	<i>Melospiza georgiana</i>		PB	++
B	White-throated Sparrow *	<i>Zonotrichia albicollis</i>		PB	-
B	Dark-eyed Junco	<i>Junco hyemalis</i>		PB	nt
B	Bobolink *	<i>Dolichonyx oryzivorus</i>		PB	-
B	Red-winged Blackbird	<i>Agelaius phoeniceus</i>		UB	--
B	Western Meadowlark	<i>Sturnella neglecta</i>		PB	--
B	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>		UB	--
B	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>		UB	+
B	Common Grackle	<i>Quiscalus quiscula</i>		UB	-
B	Brown-headed Cowbird	<i>Molothrus ater</i>		PB	--
B	Orchard Oriole	<i>Icterus spurius</i>		PB	+
B	Baltimore Oriole	<i>Icterus galbula</i>		PB	+
B	Purple Finch	<i>Carpodacus purpureus</i>		PB	-
PR	House Finch	<i>Carpodacus mexicanus</i>		PB	++
PR	Pine Siskin	<i>Carduelis pinus</i>		PB	-
B	American Goldfinch	<i>Carduelis tristis</i>		PB	++
PR	House Sparrow	<i>Passer domesticus</i>		UB	--

**MAMMALS**

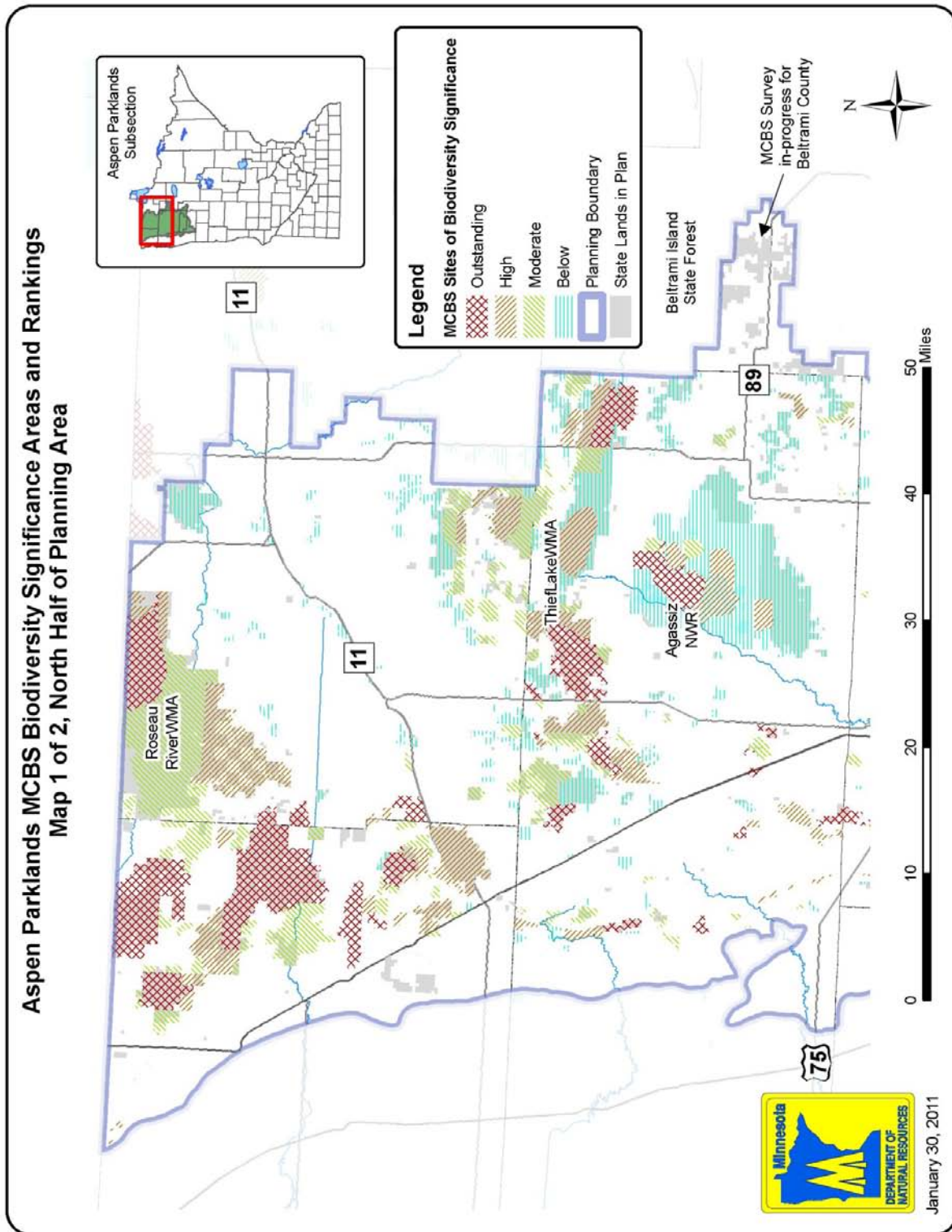
PR	Cinereus Shrew	<i>Sorex cinereus</i>			
PR	Water Shrew	<i>Sorex palustris</i>			
PR	Arctic Shrew	<i>Sorex arcticus</i>			
PR	Pygmy Shrew	<i>Sorex hoyi</i>			
PR	Northern Short-tailed Shrew	<i>Blarina brevicauda</i>			
PR	Star-nosed Mole	<i>Condylura cristata</i>			
B	Little Brown Bat	<i>Myotis lucifugus</i>			
B	Silver-haired Bat	<i>Lasionycteris noctivagans</i>			
B	Big Brown Bat	<i>Eptesicus fuscus</i>			
B	Eastern Red Bat	<i>Lasiurus borealis</i>			
PR	Eastern Cottontail	<i>Sylvilagus floridanus</i>		PWA, SG	
PR	Snowshoe Hare	<i>Lepus americanus</i>		PWA, SG	
PR	White-tailed Jackrabbit	<i>Lepus townsendii</i>		PWA, SG	
PR	Least Chipmunk	<i>Tamias minimus</i>			
PR	Eastern Chipmunk	<i>Tamias striatus</i>			
PR	Woodchuck	<i>Marmota monax</i>			
PR	Thirteen-lined Ground Squirrel	<i>Spermophilus tridecemlineatus</i>			

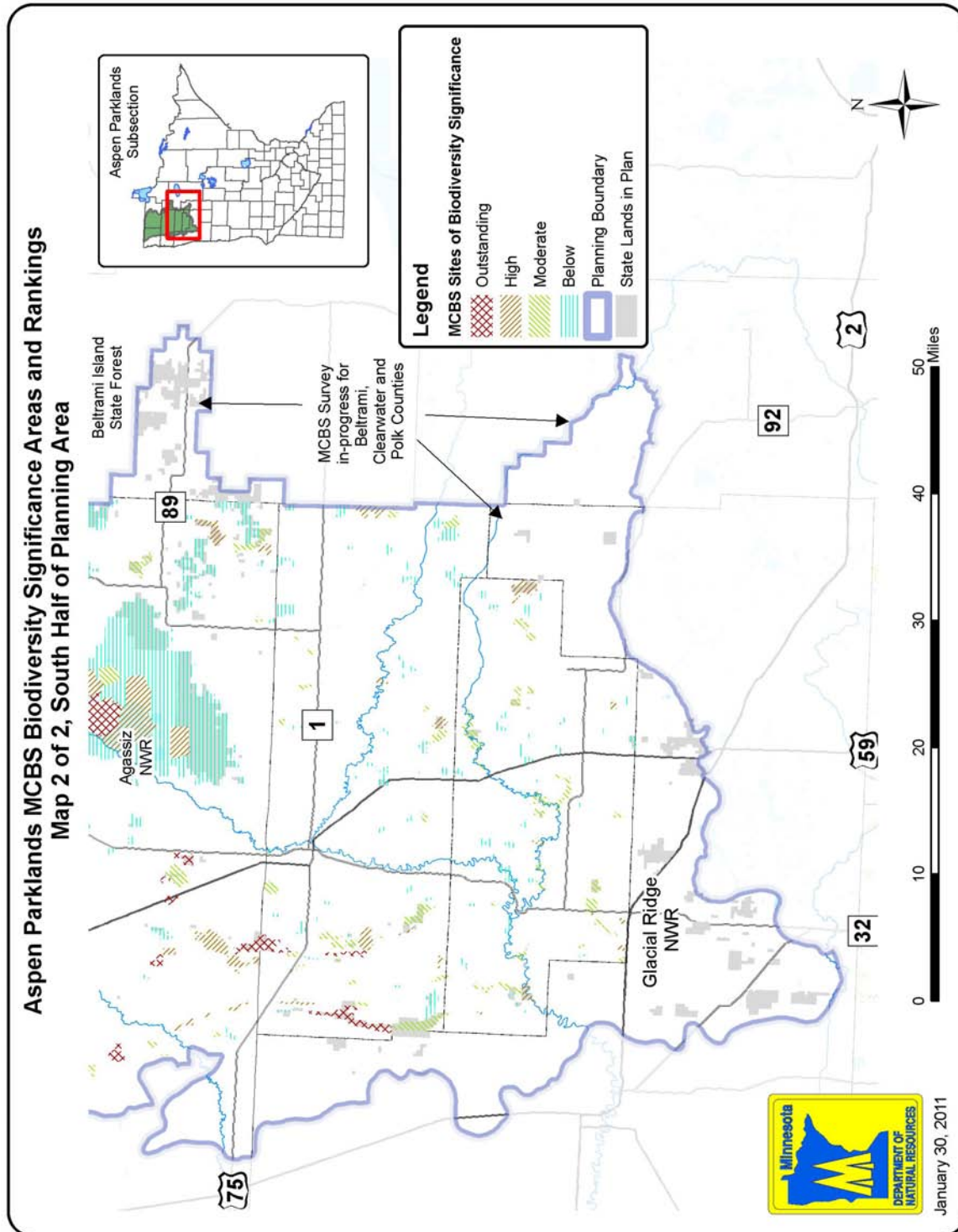


Range Status	Species Common Name	Scientific Name	Federal Legal Status	MN Legal Status	Population Trend
PR	Franklin's Ground Squirrel *	<i>Spermophilus franklinii</i>			
PR	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>		PWA, SG	
PR	Eastern Fox Squirrel	<i>Sciurus niger</i>		PWA, SG	
PR	Red Squirrel	<i>Tamiasciurus hudsonicus</i>			
PR	Northern Flying Squirrel	<i>Glaucomys sabrinus</i>			
PR	Plains Pocket Gopher	<i>Geomys bursarius</i>		UWA	
PR	American Beaver	<i>Castor canadensis</i>		PWA, SG, F	
PR	Prairie Deer Mouse	<i>Peromyscus maniculatus bairdii</i>			
PR	White-footed Mouse	<i>Peromyscus leucopus</i>			
PR	Southern Red-backed Vole	<i>Clethrionomys gapperi</i>			
PR	Meadow Vole	<i>Microtus pennsylvanicus</i>			
PR	Muskrat	<i>Ondatra zibethicus</i>		PWA, SG, F	
PR	Southern Bog Lemming	<i>Synaptomys cooperi</i>			
PR	Meadow Jumping Mouse	<i>Zapus hudsonius</i>			
PR	North American Porcupine	<i>Erethizon dorsatum</i>		UWA	
PR	Coyote	<i>Canis latrans</i>		UWA	
PR	Gray Wolf *	<i>Canis lupus</i>	T	SC	
PR	Red Fox	<i>Vulpes vulpes</i>		PWA, SG, F	
PR	Gray Fox	<i>Urocyon cinereoargenteus</i>		PWA, SG, F	
PR	American Black Bear	<i>Ursus americanus</i>		PWA, BG	
PR	Northern Raccoon	<i>Procyon lotor</i>		PWA, SG, F	
PR	American Marten	<i>Martes americana</i>		PWA, SG, F	
PR	Fisher	<i>Martes pennanti</i>		PWA, SG, F	
PR	Ermine	<i>Mustela erminea</i>		UWA	
PR	Least Weasel	<i>Mustela nivalis</i>		UWA, SC	
PR	Long-tailed Weasel	<i>Mustela frenata</i>		UWA	
PR	American Mink	<i>Mustela vison</i>		PWA, SG, F	
PR	American Badger *	<i>Taxidea taxus</i>		PWA, SG, F	
PR	Eastern Spotted Skunk *	<i>Spilogale putorius</i>		T	
PR	Striped Skunk	<i>Mephitis mephitis</i>		UWA	
PR	Northern River Otter	<i>Lontra canadensis</i>		PWA, SG, F	
PR	Canada Lynx	<i>Lynx canadensis</i>	T	PWA, SG, F	
PR	Bobcat	<i>Lynx rufus</i>		PWA, SG, F	
PR	Elk *	<i>Cervus elaphus</i>		PWA, BG, SC	
PR	Mule Deer	<i>Odocoileus hemionus</i>		PWA, BG	
PR	White-tailed Deer	<i>Odocoileus virginianus</i>		PWA, BG	
PR	Moose	<i>Alces alces</i>		PWA, BG	

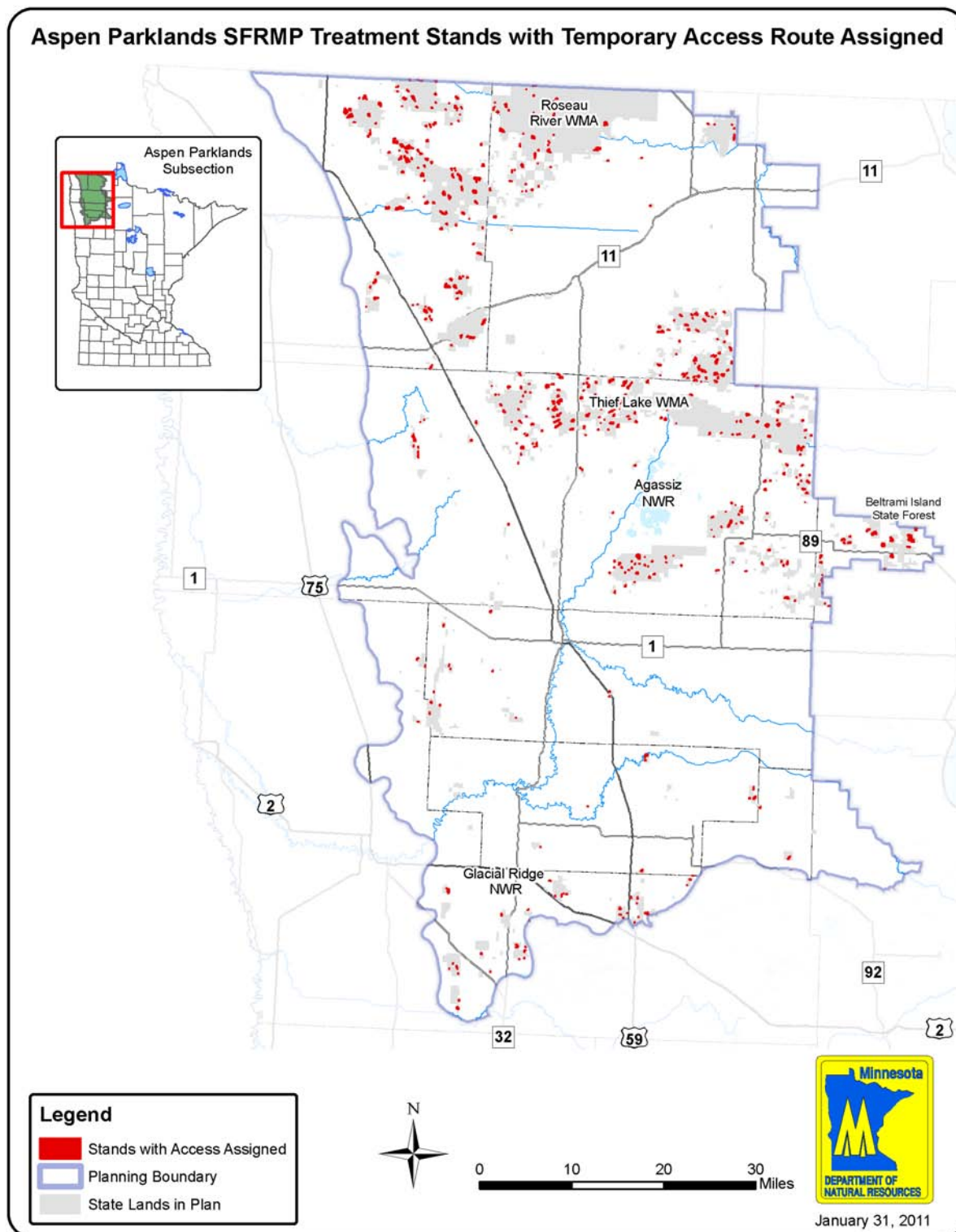
## 6.13 Appendix M. Maps

Map 6.13a. MCBS sites – north.



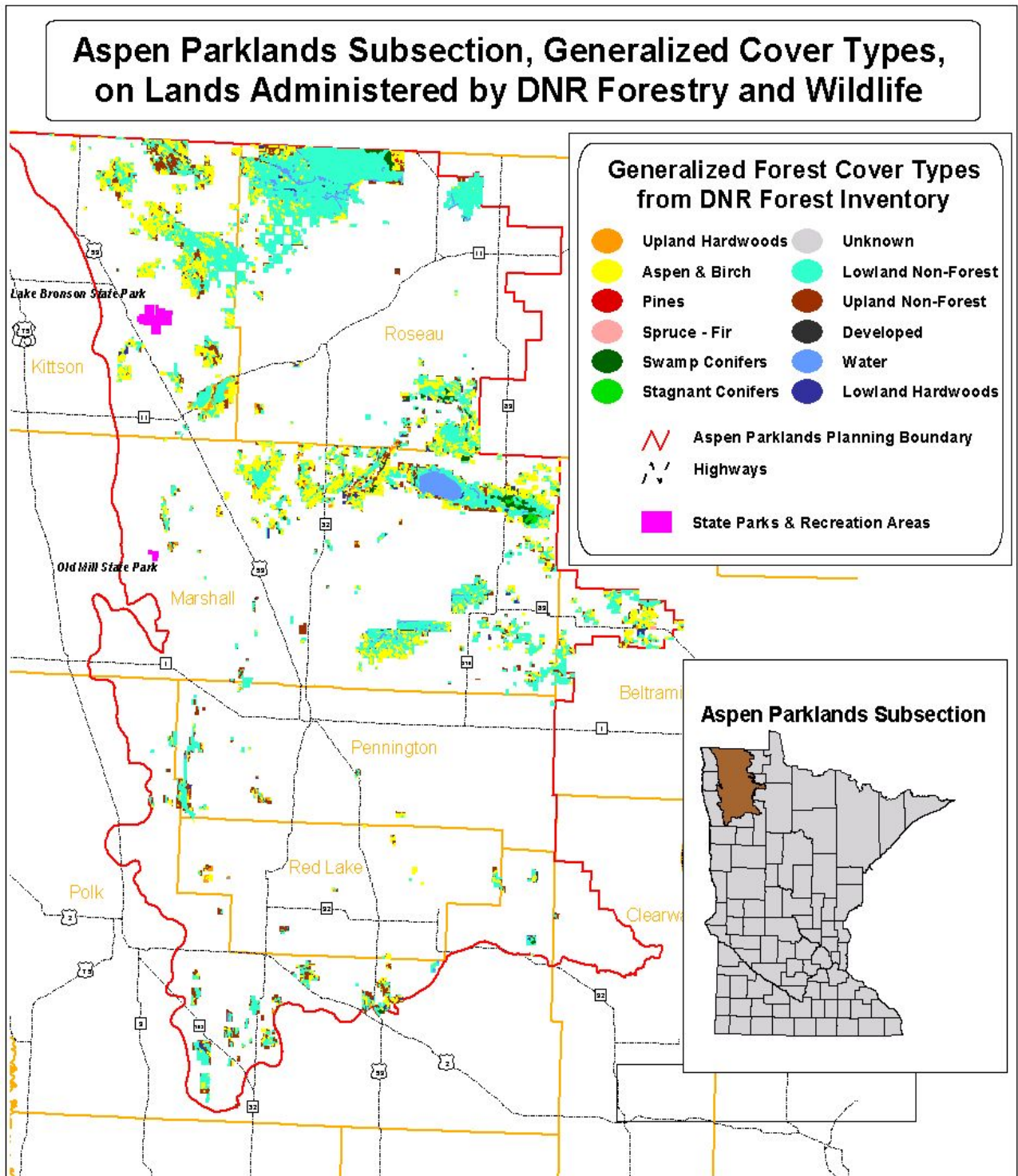
**Map 6.13b. MCBS sites – south.**

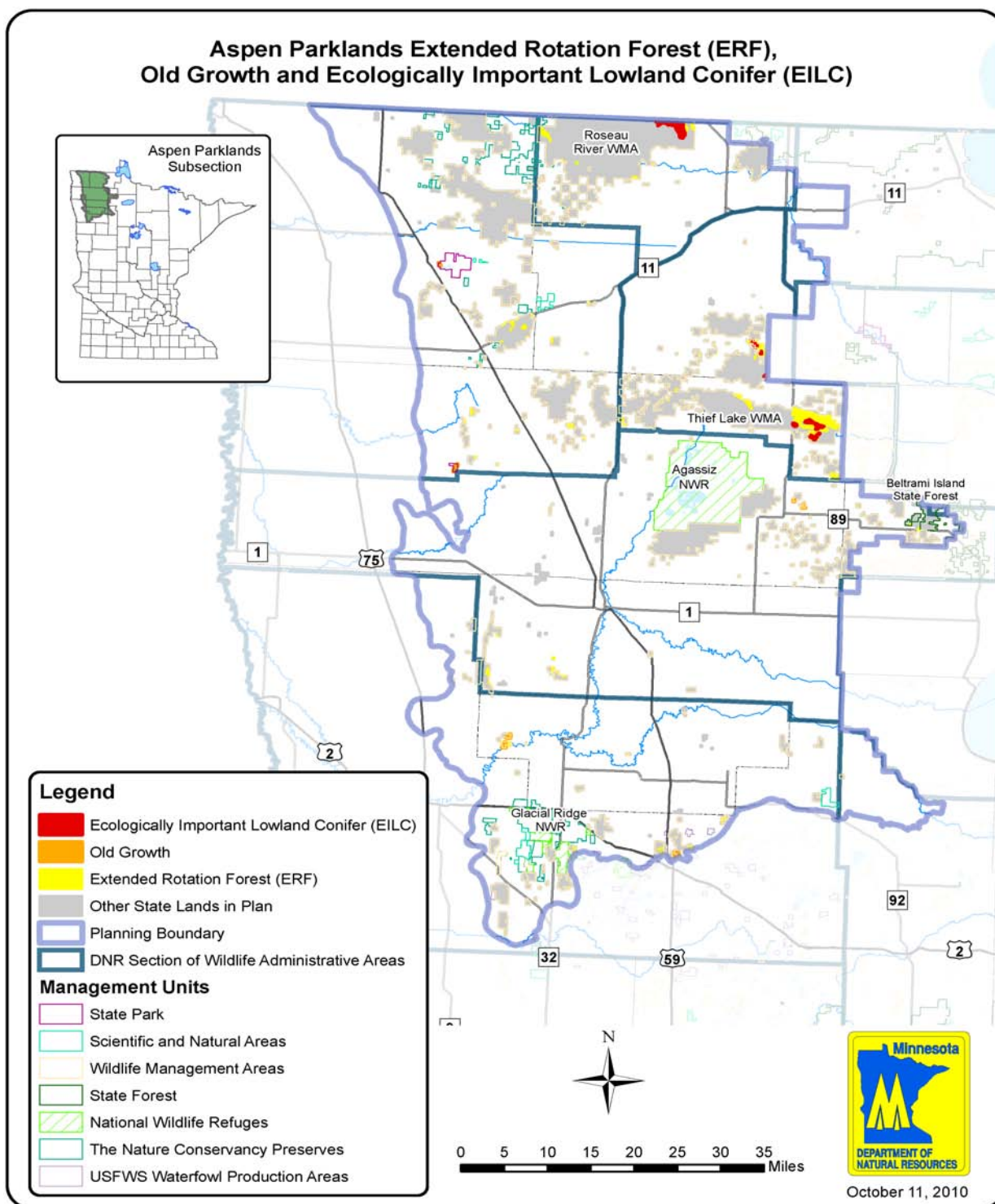
Map 6.13c. New access.

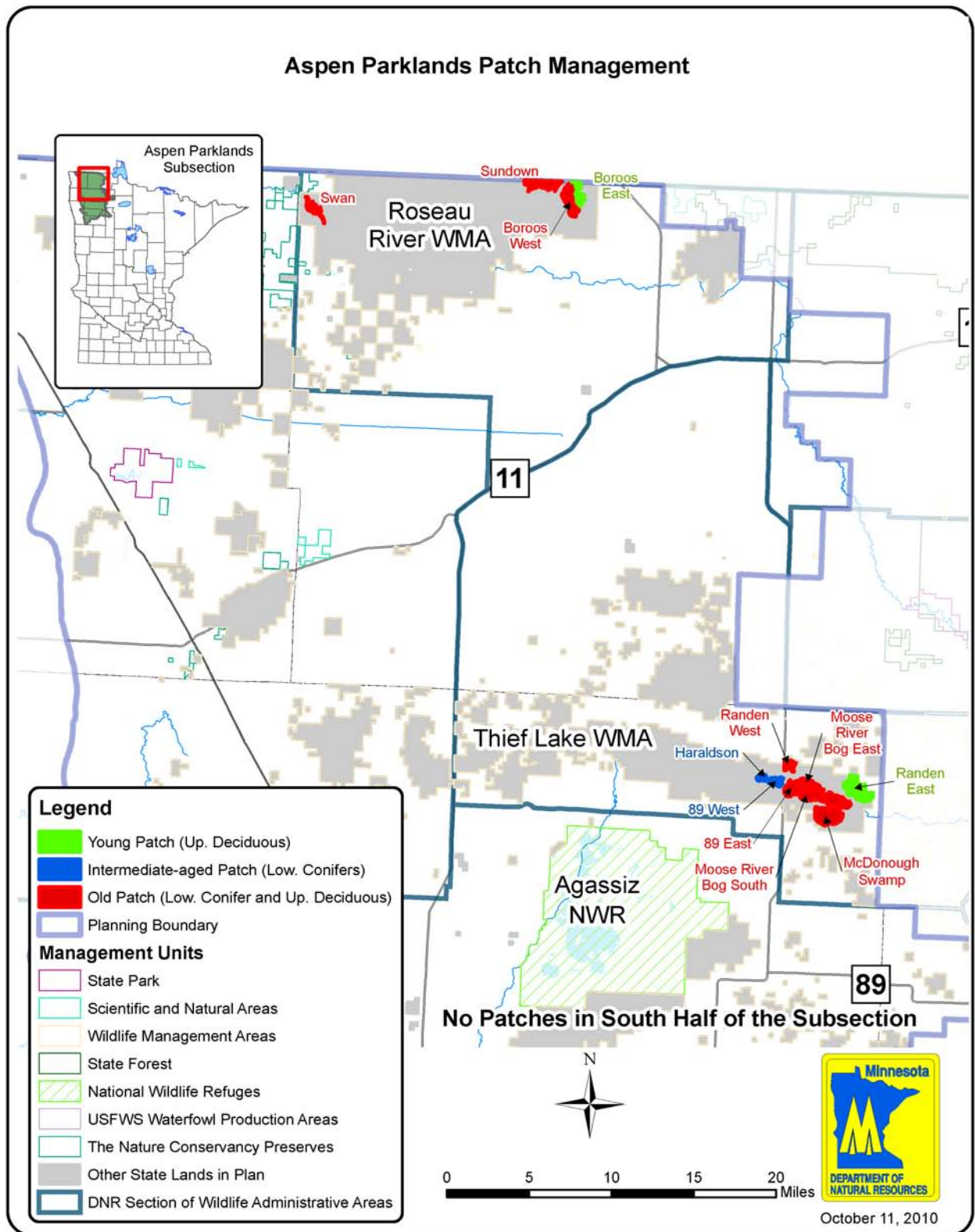




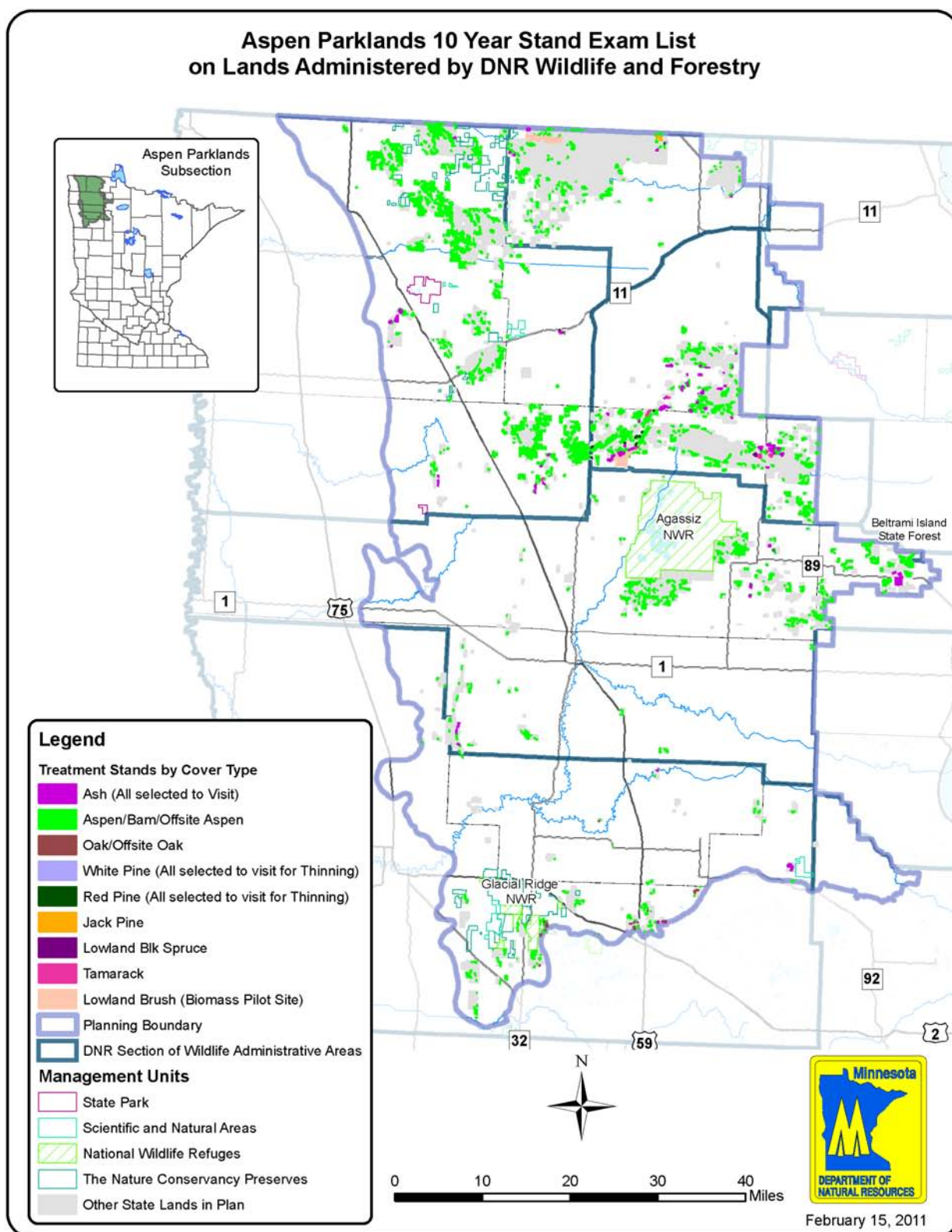
**Map 6.13d. AP Subsection cover types on lands administered by DNR Divisions of Forestry and Fish and Wildlife.**



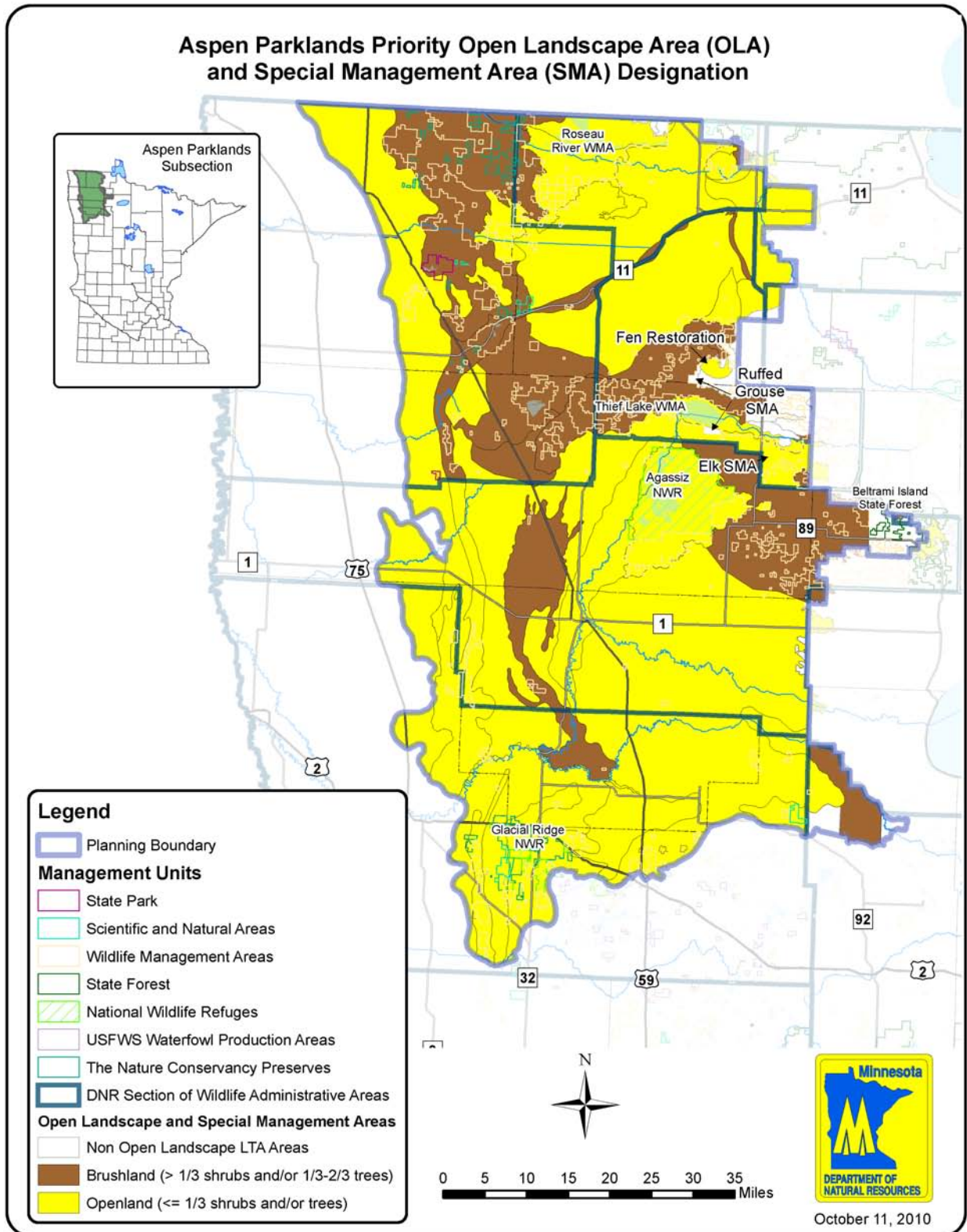
**Map 6.13e. ERF, EILC and old growth.**

**Map 6.13f. Forested patches.**



**Map 6.13g. 10-year stand exam list.**



**Map 6.13h. Priority open landscape area and special management area designations.**

## 6.14 Appendix N. Ten-Year Stand Examination List

This Appendix identifies the list of stands by location, cover type, treatment acres, and preliminary prescription selected as a result of the Aspen Parklands SFRMP stand selection process.

### Stand Examinations (Field Visits)

Over the 10-year planning period it is anticipated that every stand on the 10-Year Stand Examination List will be field visited to determine the actual management to be implemented. A total of 1951 stands are identified on the 10-Year Stand Exam List. As stands were selected and placed on the 10-Year Stand Exam List, preliminary prescriptions were assigned. Final management objectives and final prescriptions will be determined as each stand is field visited.

At the time of field visit a standard *Silvicultural Prescription Worksheet* will be prepared. As the *Worksheet* is prepared the range of decisions about each stand's management include:

1. Appraise the stand for a timber sale.
2. Defer treatment of the stand to a future year.
3. Update the stand's forest inventory data to reflect current conditions without prescribing a management action at this time.
4. Manage for the understory without harvesting at this time.
5. Prescribe silviculture treatment (e.g., site preparation and tree planting).
6. Prescribe timber stand improvement (tsi) to enhance stand vigor, diversity, and/or productivity.

### Maps of 10-Year Stand Exam List

Maps identifying the locations of stands on the 10-Year Stand Exam List can be viewed at

<http://www.dnr.state.mn.us/forestry/subsection/aspenparklands/index.html>

In addition, a link has been created to view and comment on the stands that are planned for management during the first ten years of the planning period. To view and comment on the selected stands please see:

<http://www.dnr.state.mn.us/maps/forestview/mapper.html?app=sap>

Maps identifying all lands administered by DNR by generalized cover type are provided in Appendix M as are maps of designated old-growth forest, Ecologically Important Lowland Conifers (EILC), designated patches, and Extended Rotation Forests (ERF).

*Note: The maps have been reduced in size for inclusion in this document. It is recommended that these maps be viewed at a larger scale and in color. The colored maps and this report can be viewed at*

<http://www.dnr.state.mn.us/forestry/subsection/aspenparklands/index.html>, and are also available in CD format by request.

### Stand Evaluations

As the stand field visit examinations are completed, all information from the Aspen Parklands Plan (i.e., desired future forest composition, strategies, cover type management

recommendations, and all department policy, guidelines and directives, and Forest Inventory Module (FIM) data) will be considered in evaluating the stands and making final prescriptions. The field process will include completion of the *Silvicultural Prescription Worksheet*. For many stands, the SFRMP FIM database includes: preliminary management objectives; comments concerning stand management; identification of special management areas; and, requests for a joint visit among DNR Divisions (See *Appendix G SFRMP Additional Field Names and Codes*).

During the development of the Aspen Parklands SFRMP 10-Year Stand Exam List, some stands were identified for joint site visits by personnel from the Divisions of Fish and Wildlife or Ecological and Water Resources. Joint site visits provide an opportunity to achieve consensus concerning stand management that considers the characteristics unique to individual stands and issues of concern in the field based on the goals and objectives for the stand and the surrounding landscape as recommended in the plan. Stands identified for joint site visits are indicated as such on Annual Stand Exam Lists and appraiser stand reports. Results of joint site visits are documented and filed in the timber sale permit file.

#### **Public Review of Stand Examination Lists**

The entire 10-Year Stand Exam List is available for public review at:

<http://www.dnr.state.mn.us/forestry/subsection/aspenparklands/index.html>

Stands will be available for additional public review as they are included in Annual Stand Exam Lists prepared by each Forestry Area (i.e., by stand examination year). If stands not on the 10-year list are added to the Annual Stand Exam list, they will receive public review as an Annual Plan Addition. For details on these public review processes, see:

<http://www.dnr.state.mn.us/forestry/harvesting/plans.html>

#### **Treatment Acres Summary**

Tables summarizing treatment acres in various ways are included in General Direction Statement 3.5, in chapter 3 of this plan.

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Beltrami	Warroad	154	38	5	1	13.7			Clearcut- with Reserves	2021	balm of Gilead	42
Beltrami	Warroad	155	37	3	6	333.5			SFRMP On-Site Visit	2014	Ash	23
Beltrami	Warroad	155	37	4	15	183			Clearcut- with Reserves	2019	Aspen	42
Beltrami	Warroad	155	37	4	16	44.3			Clearcut- with Reserves	2019	Aspen	42
Beltrami	Warroad	155	37	5	188	26.5			Clearcut- with Reserves	2019	Aspen	53
Beltrami	Warroad	155	37	8	180	8.7			Clearcut- with Reserves	2019	balm of Gilead	47
Beltrami	Warroad	155	37	8	181	9.7			Clearcut- with Reserves	2019	balm of Gilead	47
Beltrami	Warroad	155	38	6	520	25.3			Clearcut- with Reserves	2019	Aspen	42
Beltrami	Warroad	155	38	7	64	24.8			Clearcut- with Reserves	2019	Aspen	45
Beltrami	Warroad	155	38	7	476	1.2			Clearcut- with Reserves	2019	Aspen	31
Beltrami	Warroad	155	38	7	478	3.4			Clearcut- with Reserves	2019	Aspen	37
Beltrami	Warroad	155	38	7	481	1.3			Clearcut- with Reserves	2019	Aspen	56
Beltrami	Warroad	155	38	7	519	12.5			Clearcut- with Reserves	2019	Aspen	48
Beltrami	Warroad	155	38	7	522	18.5			Clearcut- with Reserves	2019	balm of Gilead	61
Beltrami	Warroad	155	38	17	80	19.6			Clearcut- with Reserves	2019	Aspen	48
Beltrami	Warroad	155	38	17	196	7.6			Clearcut- with Reserves	2019	Aspen	57
Beltrami	Warroad	155	38	17	515	50.7			Clearcut- with Reserves	2019	Aspen	58
Beltrami	Warroad	155	38	18	405	1			Clearcut- with Reserves	2019	Aspen	37
Beltrami	Warroad	155	38	18	488	0.7			Clearcut- with Reserves	2019	Aspen	37
Beltrami	Warroad	155	38	19	524	62			Clearcut- with Reserves	2019	Aspen	54
Beltrami	Warroad	155	38	19	526	6.1			Clearcut- with Reserves	2019	Aspen	38
Beltrami	Warroad	155	38	30	388	91.2			Clearcut- with Reserves	2021	Aspen	42
Beltrami	Warroad	155	38	30	437	6.3			Clearcut- with Reserves	2021	Aspen	27
Beltrami	Warroad	155	38	30	508	0.7			Clearcut- with Reserves	2021	Aspen	49
Beltrami	Warroad	155	38	31	421	2			Clearcut- with Reserves	2021	Aspen	41
Beltrami	Warroad	155	38	31	430	3.1			Clearcut- with Reserves	2021	Aspen	48
Beltrami	Warroad	155	38	32	427	2.5			Clearcut- with Reserves	2021	Aspen	37
Beltrami	Warroad	155	38	32	434	13.7			Clearcut- with Reserves	2021	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Beltrami	Warroad	156	37	18	54	41.8			Clearcut- with Reserves	2016	Aspen	36
Beltrami	Warroad	156	37	19	144	68.4			Clearcut- with Reserves	2016	Aspen	43
Beltrami	Warroad	156	37	22	138	82.2			Clearcut- with Reserves	2015	Aspen	57
Beltrami	Warroad	156	37	23	123	35.6			Clearcut- with Reserves	2014	Aspen	51
Beltrami	Warroad	156	37	23	135	88.8			Clearcut- with Reserves	2014	Aspen	46
Beltrami	Warroad	156	37	26	173	117.4			Clearcut- with Reserves	2013	Aspen	57
Beltrami	Warroad	156	37	26	187	51			Clearcut- with Reserves	2017	Aspen	57
Beltrami	Warroad	156	37	26	210	46.2			Clearcut- with Reserves	2017	Aspen	50
Beltrami	Warroad	156	37	27	171	85.9			Clearcut- with Reserves	2016	Aspen	51
Beltrami	Warroad	156	37	28	196	50			Clearcut- with Reserves	2018	Aspen	56
Beltrami	Warroad	156	37	28	205	7.1			Clearcut- with Reserves	2018	Aspen	52
Beltrami	Warroad	156	37	28	211	32.6			Clearcut- with Reserves	2018	Aspen	43
Beltrami	Warroad	156	37	30	184	127.7			Clearcut- with Reserves	2016	Aspen	32
Beltrami	Warroad	156	37	32	241	50.5			Clearcut- with Reserves	2019	Aspen	48
Beltrami	Warroad	156	37	33	290	22.2			SFRMP On-Site Visit	2020	Ash	14
Beltrami	Warroad	156	37	34	288	25.4			SFRMP On-Site Visit	2020	Ash	52
Beltrami	Warroad	156	37	34	323	9.8			SFRMP On-Site Visit	2020	Ash	59
Beltrami	Warroad	156	37	35	286	14.5			Clearcut- with Reserves	2012	balm of Gilead	36
Beltrami	Warroad	156	37	35	292	87.8			Clearcut- with Reserves	2012	Aspen	60
Beltrami	Warroad	156	37	35	298	28.5			Clearcut- with Reserves	2012	Aspen	50
Beltrami	Warroad	156	37	35	330	14.2			Clearcut- with Reserves	2012	Aspen	60
Beltrami	Warroad	156	38	13	97	110.2			Clearcut- with Reserves	2016	Aspen	31
Beltrami	Warroad	156	38	13	101	19.8			Clearcut- with Reserves	2016	Aspen	31
Beltrami	Warroad	156	38	13	103	9.5			Clearcut- with Reserves	2016	Aspen	39
Beltrami	Warroad	156	38	13	105	32.6			Clearcut- with Reserves	2016	Aspen	31
Beltrami	Warroad	156	38	13	294	5.3			Clearcut- with Reserves	2016	Aspen	37
Beltrami	Warroad	156	38	20	114	20.6			Clearcut- with Reserves	2012	Aspen	29
Beltrami	Warroad	156	38	20	122	2.3			Clearcut- with Reserves	2012	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Beltrami	Warroad	156	38	20	234	5.2			Clearcut- with Reserves	2012	Aspen	37
Beltrami	Warroad	156	38	20	246	1.5			Clearcut- with Reserves	2012	Aspen	37
Beltrami	Warroad	156	38	20	247	25.2			Clearcut- with Reserves	2012	Aspen	37
Beltrami	Warroad	156	38	24	225	23.2			Clearcut- with Reserves	2016	Aspen	41
Beltrami	Warroad	156	38	24	295	24.4			Clearcut- with Reserves	2016	Aspen	42
Beltrami	Warroad	156	38	24	296	11.2			Clearcut- with Reserves	2016	Aspen	44
Beltrami	Warroad	156	38	27	147	7.9			Clearcut- with Reserves	2015	balm of Gilead	58
Beltrami	Warroad	156	38	27	158	20.9			Clearcut- with Reserves	2015	Aspen	64
Beltrami	Warroad	156	38	27	222	11.7			Clearcut- with Reserves	2015	balm of Gilead	58
Beltrami	Warroad	156	38	27	273	6.4			Clearcut- with Reserves	2015	balm of Gilead	58
Beltrami	Warroad	156	38	27	274	14.3			Clearcut- with Reserves	2015	balm of Gilead	58
Beltrami	Warroad	156	38	28	136	32.7			Clearcut- with Reserves	2015	Aspen	34
Beltrami	Warroad	156	38	28	166	21.5			Clearcut- with Reserves	2015	Aspen	40
Beltrami	Warroad	156	38	34	189	1.7			Clearcut- with Reserves	2013	Aspen	32
Beltrami	Warroad	156	38	34	190	5.5			Clearcut- with Reserves	2013	Aspen	39
Beltrami	Warroad	156	38	34	192	11.9			Clearcut- with Reserves	2013	Aspen	37
Beltrami	Warroad	156	38	34	215	9.6			Clearcut- with Reserves	2013	Aspen	37
Beltrami	Warroad	156	38	34	258	15.5			Clearcut- with Reserves	2013	Aspen	36
Beltrami	Warroad	156	38	34	259	1.3			Clearcut- with Reserves	2013	Aspen	39
Beltrami	Warroad	156	38	34	260	9.5			Clearcut- with Reserves	2013	Aspen	35
Beltrami	Warroad	156	38	34	262	1.5			Clearcut- with Reserves	2013	Aspen	30
Kittson	Warroad	159	45	1	18	22.2			Clearcut- with Reserves	2012	Aspen	58
Kittson	Warroad	159	45	1	359	4.5			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	1	397	10.1			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	159	45	1	413	55.3			Clearcut- with Reserves	2018	Aspen	43
Kittson	Warroad	159	45	3	50	6.1			Clearcut- with Reserves	2018	Aspen	52
Kittson	Warroad	159	45	10	386	20.7			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	11	344	12.8			Clearcut- with Reserves	2018	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	159	45	12	292	41.7			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	12	406	241.4			Clearcut- with Reserves	2018	Aspen	34
Kittson	Warroad	159	45	14	376	3.3			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	14	377	2.9			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	14	410	23.5			Clearcut- with Reserves	2018	Aspen	26
Kittson	Warroad	159	45	14	411	15.7			Clearcut- with Reserves	2018	Aspen	47
Kittson	Warroad	159	45	14	412	48.1			Clearcut- with Reserves	2018	Aspen	27
Kittson	Warroad	159	45	15	165	20.5			Clearcut- with Reserves	2018	Aspen	44
Kittson	Warroad	159	45	15	290	23.3			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	15	371	2.3			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	15	372	1.4			Clearcut- with Reserves	2018	Aspen	27
Kittson	Warroad	159	45	15	375	4.2			Clearcut- with Reserves	2018	Aspen	27
Kittson	Warroad	159	45	16	150	20.5			Clearcut- with Reserves	2018	Aspen	27
Kittson	Warroad	159	45	16	285	4.1			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	16	287	2.4			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	16	288	4.3			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	16	289	7.4			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	16	388	12			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	17	176	19.4			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	17	298	3.7			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	18	132	10.9			Clearcut- with Reserves	2018	Aspen	42
Kittson	Warroad	159	45	18	309	3			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	18	310	10.2			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	20	301	9.1			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	21	232	10.5			Clearcut- with Reserves	2012	Aspen	54
Kittson	Warroad	159	45	21	247	22.8			Clearcut- with Reserves	2012	Aspen	53
Kittson	Warroad	159	45	21	364	1.1			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	21	365	2			Clearcut- with Reserves	2018	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	159	45	21	366	3.6			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	21	367	1.6			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	45	21	369	11.1			Clearcut- with Reserves	2012	Aspen	53
Kittson	Warroad	159	45	22	227	74.1			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	159	46	1	51	9.1			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	159	46	1	52	7.7			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	159	46	1	55	21.4			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	159	46	1	56	6.5			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	159	46	1	58	1.5			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	159	46	1	60	2.3			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	159	46	1	61	1.8			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	159	46	1	62	3.1			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	159	46	36	42	30.5			Clearcut- with Reserves	2012	Aspen	59
Kittson	Warroad	159	47	2	39	5.6			SFRMP On-Site Visit	2016	Ash	60
Kittson	Warroad	160	45	9	215	3.7			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	45	9	216	26.5			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	160	45	10	210	13			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	160	45	15	53	19.4			Clearcut- with Reserves	2016	Aspen	32
Kittson	Warroad	160	45	15	217	21.5			Clearcut- with Reserves	2012	balm of Gilead	57
Kittson	Warroad	160	45	15	222	2.1			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	45	15	259	28.8			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	160	45	16	258	35.5			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	45	17	250	84			Clearcut- with Reserves	2016	Aspen	30
Kittson	Warroad	160	45	17	256	23.5			Clearcut- with Reserves	2016	Aspen	34
Kittson	Warroad	160	45	21	23	23.2			Clearcut- with Reserves	2012	Aspen	48
Kittson	Warroad	160	45	21	195	54			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	45	21	242	15.2			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	45	22	175	3.9			Clearcut- with Reserves	2016	Aspen	37



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	160	45	22	176	2.1			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	45	22	251	35.2			Clearcut- with Reserves	2016	Aspen	31
Kittson	Warroad	160	45	28	180	1.8			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	45	28	193	9.6			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	45	28	194	19.1			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	160	45	36	148	30.2			Clearcut- with Reserves	2018	Aspen	40
Kittson	Warroad	160	45	36	171	26.9			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	160	45	36	227	10.5			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	160	46	17	133	44.5			Clearcut- with Reserves	2016	Aspen	28
Kittson	Warroad	160	46	18	96	4			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	46	18	97	2.8			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	46	18	122	3.5			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	46	18	123	6.8			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	160	46	18	127	21			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	46	18	128	2			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	160	46	34	100	1.9			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	160	46	35	55	32.1			Clearcut- with Reserves	2019	Aspen	40
Kittson	Warroad	160	46	35	64	14.2			Clearcut- with Reserves	2021	Aspen	32
Kittson	Warroad	160	46	35	89	2.4			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	160	46	35	90	13.8			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	160	46	35	93	3.6			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	160	46	35	111	4.1			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	160	46	35	112	4.4			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	160	46	36	102	51.9			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	160	46	36	106	29.9			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	160	47	12	227	17.8			Clearcut- with Reserves	2016	Aspen	47
Kittson	Warroad	160	47	13	173	57.5			SFRMP On-Site Visit	2012	Ash	67
Kittson	Warroad	160	47	13	224	46.1			SFRMP On-Site Visit	2016	Ash	80

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	160	47	13	229	39.9			Clearcut- with Reserves	2012	Aspen	64
Kittson	Warroad	160	47	23	197	4.8			Clearcut- with Reserves	2016	Aspen	57
Kittson	Warroad	160	47	23	225	37.2			SFRMP On-Site Visit	2016	Ash	62
Kittson	Warroad	160	47	24	220	46.7			SFRMP On-Site Visit	2016	Ash	64
Kittson	Warroad	160	47	25	115	37.6			Clearcut- with Reserves	2017	Aspen	42
Kittson	Warroad	160	47	35	207	1.4			Clearcut- with Reserves	2016	Aspen	57
Kittson	Warroad	161	45	3	54	28.1			Clearcut- with Reserves	2012	Aspen	51
Kittson	Warroad	161	45	4	38	8.6			Clearcut- with Reserves	2017	Aspen	31
Kittson	Warroad	161	45	4	313	27.6			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	161	45	5	212	33.8			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	5	213	14.5			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	5	328	9.7			Clearcut- with Reserves	2012	Aspen	37
Kittson	Warroad	161	45	5	341	22			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	5	356	14			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	5	360	5.1			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	5	378	28.7			Clearcut- with Reserves	2017	Aspen	44
Kittson	Warroad	161	45	6	205	13.8			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	6	211	38.5			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	6	246	14.5			Clearcut- with Reserves	2021	Aspen	57
Kittson	Warroad	161	45	6	252	25.9			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	161	45	6	342	21.6			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	161	45	6	343	6.6			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	161	45	6	354	24.1			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	6	355	9.8			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	7	250	20.8			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	161	45	7	251	253.2			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	7	349	12.5			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	7	351	15.2			Clearcut- with Reserves	2021	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	161	45	7	352	33.1			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	161	45	7	353	18.7			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	7	368	90.8			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	161	45	7	371	31.1			Clearcut- with Reserves	2021	balm of Gilead	31
Kittson	Warroad	161	45	11	325	2.1			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	161	45	11	327	2.1			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	161	45	12	333	25.6			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	161	45	13	291	57.3			Clearcut- with Reserves	2019	balm of Gilead	47
Kittson	Warroad	161	45	13	308	2.8			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	161	45	13	309	6.7			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	161	45	16	335	4.3			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	16	336	2.9			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	16	337	1.3			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	16	338	6.9			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	17	208	15.4			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	161	45	17	209	9.1			Clearcut- with Reserves	2021	Aspen	57
Kittson	Warroad	161	45	17	369	52			Clearcut- with Reserves	2021	Aspen	31
Kittson	Warroad	161	45	17	370	29.4			Clearcut- with Reserves	2021	Aspen	29
Kittson	Warroad	161	45	17	377	72.9			Clearcut- with Reserves	2021	Aspen	33
Kittson	Warroad	161	45	25	222	34.7			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	161	45	25	297	9.8			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	161	45	25	298	23.5			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	161	45	25	362	2.1			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	161	45	25	363	2.9			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	161	45	26	253	8.3			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	161	45	36	202	19			Clearcut- with Reserves	2012	Aspen	47
Kittson	Warroad	161	45	36	254	25.1			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	161	45	36	255	42			Clearcut- with Reserves	2020	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	161	45	36	300	23			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	161	45	36	301	5.3			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	161	45	36	366	21.7			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	161	45	36	380	37			Clearcut- with Reserves	2020	Aspen	38
Kittson	Warroad	161	46	4	3	181			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	161	46	4	15	36.8			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	161	46	4	16	56			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	161	46	4	17	99.2			Clearcut- with Reserves	2019	Aspen	42
Kittson	Warroad	161	46	5	9	37.2			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	161	46	5	18	45.6			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	161	46	5	19	19.1			Clearcut- with Reserves	2019	Aspen	39
Kittson	Warroad	161	46	5	20	7.8			Clearcut- with Reserves	2012	Aspen	50
Kittson	Warroad	162	45	12	120	24.7			Clearcut- with Reserves	2013	Aspen	57
Kittson	Warroad	162	45	14	128	2.6			Clearcut- with Reserves	2016	Aspen	57
Kittson	Warroad	162	45	14	253	4.3			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	45	14	321	24.6			Clearcut- with Reserves	2016	Aspen	36
Kittson	Warroad	162	45	15	26	19.7			Clearcut- with Reserves	2016	Aspen	38
Kittson	Warroad	162	45	15	34	34.6			Clearcut- with Reserves	2016	Aspen	33
Kittson	Warroad	162	45	15	41	9.5			Clearcut- with Reserves	2016	Aspen	42
Kittson	Warroad	162	45	15	144	3.3			Clearcut- with Reserves	2016	Aspen	42
Kittson	Warroad	162	45	15	251	1.1			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	45	16	125	25			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	45	16	134	2.1			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	45	16	180	2.4			Clearcut- with Reserves	2013	Aspen	27
Kittson	Warroad	162	45	16	186	2.3			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	45	16	188	4.3			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	45	16	210	49.5			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	162	45	16	250	3.2			Clearcut- with Reserves	2016	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	162	45	16	263	3.4			Clearcut- with Reserves	2013	Aspen	27
Kittson	Warroad	162	45	16	265	23.8			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	162	45	17	39	46.1			Clearcut- with Reserves	2013	Aspen	42
Kittson	Warroad	162	45	17	43	72.4			Clearcut- with Reserves	2013	Aspen	51
Kittson	Warroad	162	45	17	137	9.4			Clearcut- with Reserves	2013	Aspen	27
Kittson	Warroad	162	45	19	72	26.6			Clearcut- with Reserves	2021	Aspen	33
Kittson	Warroad	162	45	21	60	32.3			Clearcut- with Reserves	2013	Aspen	36
Kittson	Warroad	162	45	21	68	69.1			Clearcut- with Reserves	2013	Aspen	46
Kittson	Warroad	162	45	23	175	75			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	162	45	24	191	4.2			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	162	45	24	192	3.9			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	162	45	24	197	17.9			Clearcut- with Reserves	2020	Offsite Aspen	37
Kittson	Warroad	162	45	24	259	4.8			Clearcut- with Reserves	2020	Aspen	57
Kittson	Warroad	162	45	24	260	6.6			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	162	45	26	288	66.9			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	162	45	27	82	20.5			Clearcut- with Reserves	2013	Aspen	45
Kittson	Warroad	162	45	27	89	50.4			Clearcut- with Reserves	2013	Aspen	46
Kittson	Warroad	162	45	28	231	19.1			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	28	232	11.1			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	28	233	10.9			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	28	234	1.8			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	29	160	31.2			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	30	85	41			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	162	45	30	146	11			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	45	30	273	23.9			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	45	30	274	5.6			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	45	30	278	3.4			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	31	93	26.3			Clearcut- with Reserves	2021	Aspen	36

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	162	45	31	94	59.7			Clearcut- with Reserves	2012	Aspen	37
Kittson	Warroad	162	45	31	102	9.2			Clearcut- with Reserves	2012	Aspen	46
Kittson	Warroad	162	45	31	107	11.3			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	31	124	37.2			Clearcut- with Reserves	2017	Aspen	27
Kittson	Warroad	162	45	31	271	6.3			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	162	45	31	272	8.6			Clearcut- with Reserves	2012	Aspen	57
Kittson	Warroad	162	45	31	276	16.9			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	31	277	26.6			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	31	286	15.7			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	31	287	21.6			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	32	159	22.7			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	32	202	11.7			Clearcut- with Reserves	2012	Aspen	37
Kittson	Warroad	162	45	32	218	35.3			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	32	267	24.3			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	32	315	21.9			Clearcut- with Reserves	2012	Aspen	37
Kittson	Warroad	162	45	32	316	29.2			Clearcut- with Reserves	2012	Aspen	37
Kittson	Warroad	162	45	33	103	12.2			Clearcut- with Reserves	2017	Aspen	32
Kittson	Warroad	162	45	33	235	2.6			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	45	33	236	2.8			Clearcut- with Reserves	2017	Aspen	27
Kittson	Warroad	162	45	33	326	77.6			Clearcut- with Reserves	2017	Aspen	42
Kittson	Warroad	162	45	35	116	17.1			Clearcut- with Reserves	2020	Aspen	52
Kittson	Warroad	162	46	2	411	11.7			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	2	453	4.8			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	2	454	45.5			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	2	456	7.1			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	2	504	1.2			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	2	505	0.9			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	2	507	16.7			Clearcut- with Reserves	2016	Aspen	57

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	162	46	2	508	12.6			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	2	509	15.3			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	3	404	41.1			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	162	46	3	422	20.5			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	3	470	8.7			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	3	535	12.1			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	3	621	3.6			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	4	471	12.9			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	162	46	4	595	0.9			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	4	620	12.6			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	4	662	37.5			Clearcut- with Reserves	2016	Aspen	26
Kittson	Warroad	162	46	4	671	19.7			Clearcut- with Reserves	2016	Aspen	29
Kittson	Warroad	162	46	5	428	31.8			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	5	531	8.2			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	5	532	4.3			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	162	46	5	533	28.2			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	162	46	8	420	15.8			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	8	472	9.7			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	8	486	24.4			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	8	565	39.7			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	8	576	36.7			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	8	667	68.4			Clearcut- with Reserves	2019	Aspen	40
Kittson	Warroad	162	46	9	474	19.2			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	9	518	1.5			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	9	519	6.5			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	9	520	34			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	9	668	51.1			Clearcut- with Reserves	2019	Aspen	29
Kittson	Warroad	162	46	10	556	7.2			Clearcut- with Reserves	2019	Aspen	27

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	162	46	10	577	4.9			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	10	580	7.7			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	10	581	1.6			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	10	654	76.9			Clearcut- with Reserves	2019	Aspen	31
Kittson	Warroad	162	46	10	673	15.5			Clearcut- with Reserves	2019	balm of Gilead	27
Kittson	Warroad	162	46	11	579	2.8			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	11	582	40.3			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	11	606	9.1			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	11	626	9.9			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	11	637	22.6			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	11	638	29.2			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	11	644	88.8			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	12	458	24.1			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	12	469	81.2			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	12	538	43.6			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	12	609	8.9			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	12	645	10.3			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	13	540	42.2			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	13	544	24.2			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	13	546	25.6			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	13	547	35.3			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	13	550	24			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	46	13	585	10			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	13	586	6.8			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	13	610	21.7			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	46	13	634	55.5			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	14	462	50.6			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	14	463	40.4			Clearcut- with Reserves	2021	Aspen	37



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	162	46	14	559	3.1			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	14	563	78.2			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	14	574	4.7			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	14	584	15			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	14	587	48.7			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	16	451	164			Clearcut- with Reserves	2012	Aspen	27
Kittson	Warroad	162	46	16	494	11.6			Clearcut- with Reserves	2019	Aspen	37
Kittson	Warroad	162	46	16	523	31.5			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	16	529	9.3			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	16	572	117.2			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	16	655	26			Clearcut- with Reserves	2019	Aspen	28
Kittson	Warroad	162	46	16	664	15.2			Clearcut- with Reserves	2019	Aspen	30
Kittson	Warroad	162	46	18	441	7.3			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	18	443	2.9			Clearcut- with Reserves	2019	Aspen	27
Kittson	Warroad	162	46	24	554	3.4			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	46	24	611	14.6			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	24	615	29.6			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	24	616	3.8			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	46	24	663	12.1			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	46	25	425	6.6			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	46	25	557	12.4			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	25	661	42			Clearcut- with Reserves	2021	Aspen	34
Kittson	Warroad	162	46	33	657	30.5			Clearcut- with Reserves	2019	Aspen	44
Kittson	Warroad	162	46	34	346	7.1			Clearcut- with Reserves	2019	Aspen	36
Kittson	Warroad	162	46	34	392	1.5			Clearcut- with Reserves	2019	Aspen	36
Kittson	Warroad	162	46	36	413	1.8			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	46	36	416	2.7			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	162	46	36	426	25.3			Clearcut- with Reserves	2021	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	162	46	36	511	1.5			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	36	512	2.5			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	162	46	36	513	5.8			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	162	46	36	656	34.8			Clearcut- with Reserves	2021	Aspen	35
Kittson	Warroad	162	47	6	4	15.4			Clearcut- with Reserves	2016	Offsite Aspen	71
Kittson	Warroad	162	47	6	7	7.9			Clearcut- with Reserves	2016	Aspen	66
Kittson	Warroad	163	45	4	133	8.6			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	4	137	2.2			Clearcut- with Reserves	2018	Aspen	27
Kittson	Warroad	163	45	4	167	27			Clearcut- with Reserves	2018	Aspen	27
Kittson	Warroad	163	45	4	202	25.1			Clearcut- with Reserves	2018	Aspen	27
Kittson	Warroad	163	45	8	180	2.1			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	8	206	4.5			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	8	225	2.3			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	8	245	5.9			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	8	250	2.2			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	184	1.1			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	204	6.7			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	207	26.7			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	229	10.4			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	230	6.4			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	234	0.6			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	235	1.9			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	236	8.3			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	237	26.7			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	238	6.4			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	252	28.7			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	9	265	21.8			Clearcut- with Reserves	2018	Aspen	28
Kittson	Warroad	163	45	9	266	38.9			Clearcut- with Reserves	2018	Aspen	28

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	163	45	9	267	11.5			Clearcut- with Reserves	2018	Aspen	38
Kittson	Warroad	163	45	9	268	28.2			Clearcut- with Reserves	2018	Aspen	33
Kittson	Warroad	163	45	16	140	2.4			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	16	192	3.5			Clearcut- with Reserves	2018	Aspen	27
Kittson	Warroad	163	45	16	197	26			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	16	211	24.2			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	20	89	41.9			Clearcut- with Reserves	2012	Aspen	63
Kittson	Warroad	163	45	20	189	2.3			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	20	190	5.4			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	20	191	3.2			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	20	208	10			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	20	210	10.1			Clearcut- with Reserves	2018	Aspen	37
Kittson	Warroad	163	45	36	147	10.7			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	163	45	36	153	1.1			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	163	45	36	155	5.2			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	163	46	1	101	12.1			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	1	106	18.2			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	1	108	41.5			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	1	112	2			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	1	162	3.4			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	163	46	2	90	6.7			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	3	129	51.3			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	163	46	3	130	5.6			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	3	131	4.5			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	3	146	20.2			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	4	125	31.2			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	4	204	26			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	163	46	9	102	2.2			Clearcut- with Reserves	2020	Aspen	27

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	163	46	9	105	8.7			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	9	124	3.7			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	163	46	9	144	5.4			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	163	46	9	155	4.5			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	163	46	9	281	8.8			Clearcut- with Reserves	2020	Aspen	40
Kittson	Warroad	163	46	10	103	8.1			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	10	156	5.6			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	10	157	17.2			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	10	158	7.5			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	10	228	1			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	163	46	10	229	0.8			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	163	46	10	279	47.6			Clearcut- with Reserves	2020	Aspen	33
Kittson	Warroad	163	46	10	280	19.3			Clearcut- with Reserves	2020	Aspen	29
Kittson	Warroad	163	46	12	232	5			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	163	46	23	177	4.5			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	23	284	40.2			Clearcut- with Reserves	2014	Aspen	34
Kittson	Warroad	163	46	23	287	32.8			Clearcut- with Reserves	2014	Aspen	27
Kittson	Warroad	163	46	23	291	5.6			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	24	85	6.4			Clearcut- with Reserves	2014	Aspen	40
Kittson	Warroad	163	46	24	94	19.1			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	24	164	7.2			Clearcut- with Reserves	2014	Aspen	27
Kittson	Warroad	163	46	24	172	3.7			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	24	174	23.1			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	24	176	10.3			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	24	180	0.7			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	24	183	3			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	24	275	11.3			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	32	95	14.5			Clearcut- with Reserves	2016	Aspen	38

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	163	46	32	116	71			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	33	131	12.7			Clearcut- with Reserves	2016	Aspen	58
Kittson	Warroad	163	46	33	218	13.5			Clearcut- with Reserves	2016	Aspen	58
Kittson	Warroad	163	46	33	219	8.7			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	33	222	9.1			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	163	46	33	223	21.9			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	33	242	13.5			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	33	264	2.1			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	163	46	33	266	1.9			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	163	46	33	270	41.8			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	33	271	54.1			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	33	283	48.9			Clearcut- with Reserves	2016	Aspen	29
Kittson	Warroad	163	46	34	213	7.6			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	214	3.8			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	216	17.9			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	217	18.6			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	220	24.1			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	243	36.5			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	244	9.2			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	248	4.7			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	250	13.9			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	251	22.3			Clearcut- with Reserves	2016	Aspen	37
Kittson	Warroad	163	46	34	252	17.4			Clearcut- with Reserves	2016	Aspen	27
Kittson	Warroad	163	46	36	200	12.1			Clearcut- with Reserves	2014	Aspen	27
Kittson	Warroad	163	46	36	201	6.4			Clearcut- with Reserves	2014	Aspen	37
Kittson	Warroad	163	46	36	286	64.3			Clearcut- with Reserves	2014	Aspen	39
Kittson	Warroad	163	46	36	289	22.9			Clearcut- with Reserves	2014	Aspen	43
Kittson	Warroad	163	46	36	290	17.8			Clearcut- with Reserves	2014	Aspen	33

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	163	47	2	309	2.2			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	163	47	2	402	36.5			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	163	47	3	401	5.3			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	10	237	5.7			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	10	300	7.3			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	11	385	74.7			Clearcut- with Reserves	2013	Aspen	35
Kittson	Warroad	163	47	11	398	31.5			Clearcut- with Reserves	2013	Aspen	31
Kittson	Warroad	163	47	12	250	121			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	163	47	12	355	5.5			Clearcut- with Reserves	2013	Aspen	27
Kittson	Warroad	163	47	12	373	39.1			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	163	47	12	374	12.5			Clearcut- with Reserves	2013	Aspen	57
Kittson	Warroad	163	47	12	383	48			Clearcut- with Reserves	2013	Aspen	37
Kittson	Warroad	163	47	12	386	126.2			Clearcut- with Reserves	2013	Aspen	30
Kittson	Warroad	163	47	13	375	18.9			Clearcut- with Reserves	2015	Aspen	37
Kittson	Warroad	163	47	13	382	219.9			Clearcut- with Reserves	2015	Aspen	40
Kittson	Warroad	163	47	13	399	17.4			Clearcut- with Reserves	2015	Aspen	48
Kittson	Warroad	163	47	14	323	31.6			Clearcut- with Reserves	2015	Aspen	57
Kittson	Warroad	163	47	14	324	73.1			Clearcut- with Reserves	2015	Aspen	37
Kittson	Warroad	163	47	15	274	23.3			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	15	371	34.8			Clearcut- with Reserves	2017	Aspen	27
Kittson	Warroad	163	47	15	381	125.5			Clearcut- with Reserves	2017	Aspen	31
Kittson	Warroad	163	47	15	384	80.1			Clearcut- with Reserves	2017	Aspen	30
Kittson	Warroad	163	47	16	135	41			Clearcut- with Reserves	2012	Aspen	68
Kittson	Warroad	163	47	16	234	22.4			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	16	246	27.3			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	16	284	23.2			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	16	285	34.1			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	163	47	16	390	86.9			Clearcut- with Reserves	2017	Aspen	38

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	163	47	16	396	38.4			Clearcut- with Reserves	2021	Aspen	29
Kittson	Warroad	163	47	21	370	50.4			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	21	389	101.1			Clearcut- with Reserves	2012	Aspen	43
Kittson	Warroad	163	47	21	392	52.9			Clearcut- with Reserves	2021	Aspen	30
Kittson	Warroad	163	47	22	245	122.1			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	22	293	5.8			Clearcut- with Reserves	2017	Aspen	27
Kittson	Warroad	163	47	22	405	29.7			Clearcut- with Reserves	2012	Aspen	59
Kittson	Warroad	163	47	23	364	5.4			Clearcut- with Reserves	2017	Aspen	37
Kittson	Warroad	163	47	23	391	28.1			Clearcut- with Reserves	2017	Aspen	28
Kittson	Warroad	163	47	23	400	75.9			Clearcut- with Reserves	2021	Aspen	31
Kittson	Warroad	163	47	24	241	2			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	163	47	24	243	11.1			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	163	47	24	264	31.3			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	163	47	24	314	6.1			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	163	47	24	321	6.8			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	163	47	24	368	15.9			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	163	47	24	369	7.8			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	163	47	26	303	11.5			Clearcut- with Reserves	2021	Aspen	27
Kittson	Warroad	163	47	26	325	18.7			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	163	47	26	327	1.9			Clearcut- with Reserves	2021	Aspen	37
Kittson	Warroad	163	47	36	387	139.4			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	45	36	54	15.7			Clearcut- with Reserves	2013	Aspen	57
Kittson	Warroad	164	45	36	56	39.7			Clearcut- with Reserves	2013	Aspen	52
Kittson	Warroad	164	46	25	82	23.3			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	25	91	3.6			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	164	46	26	151	54.9			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	26	156	51.9			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	27	108	11.7			Clearcut- with Reserves	2020	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Kittson	Warroad	164	46	27	164	85.7			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	28	61	6.1			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	32	130	9.4			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	32	146	7.7			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	33	79	10.5			Clearcut- with Reserves	2020	Aspen	27
Kittson	Warroad	164	46	34	62	58.8			Clearcut- with Reserves	2012	Aspen	37
Kittson	Warroad	164	46	34	169	200.3			Clearcut- with Reserves	2012	Aspen	37
Kittson	Warroad	164	46	34	170	176.6			Clearcut- with Reserves	2012	Aspen	37
Kittson	Warroad	164	46	35	83	7.5			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	35	102	2.9			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	35	104	1.6			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	35	105	1.5			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	35	109	12			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	35	121	25.5			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	35	168	52.5			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	36	75	15.1			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	36	77	21.2			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	36	113	23.3			Clearcut- with Reserves	2020	Aspen	37
Kittson	Warroad	164	46	36	123	11.2			SFRMP On-Site Visit	2020	Ash	77
Kittson	Warroad	164	48	36	24	88.3			Clearcut- with Reserves	2018	Aspen	40
Marshall	Warroad	154	39	1	24	2.3			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	154	44	6	84	2.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	155	39	6	6	33.7			Clearcut- with Reserves	2013	Aspen	32
Marshall	Warroad	155	39	6	388	39.5			Clearcut- with Reserves	2013	Aspen	32
Marshall	Warroad	155	39	6	390	0.5			Clearcut- with Reserves	2013	Aspen	36
Marshall	Warroad	155	39	6	391	1.2			Clearcut- with Reserves	2013	Aspen	36
Marshall	Warroad	155	39	6	428	18			Clearcut- with Reserves	2013	Aspen	36
Marshall	Warroad	155	39	7	94	23.1			Clearcut- with Reserves	2012	Aspen	45



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	155	39	7	338	5			Clearcut- with Reserves	2012	Aspen	48
Marshall	Warroad	155	39	7	370	7.8			Clearcut- with Reserves	2012	Aspen	48
Marshall	Warroad	155	39	7	375	0.4			Clearcut- with Reserves	2012	Aspen	37
Marshall	Warroad	155	39	7	424	8			Clearcut- with Reserves	2012	Aspen	39
Marshall	Warroad	155	39	9	69	6.6			Clearcut- with Reserves	2017	Aspen	49
Marshall	Warroad	155	39	9	350	3.4			Clearcut- with Reserves	2017	Aspen	61
Marshall	Warroad	155	39	9	403	6.3			Clearcut- with Reserves	2017	Aspen	27
Marshall	Warroad	155	39	9	406	8.5			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	155	39	9	425	7.8			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	155	39	9	429	17.8			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	155	39	9	430	12.7			Clearcut- with Reserves	2017	Aspen	45
Marshall	Warroad	155	39	9	431	24.9			Clearcut- with Reserves	2017	Aspen	42
Marshall	Warroad	155	39	11	85	32.7			Clearcut- with Reserves	2017	Aspen	40
Marshall	Warroad	155	39	11	422	55.6			Clearcut- with Reserves	2017	Aspen	41
Marshall	Warroad	155	39	25	172	49			Clearcut- with Reserves	2021	Aspen	43
Marshall	Warroad	155	39	25	288	8.9			Clearcut- with Reserves	2021	Aspen	27
Marshall	Warroad	155	39	25	421	58.1			Clearcut- with Reserves	2021	Aspen	38
Marshall	Warroad	155	39	25	438	8.3			Clearcut- with Reserves	2021	Aspen	43
Marshall	Warroad	155	39	33	230	28.1			Clearcut- with Reserves	2015	Aspen	45
Marshall	Warroad	155	39	33	439	41.5			Clearcut- with Reserves	2015	Aspen	40
Marshall	Warroad	155	39	34	197	51.4			Clearcut- with Reserves	2015	Aspen	33
Marshall	Warroad	155	39	34	229	8.5			Clearcut- with Reserves	2012	Aspen	50
Marshall	Warroad	155	39	34	258	2.2			Clearcut- with Reserves	2015	Aspen	33
Marshall	Warroad	155	39	34	279	13.9			Clearcut- with Reserves	2015	Aspen	33
Marshall	Warroad	155	39	34	434	16.3			Clearcut- with Reserves	2015	Aspen	38
Marshall	Warroad	155	39	34	436	26.8			Clearcut- with Reserves	2015	Aspen	43
Marshall	Warroad	155	39	35	283	1.5			Clearcut- with Reserves	2012	Aspen	46
Marshall	Warroad	155	39	35	284	4.3			Clearcut- with Reserves	2012	Aspen	46

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	155	39	35	285	2.7			Clearcut- with Reserves	2012	Aspen	46
Marshall	Warroad	155	39	35	420	69			Clearcut- with Reserves	2012	Aspen	45
Marshall	Warroad	155	40	1	79	1.5			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	155	40	2	118	13.7			Clearcut- with Reserves	2013	balm of Gilead	40
Marshall	Warroad	155	40	9	22	9.7			Clearcut- with Reserves	2012	Aspen	55
Marshall	Warroad	155	40	9	70	2.6			Clearcut- with Reserves	2012	Aspen	37
Marshall	Warroad	155	40	9	116	14			Clearcut- with Reserves	2012	Aspen	40
Marshall	Warroad	155	40	10	25	57.9			Clearcut- with Reserves	2012	Aspen	35
Marshall	Warroad	155	40	11	30	32.3			SFRMP On-Site Visit	2013	Ash	113
Marshall	Warroad	155	40	11	113	3.8			Clearcut- with Reserves	2013	Aspen	59
Marshall	Warroad	155	40	13	96	22.1			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	155	40	14	52	11.1			SFRMP On-Site Visit	2013	Ash	108
Marshall	Warroad	155	40	14	117	7.5			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	155	40	17	53	12.7			Clearcut- with Reserves	2013	Aspen	52
Marshall	Warroad	155	40	17	86	7.2			Clearcut- with Reserves	2013	Aspen	52
Marshall	Warroad	155	41	7	66	30.4			Clearcut- with Reserves	2017	Aspen	52
Marshall	Warroad	155	41	7	341	11.2			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	155	41	7	387	2.1			Clearcut- with Reserves	2017	Offsite Aspen	47
Marshall	Warroad	155	41	7	390	8.7			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	155	41	8	188	0.8			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	155	41	8	347	4.4			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	155	41	8	357	2.8			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	155	41	8	400	2.8			Clearcut- with Reserves	2017	Aspen	36
Marshall	Warroad	155	41	8	503	18.9			Clearcut- with Reserves	2017	Aspen	42
Marshall	Warroad	155	41	9	74	21.1			Clearcut- with Reserves	2017	Aspen	41
Marshall	Warroad	155	41	9	349	0.7			Clearcut- with Reserves	2017	Aspen	34
Marshall	Warroad	155	41	9	354	0.6			Clearcut- with Reserves	2017	Aspen	34
Marshall	Warroad	155	41	9	379	0.8			Clearcut- with Reserves	2017	Aspen	34

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	155	41	9	389	3			Clearcut- with Reserves	2017	Aspen	34
Marshall	Warroad	155	41	9	501	49.6			Clearcut- with Reserves	2017	Aspen	42
Marshall	Warroad	155	41	9	502	7.5			Clearcut- with Reserves	2017	Aspen	50
Marshall	Warroad	155	41	10	173	1.5			Clearcut- with Reserves	2017	Aspen	34
Marshall	Warroad	155	41	15	506	5.7			Clearcut- with Reserves	2017	balm of Gilead	43
Marshall	Warroad	155	41	15	507	5.3			Clearcut- with Reserves	2017	Aspen	41
Marshall	Warroad	155	41	16	88	10.5			Clearcut- with Reserves	2017	Aspen	44
Marshall	Warroad	155	41	17	99	33.1			Clearcut- with Reserves	2017	Aspen	36
Marshall	Warroad	155	41	17	455	4.1			Clearcut- with Reserves	2017	Aspen	36
Marshall	Warroad	155	41	17	461	1.1			Clearcut- with Reserves	2017	Aspen	36
Marshall	Warroad	155	41	17	462	5.1			Clearcut- with Reserves	2017	Aspen	36
Marshall	Warroad	155	41	17	464	0.4			Clearcut- with Reserves	2017	Aspen	36
Marshall	Warroad	155	41	17	508	13			Clearcut- with Reserves	2017	Aspen	41
Marshall	Warroad	155	41	17	509	5.6			Clearcut- with Reserves	2017	Aspen	41
Marshall	Warroad	155	41	17	510	5.4			Clearcut- with Reserves	2017	Aspen	47
Marshall	Warroad	155	41	19	138	51.2			Clearcut- with Reserves	2015	Aspen	50
Marshall	Warroad	155	41	19	158	2.2			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	41	19	167	9.3			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	41	19	496	11			Clearcut- with Reserves	2015	Aspen	48
Marshall	Warroad	155	41	19	499	38.9			Clearcut- with Reserves	2020	Aspen	41
Marshall	Warroad	155	41	20	136	22.1			Clearcut- with Reserves	2015	Aspen	32
Marshall	Warroad	155	41	20	140	18.1			Clearcut- with Reserves	2015	Aspen	38
Marshall	Warroad	155	41	20	498	32.1			Clearcut- with Reserves	2015	Aspen	40
Marshall	Warroad	155	41	20	500	15.2			Clearcut- with Reserves	2015	Aspen	47
Marshall	Warroad	155	42	9	30	96.7			Clearcut- with Reserves	2021	Aspen	49
Marshall	Warroad	155	42	9	255	4.1			Clearcut- with Reserves	2021	Aspen	36
Marshall	Warroad	155	42	9	261	2.3			Clearcut- with Reserves	2018	Aspen	36
Marshall	Warroad	155	42	9	348	2.3			Clearcut- with Reserves	2018	Aspen	36

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	155	42	9	359	3.4			Clearcut- with Reserves	2012	Aspen	36
Marshall	Warroad	155	42	9	362	4.7			Clearcut- with Reserves	2012	Aspen	36
Marshall	Warroad	155	42	9	370	1.2			Clearcut- with Reserves	2012	Aspen	36
Marshall	Warroad	155	42	9	376	1.3			Clearcut- with Reserves	2012	Aspen	36
Marshall	Warroad	155	42	9	377	1			Clearcut- with Reserves	2012	Aspen	36
Marshall	Warroad	155	42	9	383	2			Clearcut- with Reserves	2012	Aspen	36
Marshall	Warroad	155	42	9	479	2.5			Clearcut- with Reserves	2012	Aspen	36
Marshall	Warroad	155	42	9	484	0.3			Clearcut- with Reserves	2012	Aspen	36
Marshall	Warroad	155	42	9	508	8.3			Clearcut- with Reserves	2018	Aspen	51
Marshall	Warroad	155	42	9	515	15.2			Clearcut- with Reserves	2012	Aspen	48
Marshall	Warroad	155	42	9	516	5.2			Clearcut- with Reserves	2012	Aspen	41
Marshall	Warroad	155	42	9	517	10.3			Clearcut- with Reserves	2018	Aspen	43
Marshall	Warroad	155	42	9	519	5.3			Clearcut- with Reserves	2018	Aspen	44
Marshall	Warroad	155	42	10	518	5.4			Clearcut- with Reserves	2021	Aspen	51
Marshall	Warroad	155	42	11	19	60.6			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	155	42	11	303	0.8			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	155	42	11	333	4.4			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	155	42	11	346	3.9			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	155	42	11	513	14.6			Clearcut- with Reserves	2018	balm of Gilead	39
Marshall	Warroad	155	42	12	309	1.1			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	155	42	12	336	0.6			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	155	42	12	514	5.6			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	155	42	13	401	7			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	42	13	412	3.5			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	42	13	416	1.1			Clearcut- with Reserves	2020	Aspen	60
Marshall	Warroad	155	42	13	437	2.8			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	42	14	64	24.3			Clearcut- with Reserves	2020	Aspen	50
Marshall	Warroad	155	42	14	76	26.6			Clearcut- with Reserves	2020	Aspen	51

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	155	42	14	390	4.5			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	42	14	394	1.7			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	42	14	458	4.6			Clearcut- with Reserves	2020	Aspen	38
Marshall	Warroad	155	42	15	73	20			Clearcut- with Reserves	2020	Aspen	36
Marshall	Warroad	155	42	15	430	3.1			Clearcut- with Reserves	2020	Aspen	36
Marshall	Warroad	155	42	15	435	3.9			Clearcut- with Reserves	2020	Aspen	36
Marshall	Warroad	155	42	15	444	2.7			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	155	42	15	451	3			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	42	16	423	4.9			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	155	42	16	424	2.4			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	155	42	16	520	21.2			Clearcut- with Reserves	2018	Aspen	47
Marshall	Warroad	155	42	16	523	6.5			Clearcut- with Reserves	2018	Aspen	51
Marshall	Warroad	155	42	16	524	15.1			Clearcut- with Reserves	2018	Aspen	43
Marshall	Warroad	155	42	20	504	9.4			Clearcut- with Reserves	2013	Aspen	46
Marshall	Warroad	155	42	20	507	8.4			Clearcut- with Reserves	2013	Aspen	47
Marshall	Warroad	155	42	20	509	24			Clearcut- with Reserves	2013	Aspen	48
Marshall	Warroad	155	42	21	499	8.9			Clearcut- with Reserves	2013	Aspen	51
Marshall	Warroad	155	42	21	503	69.8			Clearcut- with Reserves	2013	Aspen	48
Marshall	Warroad	155	42	22	90	14.6			Clearcut- with Reserves	2013	Aspen	32
Marshall	Warroad	155	42	22	227	2.4			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	155	42	22	298	4.4			Clearcut- with Reserves	2013	Aspen	44
Marshall	Warroad	155	42	22	497	16.5			Clearcut- with Reserves	2013	Aspen	41
Marshall	Warroad	155	42	22	502	18.2			Clearcut- with Reserves	2013	Aspen	48
Marshall	Warroad	155	42	23	97	45.4			Clearcut- with Reserves	2016	Aspen	54
Marshall	Warroad	155	42	23	496	9.3			Clearcut- with Reserves	2016	Aspen	45
Marshall	Warroad	155	42	23	498	47.4			Clearcut- with Reserves	2016	Aspen	50
Marshall	Warroad	155	42	23	505	25.6			Clearcut- with Reserves	2016	Aspen	41
Marshall	Warroad	155	42	23	510	36.5			Clearcut- with Reserves	2016	Aspen	49

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	155	42	23	512	5.1			Clearcut- with Reserves	2016	balm of Gilead	40
Marshall	Warroad	155	42	24	211	20.7			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	155	42	24	225	15.5			Clearcut- with Reserves	2020	Aspen	47
Marshall	Warroad	155	42	24	242	46.2			Clearcut- with Reserves	2020	Aspen	49
Marshall	Warroad	155	42	24	495	17.1			Clearcut- with Reserves	2020	Aspen	39
Marshall	Warroad	155	42	24	501	12.7			Clearcut- with Reserves	2020	Aspen	42
Marshall	Warroad	155	42	24	511	8.4			Clearcut- with Reserves	2016	Aspen	42
Marshall	Warroad	155	42	26	144	12.6			Clearcut- with Reserves	2012	Aspen	37
Marshall	Warroad	155	42	26	153	13.7			Clearcut- with Reserves	2012	Aspen	48
Marshall	Warroad	155	42	26	276	1			Clearcut- with Reserves	2012	Aspen	37
Marshall	Warroad	155	42	26	283	4			Clearcut- with Reserves	2012	balm of Gilead	38
Marshall	Warroad	155	42	26	493	20.9			Clearcut- with Reserves	2012	Aspen	51
Marshall	Warroad	155	42	26	494	31.9			Clearcut- with Reserves	2012	Aspen	48
Marshall	Warroad	155	42	27	155	11			Clearcut- with Reserves	2013	balm of Gilead	47
Marshall	Warroad	155	42	27	195	3.3			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	155	42	32	492	9.3			Clearcut- with Reserves	2013	Aspen	51
Marshall	Warroad	155	42	33	181	11			Clearcut- with Reserves	2013	Aspen	57
Marshall	Warroad	155	42	34	490	32.8			Clearcut- with Reserves	2013	Aspen	45
Marshall	Warroad	155	43	17	27	18			Clearcut- with Reserves	2014	Aspen	36
Marshall	Warroad	156	39	2	174	0.2			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	156	39	2	175	1.6			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	156	39	2	176	0.6			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	156	39	18	24	6.7			Clearcut- with Reserves	2012	Aspen	41
Marshall	Warroad	156	39	18	130	4.2			SFRMP On-Site Visit	2012	Ash	102
Marshall	Warroad	156	39	18	144	15.5			SFRMP On-Site Visit	2012	Ash	102
Marshall	Warroad	156	39	18	146	3.5			Clearcut- with Reserves	2012	Aspen	41
Marshall	Warroad	156	39	18	148	1.6			Clearcut- with Reserves	2012	Aspen	33
Marshall	Warroad	156	39	18	151	4.6			Clearcut- with Reserves	2012	Aspen	41

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	156	39	19	54	33.5			Clearcut- with Reserves	2015	Aspen	41
Marshall	Warroad	156	39	19	57	3.3			SFRMP On-Site Visit	2015	Ash	7
Marshall	Warroad	156	39	20	60	5			Clearcut- with Reserves	2015	Aspen	55
Marshall	Warroad	156	39	31	75	7.5			Clearcut- with Reserves	2013	Aspen	62
Marshall	Warroad	156	40	9	238	5			Clearcut- with Reserves	2018	Aspen	27
Marshall	Warroad	156	40	9	245	0.6			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	156	40	9	551	0.7			Clearcut- with Reserves	2018	Aspen	27
Marshall	Warroad	156	40	9	554	0.6			Clearcut- with Reserves	2018	Aspen	27
Marshall	Warroad	156	40	10	249	2.8			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	156	40	10	578	14.9			Clearcut- with Reserves	2018	Aspen	41
Marshall	Warroad	156	40	10	579	33			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	156	40	10	580	7.2			Clearcut- with Reserves	2018	Aspen	45
Marshall	Warroad	156	40	15	170	4			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	156	40	15	565	1.6			Clearcut- with Reserves	2018	Aspen	43
Marshall	Warroad	156	40	16	57	73.1			Clearcut- with Reserves	2018	Aspen	62
Marshall	Warroad	156	40	16	331	13.8			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	156	40	17	279	1.2			Clearcut- with Reserves	2018	Aspen	27
Marshall	Warroad	156	40	17	315	3.5			Clearcut- with Reserves	2018	balm of Gilead	47
Marshall	Warroad	156	40	17	334	9.4			Clearcut- with Reserves	2018	balm of Gilead	47
Marshall	Warroad	156	40	18	307	16			Clearcut- with Reserves	2018	balm of Gilead	47
Marshall	Warroad	156	40	18	308	8.3			Clearcut- with Reserves	2018	Aspen	27
Marshall	Warroad	156	40	18	336	0.7			Clearcut- with Reserves	2018	Aspen	27
Marshall	Warroad	156	40	18	337	1.6			Clearcut- with Reserves	2018	Aspen	27
Marshall	Warroad	156	40	19	586	92.1			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	19	587	7			Clearcut- with Reserves	2020	Aspen	31
Marshall	Warroad	156	40	20	407	3.4			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	21	82	25.6			Clearcut- with Reserves	2020	Aspen	29
Marshall	Warroad	156	40	21	83	62.6			Clearcut- with Reserves	2020	Aspen	47

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	156	40	21	186	0.9			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	21	189	2			Clearcut- with Reserves	2012	Aspen	27
Marshall	Warroad	156	40	21	385	2.1			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	156	40	21	386	3.1			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	156	40	21	399	1.1			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	156	40	21	403	6			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	21	445	3.4			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	21	447	1.3			Clearcut- with Reserves	2020	Aspen	28
Marshall	Warroad	156	40	21	574	3.4			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	156	40	21	583	5.1			Clearcut- with Reserves	2012	balm of Gilead	37
Marshall	Warroad	156	40	21	584	22.1			Clearcut- with Reserves	2012	Aspen	44
Marshall	Warroad	156	40	21	588	15.8			Clearcut- with Reserves	2020	Aspen	40
Marshall	Warroad	156	40	21	589	9.4			Clearcut- with Reserves	2020	Aspen	52
Marshall	Warroad	156	40	22	86	106.2			Clearcut- with Reserves	2012	Aspen	38
Marshall	Warroad	156	40	22	197	0.9			Clearcut- with Reserves	2012	Aspen	27
Marshall	Warroad	156	40	22	377	76			Clearcut- with Reserves	2012	Aspen	34
Marshall	Warroad	156	40	22	378	14.1			Clearcut- with Reserves	2012	Aspen	37
Marshall	Warroad	156	40	22	390	0.6			Clearcut- with Reserves	2012	Aspen	37
Marshall	Warroad	156	40	22	402	1.7			Clearcut- with Reserves	2012	Aspen	37
Marshall	Warroad	156	40	22	408	0.4			Clearcut- with Reserves	2012	Aspen	37
Marshall	Warroad	156	40	22	568	7.2			Clearcut- with Reserves	2012	Aspen	34
Marshall	Warroad	156	40	22	569	1.1			Clearcut- with Reserves	2012	Aspen	34
Marshall	Warroad	156	40	22	570	0.9			Clearcut- with Reserves	2012	Aspen	34
Marshall	Warroad	156	40	22	571	1.8			Clearcut- with Reserves	2012	Aspen	34
Marshall	Warroad	156	40	22	572	0.6			Clearcut- with Reserves	2012	Aspen	34
Marshall	Warroad	156	40	22	585	9.3			Clearcut- with Reserves	2012	Aspen	50
Marshall	Warroad	156	40	22	598	6.4			Clearcut- with Reserves	2012	Aspen	55
Marshall	Warroad	156	40	28	591	6.9			Clearcut- with Reserves	2020	Aspen	31



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	156	40	29	548	4.9			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	29	596	23.6			Clearcut- with Reserves	2020	Aspen	52
Marshall	Warroad	156	40	30	136	8.3			Clearcut- with Reserves	2020	Aspen	44
Marshall	Warroad	156	40	30	482	0.7			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	30	500	1.5			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	156	40	30	522	2.2			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	30	537	1.5			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	156	40	30	592	13.3			Clearcut- with Reserves	2020	Aspen	26
Marshall	Warroad	156	40	30	594	6.8			Clearcut- with Reserves	2020	Aspen	32
Marshall	Warroad	156	40	34	144	7.7			Clearcut- with Reserves	2013	Aspen	38
Marshall	Warroad	156	40	34	577	9.2			Clearcut- with Reserves	2013	Aspen	32
Marshall	Warroad	156	40	34	599	14.7			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	156	40	36	150	24.3			Clearcut- with Reserves	2013	Aspen	31
Marshall	Warroad	156	40	36	152	23.4			Clearcut- with Reserves	2013	Aspen	41
Marshall	Warroad	156	42	20	21	12.5			Clearcut- with Reserves	2018	Aspen	43
Marshall	Warroad	156	42	20	28	9.1			Clearcut- with Reserves	2018	Aspen	43
Marshall	Warroad	156	44	28	35	8.1			Clearcut- with Reserves	2014	Aspen	43
Marshall	Warroad	156	44	32	45	4.3			Clearcut- with Reserves	2014	Aspen	67
Marshall	Warroad	157	39	2	56	28.6			Clearcut- with Reserves	2016	balm of Gilead	37
Marshall	Warroad	157	39	2	59	8.6			Clearcut- with Reserves	2016	Aspen	30
Marshall	Warroad	157	39	2	61	45.2			Clearcut- with Reserves	2013	Aspen	67
Marshall	Warroad	157	39	9	82	11.5			Clearcut- with Reserves	2019	Aspen	55
Marshall	Warroad	157	39	10	102	7.5			Clearcut- with Reserves	2013	balm of Gilead	59
Marshall	Warroad	157	39	11	93	23.4			Clearcut- with Reserves	2013	balm of Gilead	52
Marshall	Warroad	157	39	11	95	38.3			Clearcut- with Reserves	2016	balm of Gilead	40
Marshall	Warroad	157	39	11	100	34.3			Clearcut- with Reserves	2016	Aspen	37
Marshall	Warroad	157	39	11	101	7.3			Clearcut- with Reserves	2013	Aspen	62
Marshall	Warroad	157	39	14	125	10.4			Clearcut- with Reserves	2019	Aspen	46

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	157	39	16	127	83.9			Clearcut- with Reserves	2018	balm of Gilead	54
Marshall	Warroad	157	39	16	339	17.3			Clearcut- with Reserves	2018	balm of Gilead	54
Marshall	Warroad	157	39	16	363	10.6			Clearcut- with Reserves	2018	balm of Gilead	54
Marshall	Warroad	157	39	21	161	22.4			Clearcut- with Reserves	2021	Aspen	43
Marshall	Warroad	157	39	22	144	16.4			Clearcut- with Reserves	2014	balm of Gilead	49
Marshall	Warroad	157	39	22	158	42.4			Clearcut- with Reserves	2020	balm of Gilead	33
Marshall	Warroad	157	39	22	277	3.6			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	157	39	23	163	35.6			Clearcut- with Reserves	2014	Aspen	56
Marshall	Warroad	157	39	23	166	8.6			Clearcut- with Reserves	2017	Aspen	36
Marshall	Warroad	157	39	23	172	13.7			Clearcut- with Reserves	2020	balm of Gilead	34
Marshall	Warroad	157	39	23	280	12.6			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	157	39	23	281	3.3			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	157	39	23	292	12.1			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	157	39	24	169	18.8			Clearcut- with Reserves	2016	Aspen	54
Marshall	Warroad	157	39	24	170	8			Clearcut- with Reserves	2021	balm of Gilead	43
Marshall	Warroad	157	39	24	183	11.4			Clearcut- with Reserves	2017	Aspen	48
Marshall	Warroad	157	39	24	286	5.2			Clearcut- with Reserves	2021	balm of Gilead	43
Marshall	Warroad	157	39	25	189	32.6			Clearcut- with Reserves	2017	Aspen	48
Marshall	Warroad	157	39	25	204	89.7			Clearcut- with Reserves	2019	Aspen	32
Marshall	Warroad	157	39	25	207	21.9			Clearcut- with Reserves	2014	Aspen	68
Marshall	Warroad	157	39	25	230	26			Clearcut- with Reserves	2021	Aspen	29
Marshall	Warroad	157	39	25	231	5.9			Clearcut- with Reserves	2021	Aspen	29
Marshall	Warroad	157	39	26	194	15.2			Clearcut- with Reserves	2014	Aspen	57
Marshall	Warroad	157	39	26	214	12.5			Clearcut- with Reserves	2012	Aspen	71
Marshall	Warroad	157	39	26	222	18.8			Clearcut- with Reserves	2015	Aspen	62
Marshall	Warroad	157	39	26	223	15.5			Clearcut- with Reserves	2012	balm of Gilead	67
Marshall	Warroad	157	39	26	227	3.8			Clearcut- with Reserves	2015	Aspen	65
Marshall	Warroad	157	39	26	233	6.1			Clearcut- with Reserves	2020	Aspen	32

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	157	39	26	234	7.4			Clearcut- with Reserves	2020	Aspen	32
Marshall	Warroad	157	39	26	347	4.6			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	39	26	348	4.9			Clearcut- with Reserves	2020	Aspen	32
Marshall	Warroad	157	39	29	321	7.3			Clearcut- with Reserves	2018	balm of Gilead	47
Marshall	Warroad	157	39	30	208	20.2			Clearcut- with Reserves	2018	balm of Gilead	60
Marshall	Warroad	157	39	31	251	17.2			Clearcut- with Reserves	2018	balm of Gilead	59
Marshall	Warroad	157	39	35	249	19.6	Y		Clearcut- with Reserves	2012	Aspen	76
Marshall	Warroad	157	39	36	260	17.8	Y		Clearcut- with Reserves	2019	Aspen	46
Marshall	Warroad	157	39	36	362	8.4			Clearcut- with Reserves	2016	Aspen	37
Marshall	Warroad	157	40	5	9	31.2			Clearcut- with Reserves	2014	Aspen	52
Marshall	Warroad	157	41	7	4	1.4			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	42	5	10	17.1			Clearcut- with Reserves	2013	Aspen	53
Marshall	Warroad	157	42	23	75	10.1			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	43	2	17	9.9			Clearcut- with Reserves	2014	Aspen	47
Marshall	Warroad	157	43	2	19	15.7			Clearcut- with Reserves	2014	Aspen	45
Marshall	Warroad	157	43	2	53	2.7			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	157	43	4	57	131.1			Clearcut- with Reserves	2015	Aspen	27
Marshall	Warroad	157	43	4	68	1.7			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	157	43	6	6	6.6			Clearcut- with Reserves	2014	Aspen	40
Marshall	Warroad	157	43	6	82	13.6			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	157	43	8	60	15.9			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	157	43	26	89	11			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	43	26	90	6.5			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	43	26	91	7			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	43	26	93	11			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	44	2	143	25.4			Clearcut- with Reserves	2016	Aspen	37
Marshall	Warroad	157	44	2	144	8			SFRMP On-Site Visit	2016	Ash	77
Marshall	Warroad	157	44	2	179	6.6			Clearcut- with Reserves	2016	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	157	44	2	188	15.2			Clearcut- with Reserves	2016	Aspen	37
Marshall	Warroad	157	44	2	189	3.4			Clearcut- with Reserves	2016	Aspen	37
Marshall	Warroad	157	44	2	190	9.2			Clearcut- with Reserves	2016	Aspen	37
Marshall	Warroad	157	44	3	146	18.2			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	157	44	4	148	0.8			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	157	44	10	155	0.4			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	44	12	58	10			Clearcut- with Reserves	2015	Aspen	47
Marshall	Warroad	157	44	12	60	17.7			Clearcut- with Reserves	2014	Aspen	39
Marshall	Warroad	157	44	12	140	3.5			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	157	44	12	181	2			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	157	44	12	201	37			Clearcut- with Reserves	2014	Aspen	31
Marshall	Warroad	157	44	14	84	16.4			Clearcut- with Reserves	2015	Tamarack	124
Marshall	Warroad	157	44	14	95	10.6			SFRMP On-Site Visit	2015	Ash	60
Marshall	Warroad	157	44	14	124	5.1			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	44	14	157	4.2			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	44	14	160	24.8			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	44	14	163	6.2			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	44	14	166	2.2			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	44	14	197	32.6			Clearcut- with Reserves	2015	Aspen	52
Marshall	Warroad	157	44	16	66	99.4			Clearcut- with Reserves	2021	Aspen	41
Marshall	Warroad	157	44	16	69	82.1			Clearcut- with Reserves	2012	Aspen	47
Marshall	Warroad	157	44	22	103	50.3			SFRMP On-Site Visit	2019	Ash	74
Marshall	Warroad	157	44	22	187	3.2			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	44	24	191	1.2			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	44	24	192	2			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	157	45	1	66	25.4			Clearcut- with Reserves	2021	Aspen	32
Marshall	Warroad	157	45	11	19	16.6			Clearcut- with Reserves	2017	Aspen	47
Marshall	Warroad	157	45	33	51	7.7			Clearcut- with Reserves	2018	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	157	46	11	138	4.6			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	11	141	5.6			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	11	155	1.1			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	11	156	7.9			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	11	157	1.6			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	11	158	6.9			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	11	165	45.8			Clearcut- with Reserves	2018	Aspen	34
Marshall	Warroad	157	46	14	51	6.8			SFRMP On-Site Visit	2018	Ash	86
Marshall	Warroad	157	46	14	102	6.8			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	14	130	1.7			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	14	139	6.3			Clearcut- with Reserves	2018	balm of Gilead	57
Marshall	Warroad	157	46	14	153	1.3			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	157	46	23	64	26.6			SFRMP On-Site Visit	2018	Ash	70
Marshall	Warroad	158	39	8	98	18.7			Clearcut- with Reserves	2015	balm of Gilead	53
Marshall	Warroad	158	39	9	119	8.7			Clearcut- with Reserves	2015	balm of Gilead	55
Marshall	Warroad	158	39	10	37	3.2			Clearcut- with Reserves	2013	Aspen	63
Marshall	Warroad	158	39	12	69	10			Clearcut- with Reserves	2018	balm of Gilead	48
Marshall	Warroad	158	39	13	234	15.7			Clearcut- with Reserves	2012	Aspen	59
Marshall	Warroad	158	39	13	237	3.1			Clearcut- with Reserves	2012	Aspen	62
Marshall	Warroad	158	39	14	170	43.2			Clearcut- with Reserves	2018	Aspen	57
Marshall	Warroad	158	39	16	132	15.5			Clearcut- with Reserves	2015	Aspen	49
Marshall	Warroad	158	39	16	173	9.5			Clearcut- with Reserves	2015	balm of Gilead	53
Marshall	Warroad	158	39	17	150	4			Clearcut- with Reserves	2015	balm of Gilead	55
Marshall	Warroad	158	39	17	189	28.6			Clearcut- with Reserves	2013	Aspen	63
Marshall	Warroad	158	39	17	204	18			Clearcut- with Reserves	2019	Aspen	46
Marshall	Warroad	158	39	19	242	19.5			Clearcut- with Reserves	2020	balm of Gilead	42
Marshall	Warroad	158	39	19	298	97.1			SFRMP On-Site Visit	2015	Ash	81
Marshall	Warroad	158	39	19	337	12.7	Y		Clearcut- with Reserves	2015	balm of Gilead	58

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	39	19	343	15.4			SFRMP On-Site Visit	2015	Ash	81
Marshall	Warroad	158	39	19	369	31.5			SFRMP On-Site Visit	2015	Ash	82
Marshall	Warroad	158	39	19	391	12.9			Clearcut- with Reserves	2021	Tamarack	80
Marshall	Warroad	158	39	20	329	168.4	Y		Clearcut- with Reserves	2015	Aspen	83
Marshall	Warroad	158	39	20	331	29.8			SFRMP On-Site Visit	2015	Ash	113
Marshall	Warroad	158	39	20	334	33.2			Clearcut- with Reserves	2021	Aspen	41
Marshall	Warroad	158	39	20	372	10.4	Y		Clearcut- with Reserves	2015	balm of Gilead	70
Marshall	Warroad	158	39	22	270	2.8			Clearcut- with Reserves	2018	balm of Gilead	48
Marshall	Warroad	158	39	23	379	10.8			Clearcut- with Reserves	2021	Aspen	51
Marshall	Warroad	158	39	24	409	43.8			Clearcut- with Reserves	2015	balm of Gilead	54
Marshall	Warroad	158	39	26	554	4.9	Y		Clearcut- with Reserves	2021	balm of Gilead	61
Marshall	Warroad	158	39	26	575	8.9	Y		Clearcut- with Reserves	2013	balm of Gilead	51
Marshall	Warroad	158	39	27	514	128.9	Y		Clearcut- with Reserves	2021	balm of Gilead	64
Marshall	Warroad	158	39	29	456	38.2			SFRMP On-Site Visit	2015	Ash	89
Marshall	Warroad	158	39	30	424	9.8			SFRMP On-Site Visit	2015	Ash	69
Marshall	Warroad	158	39	30	476	55.6	Y		Clearcut- with Reserves	2017	Tamarack	110
Marshall	Warroad	158	39	31	643	22.8			Clearcut- with Reserves	2019	balm of Gilead	64
Marshall	Warroad	158	39	31	662	15.8			SFRMP On-Site Visit	2019	Ash	61
Marshall	Warroad	158	39	35	609	47.7	Y		Clearcut- with Reserves	2013	balm of Gilead	60
Marshall	Warroad	158	39	35	611	33.5	Y		Clearcut- with Reserves	2013	balm of Gilead	52
Marshall	Warroad	158	39	35	658	58.8	Y		Clearcut- with Reserves	2013	balm of Gilead	62
Marshall	Warroad	158	39	35	685	2.3	Y		Clearcut- with Reserves	2013	balm of Gilead	62
Marshall	Warroad	158	39	36	620	9.3	Y		Clearcut- with Reserves	2013	balm of Gilead	59
Marshall	Warroad	158	39	36	625	4.2	Y		Clearcut- with Reserves	2013	balm of Gilead	59
Marshall	Warroad	158	39	36	631	9.2	Y		Clearcut- with Reserves	2013	balm of Gilead	54
Marshall	Warroad	158	40	1	29	17.2			Clearcut- with Reserves	2015	Aspen	60
Marshall	Warroad	158	40	4	78	46.1			Clearcut- with Reserves	2012	Offsite Aspen	86
Marshall	Warroad	158	40	5	7	53.6			Clearcut- with Reserves	2017	Offsite Aspen	59

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	40	5	44	7.4			SFRMP On-Site Visit	2017	Ash	54
Marshall	Warroad	158	40	22	141	11.3			Clearcut- with Reserves	2015	balm of Gilead	47
Marshall	Warroad	158	40	22	177	14.7			Clearcut- with Reserves	2012	Aspen	55
Marshall	Warroad	158	40	23	145	23.6			Clearcut- with Reserves	2019	balm of Gilead	48
Marshall	Warroad	158	40	23	173	16.7			Clearcut- with Reserves	2012	Aspen	65
Marshall	Warroad	158	40	23	198	86.2			Clearcut- with Reserves	2020	Aspen	49
Marshall	Warroad	158	40	23	489	31.4			Clearcut- with Reserves	2019	balm of Gilead	48
Marshall	Warroad	158	40	24	187	55.2			SFRMP On-Site Visit	2012	Ash	63
Marshall	Warroad	158	40	24	211	6.7			Clearcut- with Reserves	2012	balm of Gilead	59
Marshall	Warroad	158	40	24	212	7.8			Clearcut- with Reserves	2019	balm of Gilead	46
Marshall	Warroad	158	40	25	230	10.2			Clearcut- with Reserves	2019	balm of Gilead	49
Marshall	Warroad	158	40	25	232	9.7			Clearcut- with Reserves	2012	balm of Gilead	59
Marshall	Warroad	158	40	25	237	13.9			Clearcut- with Reserves	2020	balm of Gilead	42
Marshall	Warroad	158	40	25	250	73.9			Clearcut- with Reserves	2014	Tamarack	136
Marshall	Warroad	158	40	26	243	40.1			Clearcut- with Reserves	0	Black Spruce Lowland	141
Marshall	Warroad	158	40	27	219	16.5			Clearcut- with Reserves	2015	balm of Gilead	41
Marshall	Warroad	158	40	27	229	2.9			Clearcut- with Reserves	2015	balm of Gilead	54
Marshall	Warroad	158	40	27	456	1.5			Clearcut- with Reserves	2015	balm of Gilead	54
Marshall	Warroad	158	40	27	457	0.3			Clearcut- with Reserves	2015	balm of Gilead	54
Marshall	Warroad	158	40	27	458	1.3			Clearcut- with Reserves	2015	balm of Gilead	54
Marshall	Warroad	158	40	29	410	10.8			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	158	40	31	280	49			Clearcut- with Reserves	2020	Aspen	36
Marshall	Warroad	158	40	31	299	40.1			Clearcut- with Reserves	2016	balm of Gilead	49
Marshall	Warroad	158	40	31	302	14.9			Clearcut- with Reserves	2013	Aspen	51
Marshall	Warroad	158	40	31	326	7.2			Clearcut- with Reserves	0	Aspen	36
Marshall	Warroad	158	40	31	338	15			Clearcut- with Reserves	2020	Aspen	29
Marshall	Warroad	158	40	31	342	4.6			Clearcut- with Reserves	2012	balm of Gilead	68

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	40	31	536	12.3			Clearcut- with Reserves	2016	Aspen	57
Marshall	Warroad	158	40	32	268	53.3			Clearcut- with Reserves	2016	Aspen	46
Marshall	Warroad	158	40	32	406	1			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	158	40	32	407	1.3			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	158	40	32	408	2.7			Clearcut- with Reserves	2014	balm of Gilead	72
Marshall	Warroad	158	40	32	409	2.7			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	158	40	33	434	3.2			Clearcut- with Reserves	2015	Aspen	27
Marshall	Warroad	158	40	34	311	15.9			Clearcut- with Reserves	2015	balm of Gilead	46
Marshall	Warroad	158	40	34	461	1.6			Clearcut- with Reserves	2015	balm of Gilead	46
Marshall	Warroad	158	40	34	462	3.4			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	40	34	463	4.9			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	40	35	340	54.3			Clearcut- with Reserves	2021	Aspen	38
Marshall	Warroad	158	40	36	285	9.5			Clearcut- with Reserves	2019	balm of Gilead	48
Marshall	Warroad	158	40	36	333	13.1			Clearcut- with Reserves	2017	Aspen	57
Marshall	Warroad	158	40	36	352	10.9			Clearcut- with Reserves	2017	Aspen	47
Marshall	Warroad	158	41	1	507	1.5			Clearcut- with Reserves	2017	balm of Gilead	47
Marshall	Warroad	158	41	2	506	29.1			Clearcut- with Reserves	2012	Aspen	58
Marshall	Warroad	158	41	8	61	16.7			Clearcut- with Reserves	2020	Aspen	45
Marshall	Warroad	158	41	9	51	9			Clearcut- with Reserves	2019	Aspen	48
Marshall	Warroad	158	41	10	60	23.4			Clearcut- with Reserves	2015	Aspen	59
Marshall	Warroad	158	41	10	71	9.8			Clearcut- with Reserves	2015	balm of Gilead	55
Marshall	Warroad	158	41	10	467	4.2			Clearcut- with Reserves	0	Aspen	37
Marshall	Warroad	158	41	10	468	9			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	158	41	11	65	10.5			Clearcut- with Reserves	2015	balm of Gilead	56
Marshall	Warroad	158	41	11	104	6.4			Clearcut- with Reserves	2016	Aspen	41
Marshall	Warroad	158	41	11	108	4			Clearcut- with Reserves	2020	balm of Gilead	30
Marshall	Warroad	158	41	11	515	6.5			Clearcut- with Reserves	2016	Aspen	45
Marshall	Warroad	158	41	13	485	2			Clearcut- with Reserves	2016	Aspen	37



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	41	13	487	1.4			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	158	41	16	114	8.9			Clearcut- with Reserves	2012	Aspen	58
Marshall	Warroad	158	41	16	116	8.2			Clearcut- with Reserves	2019	balm of Gilead	34
Marshall	Warroad	158	41	16	382	0.4			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	41	16	383	0.5			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	41	16	388	1.7			Clearcut- with Reserves	2019	Aspen	27
Marshall	Warroad	158	41	16	389	4.5			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	41	16	390	1.9			Clearcut- with Reserves	2014	Aspen	67
Marshall	Warroad	158	41	16	391	3.6			Clearcut- with Reserves	2012	balm of Gilead	57
Marshall	Warroad	158	41	17	128	17			Clearcut- with Reserves	2016	Aspen	51
Marshall	Warroad	158	41	17	152	4.1			Clearcut- with Reserves	2014	Aspen	67
Marshall	Warroad	158	41	17	169	16.6			Clearcut- with Reserves	2014	Aspen	53
Marshall	Warroad	158	41	17	346	10.9			Clearcut- with Reserves	2020	Aspen	41
Marshall	Warroad	158	41	20	191	52.1			Clearcut- with Reserves	2015	Aspen	57
Marshall	Warroad	158	41	20	327	10			Clearcut- with Reserves	2012	Aspen	61
Marshall	Warroad	158	41	20	370	8			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	41	26	451	5			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	41	27	232	18.2			Clearcut- with Reserves	2021	Aspen	36
Marshall	Warroad	158	41	27	243	10.5			Clearcut- with Reserves	2015	Aspen	40
Marshall	Warroad	158	41	27	256	30.9			Clearcut- with Reserves	2017	Aspen	44
Marshall	Warroad	158	41	27	445	0.2			Clearcut- with Reserves	0	Aspen	37
Marshall	Warroad	158	41	27	523	8.2			Clearcut- with Reserves	2020	Aspen	31
Marshall	Warroad	158	41	28	229	29.3			Clearcut- with Reserves	2021	Aspen	33
Marshall	Warroad	158	41	28	423	0.6			Clearcut- with Reserves	2021	Aspen	33
Marshall	Warroad	158	41	29	221	15.1			Clearcut- with Reserves	2014	balm of Gilead	45
Marshall	Warroad	158	41	29	340	0.9			Clearcut- with Reserves	2014	balm of Gilead	45
Marshall	Warroad	158	41	29	516	14.4			Clearcut- with Reserves	2014	balm of Gilead	45
Marshall	Warroad	158	41	30	218	9.9			Clearcut- with Reserves	2020	Aspen	41

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	41	36	269	27.2			Clearcut- with Reserves	2020	Aspen	42
Marshall	Warroad	158	41	36	273	19.1			Clearcut- with Reserves	2017	Aspen	46
Marshall	Warroad	158	41	36	281	25			Clearcut- with Reserves	2012	Aspen	69
Marshall	Warroad	158	41	36	285	7.5			Clearcut- with Reserves	2017	Aspen	44
Marshall	Warroad	158	41	36	490	4.5			Clearcut- with Reserves	2019	Aspen	41
Marshall	Warroad	158	42	1	19	11.3			Commercial Thinning	0	Norway Pine	40
Marshall	Warroad	158	42	1	217	32.7			Clearcut- with Reserves	2016	Aspen	39
Marshall	Warroad	158	42	1	227	17.9			Clearcut- with Reserves	2016	Aspen	38
Marshall	Warroad	158	42	2	13	46.2			Clearcut- with Reserves	2020	Tamarack	77
Marshall	Warroad	158	42	2	775	4.7			Clearcut- with Reserves	2013	Aspen	57
Marshall	Warroad	158	42	3	30	5			Clearcut- with Reserves	2021	balm of Gilead	33
Marshall	Warroad	158	42	3	43	12.3			Clearcut- with Reserves	2021	Aspen	32
Marshall	Warroad	158	42	3	222	18.7			Clearcut- with Reserves	2015	balm of Gilead	49
Marshall	Warroad	158	42	3	225	28.9			Clearcut- with Reserves	2021	Aspen	35
Marshall	Warroad	158	42	3	249	49.5			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	158	42	4	244	45.9			Clearcut- with Reserves	2013	balm of Gilead	56
Marshall	Warroad	158	42	4	767	5.6			Clearcut- with Reserves	2021	Aspen	27
Marshall	Warroad	158	42	5	3	19.3			Clearcut- with Reserves	2019	Aspen	36
Marshall	Warroad	158	42	5	15	51.5			Clearcut- with Reserves	2019	Aspen	39
Marshall	Warroad	158	42	5	18	29.2			Clearcut- with Reserves	2021	Aspen	28
Marshall	Warroad	158	42	5	23	31.9			Clearcut- with Reserves	2015	Aspen	45
Marshall	Warroad	158	42	10	62	3.4			Clearcut- with Reserves	2021	balm of Gilead	29
Marshall	Warroad	158	42	10	63	8.7			Clearcut- with Reserves	2017	Aspen	36
Marshall	Warroad	158	42	10	67	6.2			Clearcut- with Reserves	2013	balm of Gilead	53
Marshall	Warroad	158	42	10	267	17			Clearcut- with Reserves	2013	Aspen	53
Marshall	Warroad	158	42	10	272	10			SFRMP On-Site Visit	2021	Ash	99
Marshall	Warroad	158	42	10	287	6.3			Clearcut- with Reserves	2018	Aspen	40
Marshall	Warroad	158	42	10	693	9.5			Clearcut- with Reserves	2017	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	42	11	273	23.8			Clearcut- with Reserves	2021	Aspen	26
Marshall	Warroad	158	42	11	275	12.7			Clearcut- with Reserves	2019	Aspen	40
Marshall	Warroad	158	42	11	511	146.5			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	42	11	685	0.2			Clearcut- with Reserves	0	Aspen	27
Marshall	Warroad	158	42	11	790	4.2			Clearcut- with Reserves	0	Aspen	68
Marshall	Warroad	158	42	13	341	20			Clearcut- with Reserves	2019	Aspen	50
Marshall	Warroad	158	42	14	314	381.8			Clearcut- with Reserves	2016	balm of Gilead	49
Marshall	Warroad	158	42	15	342	4.7			Commercial Thinning	0	Norway Pine	35
Marshall	Warroad	158	42	16	335	32.2			Clearcut- with Reserves	2015	balm of Gilead	45
Marshall	Warroad	158	42	16	349	58.5			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	42	17	301	51.4			Clearcut- with Reserves	2012	Aspen	50
Marshall	Warroad	158	42	17	669	39.4			Clearcut- with Reserves	2015	balm of Gilead	47
Marshall	Warroad	158	42	17	670	24.3			Clearcut- with Reserves	2012	balm of Gilead	47
Marshall	Warroad	158	42	17	674	7.1			Clearcut- with Reserves	2015	balm of Gilead	47
Marshall	Warroad	158	42	19	365	15.3			Clearcut- with Reserves	2020	Aspen	33
Marshall	Warroad	158	42	19	368	7.5			Clearcut- with Reserves	2012	balm of Gilead	58
Marshall	Warroad	158	42	19	390	33.2			Clearcut- with Reserves	2021	Aspen	32
Marshall	Warroad	158	42	19	394	21			Clearcut- with Reserves	2021	Aspen	32
Marshall	Warroad	158	42	19	400	45			Clearcut- with Reserves	2019	balm of Gilead	36
Marshall	Warroad	158	42	19	616	45			Clearcut- with Reserves	2012	Aspen	66
Marshall	Warroad	158	42	19	803	7.8			Clearcut- with Reserves	2020	Aspen	33
Marshall	Warroad	158	42	20	107	39.1			Clearcut- with Reserves	2021	balm of Gilead	32
Marshall	Warroad	158	42	20	133	48.8			Clearcut- with Reserves	2021	Aspen	32
Marshall	Warroad	158	42	20	159	7.2			Commercial Thinning	0	Norway Pine	36
Marshall	Warroad	158	42	20	369	31.4			Clearcut- with Reserves	2018	Aspen	41
Marshall	Warroad	158	42	20	709	1.1			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	158	42	21	94	72.6			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	158	42	21	106	8.8			Clearcut- with Reserves	2020	Aspen	31

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	42	21	137	7.3			Clearcut- with Reserves	2016	Aspen	36
Marshall	Warroad	158	42	21	144	4.6			Clearcut- with Reserves	2016	Aspen	38
Marshall	Warroad	158	42	21	807	5.4			Clearcut- with Reserves	2016	Aspen	37
Marshall	Warroad	158	42	21	808	8.7			Clearcut- with Reserves	2020	Aspen	34
Marshall	Warroad	158	42	22	96	11.6			Clearcut- with Reserves	2020	Aspen	36
Marshall	Warroad	158	42	22	98	12			Commercial Thinning	0	Norway Pine	35
Marshall	Warroad	158	42	22	161	2.9			Commercial Thinning	0	Norway Pine	37
Marshall	Warroad	158	42	22	714	18.5			Commercial Thinning	0	Norway Pine	37
Marshall	Warroad	158	42	22	726	1.1			Commercial Thinning	0	Norway Pine	37
Marshall	Warroad	158	42	23	418	14.4			Clearcut- with Reserves	2021	balm of Gilead	40
Marshall	Warroad	158	42	24	148	18.2			Clearcut- with Reserves	2020	Aspen	41
Marshall	Warroad	158	42	26	472	14.5			Clearcut- with Reserves	2019	Aspen	38
Marshall	Warroad	158	42	26	559	47.8			Clearcut- with Reserves	2013	Aspen	55
Marshall	Warroad	158	42	27	439	2.2			Commercial Thinning	0	Norway Pine	32
Marshall	Warroad	158	42	27	457	7.6			Clearcut- with Reserves	2016	Aspen	47
Marshall	Warroad	158	42	27	463	20.5			Clearcut- with Reserves	2013	Tamarack	81
Marshall	Warroad	158	42	27	475	27.4			Clearcut- with Reserves	2013	Aspen	52
Marshall	Warroad	158	42	27	582	4.4			Clearcut- with Reserves	2013	Aspen	59
Marshall	Warroad	158	42	27	585	1.3			Commercial Thinning	0	Norway Pine	7
Marshall	Warroad	158	42	27	683	1.7			Clearcut- with Reserves	2020	Aspen	31
Marshall	Warroad	158	42	28	465	32.2			SFRMP On-Site Visit	2012	Ash	61
Marshall	Warroad	158	42	28	556	62.1			Clearcut- with Reserves	2017	balm of Gilead	45
Marshall	Warroad	158	42	28	645	6.2			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	158	42	29	168	16.4			SFRMP On-Site Visit	2019	Ash	23
Marshall	Warroad	158	42	29	543	39			Clearcut- with Reserves	2012	Aspen	60
Marshall	Warroad	158	42	29	560	34.5			Clearcut- with Reserves	2013	Aspen	56
Marshall	Warroad	158	42	29	562	11.8			SFRMP On-Site Visit	2013	Ash	75
Marshall	Warroad	158	42	29	641	27.6			Clearcut- with Reserves	2013	Aspen	56

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	42	30	178	9.8			Clearcut- with Reserves	2015	Aspen	41
Marshall	Warroad	158	42	30	180	25			Clearcut- with Reserves	2019	Aspen	36
Marshall	Warroad	158	42	30	462	3.1			Clearcut- with Reserves	2015	balm of Gilead	66
Marshall	Warroad	158	42	30	653	1			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	158	42	31	482	7.7			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	158	42	31	493	26.9			SFRMP On-Site Visit	2019	Ash	62
Marshall	Warroad	158	42	31	503	23.9			SFRMP On-Site Visit	2019	Ash	40
Marshall	Warroad	158	42	31	504	27			SFRMP On-Site Visit	2019	Ash	44
Marshall	Warroad	158	42	31	633	1.5			Clearcut- with Reserves	2019	Aspen	37
Marshall	Warroad	158	42	31	636	7.7			SFRMP On-Site Visit	2019	Ash	40
Marshall	Warroad	158	42	32	200	5.4			Clearcut- with Reserves	2017	Aspen	39
Marshall	Warroad	158	42	32	495	9			Clearcut- with Reserves	2017	Aspen	49
Marshall	Warroad	158	42	32	565	12.7			SFRMP On-Site Visit	2013	Ash	73
Marshall	Warroad	158	42	32	566	42.4			SFRMP On-Site Visit	2013	Ash	73
Marshall	Warroad	158	42	32	567	31.2			SFRMP On-Site Visit	2013	Ash	86
Marshall	Warroad	158	42	32	570	880.5			Clearcut- with Reserves	2017	Lowland Brush	0
Marshall	Warroad	158	42	32	574	19.9			Clearcut- with Reserves	2017	Aspen	49
Marshall	Warroad	158	42	32	640	3.6			Clearcut- with Reserves	2017	balm of Gilead	37
Marshall	Warroad	158	42	33	484	41.8			Clearcut- with Reserves	2012	Aspen	65
Marshall	Warroad	158	42	33	492	31.3			Clearcut- with Reserves	2012	Aspen	65
Marshall	Warroad	158	43	1	25	3.9			Clearcut- with Reserves	2020	balm of Gilead	32
Marshall	Warroad	158	43	1	33	12.2			SFRMP On-Site Visit	2020	Ash	13
Marshall	Warroad	158	43	2	36	9			Clearcut- with Reserves	2013	balm of Gilead	46
Marshall	Warroad	158	43	2	334	0.4			Clearcut- with Reserves	2013	Aspen	32
Marshall	Warroad	158	43	2	335	1.6			Clearcut- with Reserves	2013	balm of Gilead	53
Marshall	Warroad	158	43	2	336	2.7			Clearcut- with Reserves	2013	balm of Gilead	53
Marshall	Warroad	158	43	4	8	15			Clearcut- with Reserves	2020	Aspen	40

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	43	4	9	16.7			Clearcut- with Reserves	2020	Aspen	35
Marshall	Warroad	158	43	4	413	3.3			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	4	493	27.1			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	4	569	39.2			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	158	43	5	5	19.8			Clearcut- with Reserves	2012	Aspen	63
Marshall	Warroad	158	43	5	12	145.9			Clearcut- with Reserves	2020	Aspen	36
Marshall	Warroad	158	43	5	14	41.5			Clearcut- with Reserves	2012	Aspen	63
Marshall	Warroad	158	43	5	20	17.2			Clearcut- with Reserves	2012	Aspen	56
Marshall	Warroad	158	43	5	26	5.7			Clearcut- with Reserves	2020	Aspen	42
Marshall	Warroad	158	43	5	492	15.6			Clearcut- with Reserves	2020	Aspen	36
Marshall	Warroad	158	43	7	566	63.7			Clearcut- with Reserves	2020	Aspen	32
Marshall	Warroad	158	43	7	568	37.7			Clearcut- with Reserves	2020	Aspen	29
Marshall	Warroad	158	43	8	417	14.3			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	8	418	13.6			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	8	420	7.3			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	8	499	9.9			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	9	500	12.9			Clearcut- with Reserves	2020	Aspen	27
Marshall	Warroad	158	43	9	501	43.5			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	11	340	2.8			Clearcut- with Reserves	2012	Aspen	62
Marshall	Warroad	158	43	12	52	20.4			Clearcut- with Reserves	2020	Aspen	36
Marshall	Warroad	158	43	12	349	8			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	13	373	9.5			Clearcut- with Reserves	2020	Aspen	37
Marshall	Warroad	158	43	14	93	10.2			Clearcut- with Reserves	2012	Aspen	54
Marshall	Warroad	158	43	14	95	26.8			Clearcut- with Reserves	2015	Aspen	50
Marshall	Warroad	158	43	14	105	48.8			Clearcut- with Reserves	2019	Aspen	43
Marshall	Warroad	158	43	14	316	23.5			Clearcut- with Reserves	2015	Aspen	46
Marshall	Warroad	158	43	14	389	18.5			Clearcut- with Reserves	2012	Aspen	53
Marshall	Warroad	158	43	16	114	38.7			Clearcut- with Reserves	2013	Aspen	40

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	43	16	424	30.9			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	16	433	15.8			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	16	435	0.7			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	16	441	4.8			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	16	456	5.3			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	16	457	3.6			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	16	502	3.1			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	16	504	2.9			Clearcut- with Reserves	2013	Aspen	27
Marshall	Warroad	158	43	16	505	5.4			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	16	573	78.7			Clearcut- with Reserves	2013	Aspen	27
Marshall	Warroad	158	43	17	432	17.2			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	17	561	71.2			Clearcut- with Reserves	2014	Aspen	27
Marshall	Warroad	158	43	17	577	0.5			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	19	485	5.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	43	20	483	31			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	43	20	507	18.8			Clearcut- with Reserves	2014	Aspen	27
Marshall	Warroad	158	43	20	543	21.6			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	20	564	30.4			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	21	539	74.2			Clearcut- with Reserves	2013	Aspen	27
Marshall	Warroad	158	43	25	205	138.8			Clearcut- with Reserves	2014	Aspen	49
Marshall	Warroad	158	43	25	207	26.3			Clearcut- with Reserves	2013	balm of Gilead	51
Marshall	Warroad	158	43	25	383	2.5			Clearcut- with Reserves	2016	Aspen	37
Marshall	Warroad	158	43	26	197	118.2			Clearcut- with Reserves	2013	Aspen	50
Marshall	Warroad	158	43	26	223	57.5			Clearcut- with Reserves	2016	Aspen	43
Marshall	Warroad	158	43	26	362	11.4			Commercial Thinning	0	Norway Pine	37
Marshall	Warroad	158	43	27	405	17.6			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	27	445	20.6			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	27	450	179.3			Clearcut- with Reserves	2015	Aspen	27

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	43	27	528	28.6			Clearcut- with Reserves	2015	Aspen	27
Marshall	Warroad	158	43	27	529	21.1			Clearcut- with Reserves	2015	Offsite Aspen	27
Marshall	Warroad	158	43	28	536	18			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	28	540	129.4			Clearcut- with Reserves	2015	Aspen	27
Marshall	Warroad	158	43	28	550	9.3			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	28	554	21.7			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	28	556	123.3			Clearcut- with Reserves	2013	Aspen	27
Marshall	Warroad	158	43	28	557	5.8			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	29	453	6.4			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	43	29	489	5			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	43	29	541	55.6			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	43	29	542	38.2			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	43	29	548	32.7			Clearcut- with Reserves	2013	Aspen	37
Marshall	Warroad	158	43	29	552	37.5			Clearcut- with Reserves	2013	Aspen	27
Marshall	Warroad	158	43	30	406	21			Clearcut- with Reserves	2014	Aspen	27
Marshall	Warroad	158	43	32	459	28.5			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	32	549	31.7			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	32	559	56.7			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	33	463	6.3			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	33	530	31.8			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	33	532	7.1			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	33	533	17.1			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	33	546	25			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	33	547	180.2			Clearcut- with Reserves	2015	Aspen	27
Marshall	Warroad	158	43	34	439	90.5			Clearcut- with Reserves	2015	Aspen	27
Marshall	Warroad	158	43	34	460	63.4			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	34	525	23.8			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	43	35	300	8.5			Clearcut- with Reserves	2020	Aspen	38



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	43	35	300	45			Clearcut- with Reserves	2020	Aspen	38
Marshall	Warroad	158	43	35	352	0.3			Clearcut- with Reserves	2014	Aspen	52
Marshall	Warroad	158	43	35	353	1			Clearcut- with Reserves	2014	Aspen	52
Marshall	Warroad	158	43	35	354	4.4			Commercial Thinning	0	Norway Pine	27
Marshall	Warroad	158	44	2	407	18.9			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	2	489	12.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	3	365	14.5			Clearcut- with Reserves	2014	Aspen	57
Marshall	Warroad	158	44	3	367	19.7			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	3	368	7.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	3	399	1.6			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	3	400	20.7			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	3	403	1.7			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	3	406	23.2			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	3	607	18.2			Clearcut- with Reserves	2014	Aspen	34
Marshall	Warroad	158	44	7	411	15.9			Clearcut- with Reserves	2015	Aspen	57
Marshall	Warroad	158	44	7	435	23.4			Clearcut- with Reserves	2015	Aspen	57
Marshall	Warroad	158	44	7	479	2.4			Clearcut- with Reserves	2015	Aspen	57
Marshall	Warroad	158	44	7	587	14.2			Clearcut- with Reserves	2015	Aspen	57
Marshall	Warroad	158	44	9	65	18.3			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	9	371	5.9			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	10	71	10.2			Clearcut- with Reserves	2014	Aspen	38
Marshall	Warroad	158	44	10	510	2.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	11	51	78.9			Clearcut- with Reserves	2012	Aspen	51
Marshall	Warroad	158	44	11	369	6.6			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	11	416	11.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	11	461	4			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	11	493	5.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	11	494	1.6			Clearcut- with Reserves	2014	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	44	11	497	4.5			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	11	600	58.1			Clearcut- with Reserves	2014	Aspen	29
Marshall	Warroad	158	44	12	336	62.3			Clearcut- with Reserves	2014	Aspen	38
Marshall	Warroad	158	44	12	339	53.6			Clearcut- with Reserves	2012	Aspen	48
Marshall	Warroad	158	44	12	394	1.1			Clearcut- with Reserves	2012	Aspen	48
Marshall	Warroad	158	44	12	439	4.6			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	12	502	1.9			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	13	101	43.3			Clearcut- with Reserves	2014	Aspen	43
Marshall	Warroad	158	44	14	104	32.2			Clearcut- with Reserves	2014	Aspen	43
Marshall	Warroad	158	44	14	170	16.8			Clearcut- with Reserves	2021	Aspen	27
Marshall	Warroad	158	44	14	347	60.9			Clearcut- with Reserves	2014	Aspen	26
Marshall	Warroad	158	44	14	350	19.5			Clearcut- with Reserves	2014	Aspen	36
Marshall	Warroad	158	44	14	429	0.9			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	14	430	1.6			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	14	431	1.8			Clearcut- with Reserves	2014	Aspen	27
Marshall	Warroad	158	44	14	451	1.4			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	14	505	4.9			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	14	506	4.9			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	14	507	4			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	14	509	4.2			Clearcut- with Reserves	2014	Aspen	27
Marshall	Warroad	158	44	14	576	13			Clearcut- with Reserves	2021	Aspen	27
Marshall	Warroad	158	44	15	119	26.5			Clearcut- with Reserves	2014	Aspen	26
Marshall	Warroad	158	44	15	444	3.2			Clearcut- with Reserves	2014	Aspen	27
Marshall	Warroad	158	44	15	445	2.8			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	15	565	5			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	15	566	6.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	15	567	5.6			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	15	568	2.7			Clearcut- with Reserves	2014	Aspen	57

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	44	16	118	9.7			Clearcut- with Reserves	2018	Aspen	45
Marshall	Warroad	158	44	16	289	111.3			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	16	360	27			Clearcut- with Reserves	2018	Aspen	53
Marshall	Warroad	158	44	16	512	16			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	16	513	5.1			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	17	290	55.7			Clearcut- with Reserves	2018	Aspen	32
Marshall	Warroad	158	44	17	454	1.1			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	17	556	4.3			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	17	564	8.1			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	17	585	25.3			Clearcut- with Reserves	2018	Aspen	38
Marshall	Warroad	158	44	18	598	58.2			Clearcut- with Reserves	2015	Aspen	44
Marshall	Warroad	158	44	19	156	45.6			Clearcut- with Reserves	2014	Aspen	54
Marshall	Warroad	158	44	19	389	2.1			Clearcut- with Reserves	2014	Aspen	57
Marshall	Warroad	158	44	20	162	67.2			Clearcut- with Reserves	2012	Aspen	44
Marshall	Warroad	158	44	20	163	22.9			Clearcut- with Reserves	2012	Aspen	54
Marshall	Warroad	158	44	20	191	22.7			Clearcut- with Reserves	2018	Aspen	39
Marshall	Warroad	158	44	20	209	10.8			Clearcut- with Reserves	2015	Aspen	49
Marshall	Warroad	158	44	20	225	11.9			Clearcut- with Reserves	2015	Aspen	33
Marshall	Warroad	158	44	20	413	4.9			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	20	417	2.5			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	20	453	16.9			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	20	559	10.2			Clearcut- with Reserves	2018	Aspen	37
Marshall	Warroad	158	44	22	419	5.2			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	22	426	2.6			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	158	44	22	432	8.6			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	22	449	4			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	158	44	22	592	19.5			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	23	176	37.3			Clearcut- with Reserves	2012	Aspen	45

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	44	23	519	2.9			Clearcut- with Reserves	2021	Aspen	39
Marshall	Warroad	158	44	23	520	3.8			Clearcut- with Reserves	2021	Aspen	39
Marshall	Warroad	158	44	23	521	1.8			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	158	44	23	611	157.3			Clearcut- with Reserves	2021	Aspen	26
Marshall	Warroad	158	44	26	250	4.6			Clearcut- with Reserves	2015	Aspen	59
Marshall	Warroad	158	44	26	254	7			Clearcut- with Reserves	2015	Aspen	44
Marshall	Warroad	158	44	26	259	12.5			Clearcut- with Reserves	2015	Aspen	42
Marshall	Warroad	158	44	26	534	268.9			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	27	457	4			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	27	525	1			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	27	597	188.6			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	28	249	9.3			Clearcut- with Reserves	2015	Aspen	42
Marshall	Warroad	158	44	28	533	5.3			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	28	596	22.3			Clearcut- with Reserves	2015	Aspen	37
Marshall	Warroad	158	44	29	384	6.6			Clearcut- with Reserves	2015	Aspen	57
Marshall	Warroad	158	44	33	260	30.7			Clearcut- with Reserves	2012	balm of Gilead	45
Marshall	Warroad	158	44	33	261	202.3			Clearcut- with Reserves	2012	Aspen	48
Marshall	Warroad	158	44	33	262	34.9			Clearcut- with Reserves	2012	Aspen	45
Marshall	Warroad	158	44	33	272	47			Clearcut- with Reserves	2021	Aspen	33
Marshall	Warroad	158	44	33	437	1.3			Clearcut- with Reserves	2021	Aspen	27
Marshall	Warroad	158	44	33	604	42.7			Clearcut- with Reserves	2021	Aspen	29
Marshall	Warroad	158	44	34	279	37.2			Clearcut- with Reserves	2021	Aspen	33
Marshall	Warroad	158	44	34	318	326.5			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	44	34	463	14.9			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	44	34	536	2.2			Clearcut- with Reserves	2017	Aspen	27
Marshall	Warroad	158	44	34	537	3.5			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	44	34	538	0.6			Clearcut- with Reserves	2017	Aspen	37
Marshall	Warroad	158	44	36	546	22			Clearcut- with Reserves	2014	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Marshall	Warroad	158	44	36	550	4.9			Clearcut- with Reserves	2014	Aspen	27
Marshall	Warroad	158	44	36	590	5.1			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	36	591	9.4			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	44	36	602	18.1			Clearcut- with Reserves	2014	Aspen	31
Marshall	Warroad	158	44	36	603	11.3			SFRMP On-Site Visit	2014	Ash	45
Marshall	Warroad	158	44	36	609	44.9			Clearcut- with Reserves	2014	Aspen	30
Marshall	Warroad	158	45	36	59	15.8			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	158	45	36	60	22.7			Clearcut- with Reserves	2021	Aspen	37
Marshall	Warroad	158	46	36	4	17.7			Clearcut- with Reserves	2014	Aspen	57
Marshall	Warroad	158	46	36	16	1.3			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	46	36	17	3.5			Clearcut- with Reserves	2014	Aspen	37
Marshall	Warroad	158	46	36	19	2.2			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	152	41	18	3	50.5			Clearcut- with Reserves	2021	Aspen	49
Pennington	Warroad	152	41	18	13	29.6			Clearcut- with Reserves	2021	Aspen	37
Pennington	Warroad	152	44	5	95	5			Clearcut- with Reserves	2014	Hybrid Poplar	27
Pennington	Warroad	152	44	9	36	21.4			Clearcut- with Reserves	2014	Aspen	52
Pennington	Warroad	152	44	9	54	116.4			Clearcut- with Reserves	2014	Aspen	60
Pennington	Warroad	152	44	9	83	1			Clearcut- with Reserves	2014	Aspen	67
Pennington	Warroad	152	44	9	96	26.5			Clearcut- with Reserves	2014	Aspen	27
Pennington	Warroad	152	44	10	69	4.8			Clearcut- with Reserves	2014	Aspen	38
Pennington	Warroad	152	44	10	81	2.6			Clearcut- with Reserves	2014	Aspen	27
Pennington	Warroad	152	44	10	99	3.2			Clearcut- with Reserves	2014	Aspen	63
Pennington	Warroad	152	45	6	18	15.4			SFRMP On-Site Visit	2014	Ash	64
Pennington	Warroad	152	45	6	85	9.4			SFRMP On-Site Visit	2014	Ash	64
Pennington	Warroad	152	45	7	27	18.9			SFRMP On-Site Visit	2014	Ash	81
Pennington	Warroad	152	45	16	60	23.3			Clearcut- with Reserves	2014	Aspen	63
Pennington	Warroad	152	45	18	35	40.4			Clearcut- with Reserves	2014	Aspen	52
Pennington	Warroad	152	45	18	75	10.5			SFRMP On-Site Visit	2014	Ash	111

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Pennington	Warroad	152	45	20	61	17.4			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	152	45	20	92	4.4			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	152	45	20	92	1.5			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	42	28	1	5.7			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	42	28	6	8.1			Clearcut- with Reserves	2014	balm of Gilead	43
Pennington	Warroad	153	42	28	9	6.3			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	42	28	16	4.1			Clearcut- with Reserves	2014	Aspen	27
Pennington	Warroad	153	42	28	18	3.5			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	44	7	80	5.7			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	44	16	46	19.8			Clearcut- with Reserves	2014	Aspen	33
Pennington	Warroad	153	44	17	41	6.6			Clearcut- with Reserves	2014	Aspen	70
Pennington	Warroad	153	44	17	51	5.2			Clearcut- with Reserves	2014	Aspen	70
Pennington	Warroad	153	45	5	124	15.2			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	45	16	46	12.8			Clearcut- with Reserves	2014	Aspen	42
Pennington	Warroad	153	45	16	80	31.2			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	45	16	101	1.7			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	45	16	104	4.6			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	45	17	121	4.1			Clearcut- with Reserves	2014	Aspen	27
Pennington	Warroad	153	45	20	112	23.4			Clearcut- with Reserves	2014	Aspen	37
Pennington	Warroad	153	45	32	75	7.7			Clearcut- with Reserves	2014	Aspen	38
Pennington	Warroad	154	39	13	18	4.3			Clearcut- with Reserves	2015	Aspen	37
Pennington	Warroad	154	39	13	21	13.8			Clearcut- with Reserves	2015	Aspen	37
Pennington	Warroad	154	39	13	26	4.3			Clearcut- with Reserves	2015	Aspen	37
Pennington	Warroad	154	44	18	49	17.5			Clearcut- with Reserves	2014	Aspen	43
Pennington	Warroad	154	45	20	38	11.6			Clearcut- with Reserves	2014	Aspen	51
Polk	Bemidji	147	45	9	8	2.2			Clearcut- with Reserves	2012	Aspen	75
Polk	Bemidji	147	45	16	31	10.4			Clearcut- with Reserves	2012	Aspen	75
Polk	Bemidji	147	45	16	57	12.8			Clearcut- with Reserves	2012	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Polk	Bemidji	147	45	21	41	27.6			Clearcut- with Reserves	2012	Aspen	75
Polk	Bemidji	147	45	21	51	30.4			Clearcut- with Reserves	2012	Aspen	57
Polk	Bemidji	147	45	21	56	7.1			Clearcut- with Reserves	2012	Aspen	37
Polk	Bemidji	148	44	3	182	12.4			Commercial Thinning	2013	Offsite Oak	89
Polk	Bemidji	148	44	3	183	13.6	Y		Commercial Thinning	2013	Oak	69
Polk	Bemidji	148	44	15	118	66.9			Clearcut- with Reserves	2013	Aspen	42
Polk	Bemidji	148	44	15	170	4			Clearcut- with Reserves	2013	Aspen	58
Polk	Bemidji	148	44	15	201	7.9			Clearcut- with Reserves	2013	Aspen	37
Polk	Bemidji	148	44	15	203	8.9			Clearcut- with Reserves	2013	Aspen	42
Polk	Bemidji	148	44	15	229	4			Clearcut- with Reserves	2013	Aspen	37
Polk	Bemidji	148	44	16	38	21.9			Clearcut- with Reserves	2013	Aspen	38
Polk	Bemidji	148	44	20	200	1.6			Clearcut- with Reserves	2013	Aspen	37
Polk	Bemidji	148	44	22	69	5.6	Y		Commercial Thinning	2013	Oak	103
Polk	Bemidji	148	44	22	167	5.3			Clearcut- with Reserves	2013	Aspen	45
Polk	Bemidji	148	44	22	180	2.6			Clearcut- with Reserves	2013	Aspen	40
Polk	Bemidji	148	44	22	219	3.6			Clearcut- with Reserves	2013	Aspen	45
Polk	Bemidji	148	44	31	92	7.8			Clearcut- with Reserves	2012	Aspen	26
Polk	Bemidji	148	44	31	94	5.3			Clearcut- with Reserves	2012	Aspen	29
Polk	Bemidji	148	44	31	96	6.1			Clearcut- with Reserves	2012	Aspen	51
Polk	Bemidji	148	44	31	100	2.1			Clearcut- with Reserves	2012	Aspen	29
Polk	Bemidji	148	44	31	102	14.1			Clearcut- with Reserves	2012	Aspen	49
Polk	Bemidji	148	44	31	195	2.8			Clearcut- with Reserves	2012	Aspen	51
Polk	Bemidji	148	45	13	42	17.1			Clearcut- with Reserves	2012	Aspen	39
Polk	Bemidji	148	45	13	242	10.6			Clearcut- with Reserves	2012	Aspen	64
Polk	Bemidji	148	45	14	208	2.1			Clearcut- with Reserves	2012	Aspen	41
Polk	Bemidji	148	45	21	72	14.5			Clearcut- with Reserves	2012	Aspen	44
Polk	Bemidji	148	45	21	75	8.4			Clearcut- with Reserves	2012	Aspen	42
Polk	Bemidji	148	45	24	57	2.5			Clearcut- with Reserves	2012	Aspen	75

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Polk	Bemidji	148	45	24	69	10.6			Clearcut- with Reserves	2012	Aspen	53
Polk	Bemidji	148	45	24	213	2.9			Clearcut- with Reserves	2012	Aspen	37
Polk	Bemidji	148	45	24	231	33.2			Clearcut- with Reserves	2012	Aspen	57
Polk	Bemidji	148	45	28	118	10.2			Clearcut- with Reserves	2012	Aspen	75
Polk	Bemidji	148	45	28	201	5.1			Clearcut- with Reserves	2012	Aspen	37
Polk	Bemidji	148	45	29	131	85.1			Clearcut- with Reserves	2012	Aspen	36
Polk	Bemidji	148	45	32	199	2.2			Clearcut- with Reserves	2012	Aspen	37
Polk	Bemidji	148	45	33	144	13.6			Clearcut- with Reserves	2012	Aspen	38
Polk	Bemidji	148	45	33	176	4.8			Clearcut- with Reserves	2012	Aspen	75
Polk	Bemidji	148	45	36	174	15			Clearcut- with Reserves	2012	Aspen	75
Polk	Bemidji	149	41	1	116	3			Clearcut- with Reserves	2014	Aspen	37
Polk	Bemidji	149	41	2	80	2.7	Y		Commercial Thinning	2014	Oak	57
Polk	Bemidji	149	41	2	81	3.7			Clearcut- with Reserves	2014	Aspen	37
Polk	Bemidji	149	41	2	90	3.6	Y		Commercial Thinning	2014	Oak	57
Polk	Bemidji	149	41	2	113	3.7	Y		Commercial Thinning	2014	Oak	77
Polk	Bemidji	149	41	2	115	7.1	Y		Commercial Thinning	2014	Oak	77
Polk	Bemidji	149	41	11	107	2.3			Clearcut- with Reserves	2014	Aspen	37
Polk	Bemidji	149	41	29	85	13.8			SFRMP On-Site Visit	2018	Ash	77
Polk	Bemidji	149	41	29	87	9.6	Y		Commercial Thinning	2018	Oak	92
Polk	Bemidji	149	41	29	88	2.7	Y		Commercial Thinning	2018	Oak	92
Polk	Bemidji	149	41	30	90	13.8			SFRMP On-Site Visit	2018	Ash	77
Polk	Bemidji	149	41	30	91	29.9			Clearcut- with Reserves	2018	Aspen	38
Polk	Bemidji	149	42	1	15	11.7			Clearcut- with Reserves	2014	Aspen	15
Polk	Bemidji	149	42	1	314	3.5			Clearcut- with Reserves	2014	Aspen	17
Polk	Bemidji	149	42	1	351	4.5			Clearcut- with Reserves	2014	Aspen	15
Polk	Bemidji	149	42	13	108	0.3	Y		Commercial Thinning	2019	Oak	93
Polk	Bemidji	149	42	13	313	7.8			Clearcut- with Reserves	2019	Aspen	37
Polk	Bemidji	149	42	13	341	11.7			Clearcut- with Reserves	2019	Aspen	26



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Polk	Bemidji	149	42	13	437	6			Clearcut- with Reserves	2019	Aspen	57
Polk	Bemidji	149	42	14	69	5.1			Clearcut- with Reserves	2019	balm of Gilead	67
Polk	Bemidji	149	42	14	311	9.6			Clearcut- with Reserves	2019	Aspen	37
Polk	Bemidji	149	42	14	423	1.6			Clearcut- with Reserves	2019	Aspen	57
Polk	Bemidji	149	42	14	426	5.5			Clearcut- with Reserves	2019	Aspen	60
Polk	Bemidji	149	42	22	378	33.6			Clearcut- with Reserves	2020	Aspen	37
Polk	Bemidji	149	42	22	381	13.8			Clearcut- with Reserves	2020	Aspen	48
Polk	Bemidji	149	42	24	123	10.3			Clearcut- with Reserves	2019	Aspen	35
Polk	Bemidji	149	42	24	332	2.7			Clearcut- with Reserves	2019	Aspen	57
Polk	Bemidji	149	42	24	405	1.1			Clearcut- with Reserves	2019	Aspen	35
Polk	Bemidji	149	42	24	409	1.8			Clearcut- with Reserves	2019	Aspen	37
Polk	Bemidji	149	42	24	412	2.6			Clearcut- with Reserves	2019	Aspen	35
Polk	Bemidji	149	42	25	171	2.1			Clearcut- with Reserves	2018	Aspen	48
Polk	Bemidji	149	42	25	201	31.3			Clearcut- with Reserves	2018	Aspen	41
Polk	Bemidji	149	42	25	278	6.3			Clearcut- with Reserves	2018	Aspen	39
Polk	Bemidji	149	42	25	326	2.2			Clearcut- with Reserves	2018	Aspen	57
Polk	Bemidji	149	42	26	358	3.9			SFRMP On-Site Visit	2020	Ash	27
Polk	Bemidji	149	42	26	364	26.5			Clearcut- with Reserves	2020	Aspen	37
Polk	Bemidji	149	42	27	286	7.7			Clearcut- with Reserves	2020	Aspen	26
Polk	Bemidji	149	42	27	320	6.5	Y		Commercial Thinning	2020	Oak	81
Polk	Bemidji	149	42	27	321	6.8	Y		Commercial Thinning	2020	Oak	77
Polk	Bemidji	149	42	27	324	5.1	Y		Commercial Thinning	2020	Oak	49
Polk	Bemidji	149	42	34	248	5.2	Y		Commercial Thinning	2020	Oak	84
Polk	Bemidji	149	42	35	445	3.1			Clearcut- with Reserves	2018	Aspen	37
Polk	Bemidji	149	42	36	265	4.2			Clearcut- with Reserves	2018	Aspen	57
Polk	Bemidji	149	43	8	52	10.7			Clearcut- with Reserves	2015	Aspen	41
Polk	Bemidji	149	43	8	53	17.3			Clearcut- with Reserves	2015	Aspen	11
Polk	Bemidji	149	43	15	33	3.5			Clearcut- with Reserves	2015	Aspen	38

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Polk	Bemidji	149	43	15	71	29.6			Clearcut- with Reserves	2015	Aspen	38
Polk	Bemidji	149	43	15	73	8.8			Clearcut- with Reserves	2015	Aspen	47
Polk	Bemidji	149	43	15	75	21.1			Clearcut- with Reserves	2015	Aspen	36
Polk	Bemidji	149	43	15	87	2.8			Clearcut- with Reserves	2015	Aspen	38
Polk	Bemidji	149	43	15	89	1.8			Clearcut- with Reserves	2015	Aspen	40
Polk	Bemidji	149	43	15	129	1.5			Clearcut- with Reserves	2015	Aspen	38
Polk	Bemidji	149	43	16	77	7.1			Commercial Thinning	2015	Offsite Oak	68
Polk	Bemidji	149	43	16	101	25.4			Clearcut- with Reserves	2015	Offsite Aspen	57
Polk	Bemidji	149	43	16	109	4.8			Clearcut- with Reserves	2015	Aspen	37
Polk	Bemidji	149	43	21	81	4			Commercial Thinning	2015	Offsite Oak	64
Polk	Bemidji	149	44	25	127	15.6			Clearcut- with Reserves	2013	Aspen	32
Polk	Bemidji	149	44	25	131	7.6	Y		Commercial Thinning	2013	Oak	82
Polk	Bemidji	149	44	25	140	11.1			Clearcut- with Reserves	2013	Aspen	26
Polk	Bemidji	149	44	25	170	2	Y		Commercial Thinning	2013	Oak	82
Polk	Bemidji	149	44	25	180	9.2			Clearcut- with Reserves	2013	Aspen	38
Polk	Bemidji	149	44	25	181	4.3			Clearcut- with Reserves	2013	Aspen	34
Polk	Bemidji	149	44	25	182	1.3			Clearcut- with Reserves	2013	Aspen	37
Polk	Bemidji	149	44	25	194	4.6			Clearcut- with Reserves	2013	Aspen	37
Polk	Bemidji	149	44	25	195	4.3			Clearcut- with Reserves	2013	Aspen	37
Polk	Bemidji	149	44	25	214	3.4	Y		Commercial Thinning	2013	Oak	77
Polk	Bemidji	149	44	33	90	10.5			Clearcut- with Reserves	2013	Aspen	75
Polk	Bemidji	149	44	33	106	20.7			Clearcut- with Reserves	2013	Aspen	75
Polk	Bemidji	149	44	34	207	5.2			Clearcut- with Reserves	2013	Aspen	37
Polk	Bemidji	149	44	34	209	10.2			Clearcut- with Reserves	2013	Aspen	57
Polk	Bemidji	149	44	36	107	5.5			Clearcut- with Reserves	2013	Aspen	65
Polk	Bemidji	149	44	36	143	14.7	Y		Commercial Thinning	2013	Oak	87
Polk	Bemidji	149	44	36	149	11			Clearcut- with Reserves	2013	Aspen	33
Polk	Bemidji	149	44	36	151	1.6	Y		Commercial Thinning	2013	Oak	80

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Polk	Bemidji	149	44	36	154	3.7			Commercial Thinning	2013	Offsite Oak	72
Polk	Bemidji	149	44	36	165	1.6			Clearcut- with Reserves	2013	Aspen	57
Polk	Bemidji	149	44	36	200	4.5			Clearcut- with Reserves	2013	Aspen	27
Polk	Bemidji	149	44	36	205	3.9	Y		Commercial Thinning	2013	Oak	77
Polk	Bemidji	149	45	16	3	22.6			Clearcut- with Reserves	2012	Aspen	34
Polk	Bemidji	149	45	16	10	38.2			Clearcut- with Reserves	2012	Aspen	75
Polk	Bemidji	149	45	16	44	3.5			Clearcut- with Reserves	2012	Aspen	75
Polk	Bemidji	150	39	22	113	3			SFRMP On-Site Visit	2016	Ash	93
Polk	Bemidji	150	39	22	121	72.9			SFRMP On-Site Visit	2016	Ash	87
Polk	Bemidji	150	39	22	148	18			SFRMP On-Site Visit	2016	Ash	87
Polk	Bemidji	150	39	34	130	0.1			Clearcut- with Reserves	2016	Aspen	57
Polk	Bemidji	150	39	34	130	3.1			Clearcut- with Reserves	2016	Aspen	57
Polk	Bemidji	150	39	34	144	3.7			Clearcut- with Reserves	2016	Aspen	57
Polk	Bemidji	150	39	34	146	0.3			Clearcut- with Reserves	2016	Aspen	37
Polk	Bemidji	151	39	22	8	19.4			Clearcut- with Reserves	2016	Aspen	27
Polk	Bemidji	151	39	30	21	7.8			Clearcut- with Reserves	2016	Aspen	57
Polk	Bemidji	152	46	1	13	4.6			Clearcut- with Reserves	2017	Aspen	37
Polk	Bemidji	152	46	1	16	15.3			Clearcut- with Reserves	2017	Aspen	37
Polk	Bemidji	152	46	1	17	4.7			Clearcut- with Reserves	2017	Aspen	37
Polk	Bemidji	152	46	1	94	5.3			Clearcut- with Reserves	2017	Aspen	37
Polk	Bemidji	152	46	12	33	6.4			Clearcut- with Reserves	2017	Aspen	49
Polk	Bemidji	152	46	14	89	6.5			Clearcut- with Reserves	2017	Aspen	37
Polk	Bemidji	152	46	16	81	3.9			Clearcut- with Reserves	2017	Aspen	37
Polk	Bemidji	153	46	12	40	10.7			Clearcut- with Reserves	2017	Aspen	36
Polk	Bemidji	153	46	13	28	9			Clearcut- with Reserves	2017	Aspen	37
Red Lake	Bemidji	150	42	7	65	0.8			Clearcut- with Reserves	2015	Aspen	57
Red Lake	Bemidji	150	42	36	51	25.9			Clearcut- with Reserves	2014	Aspen	42
Red Lake	Bemidji	150	42	36	56	21.6			Clearcut- with Reserves	2014	Aspen	52

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Red Lake	Bemidji	150	42	36	58	4.8			Clearcut- with Reserves	2014	Aspen	52
Red Lake	Bemidji	150	43	19	30	3.2			Clearcut- with Reserves	2015	Aspen	75
Red Lake	Bemidji	151	40	13	61	10.3			Clearcut- with Reserves	2016	Aspen	47
Red Lake	Bemidji	151	40	24	1	28.3			Clearcut- with Reserves	2016	Aspen	41
Red Lake	Bemidji	151	40	24	48	7.9			Clearcut- with Reserves	2016	Aspen	42
Red Lake	Bemidji	151	40	24	55	16.2			Clearcut- with Reserves	2016	Aspen	27
Red Lake	Bemidji	151	43	25	45	2.1	Y		Commercial Thinning	2015	Oak	57
Red Lake	Bemidji	151	43	25	47	2			Clearcut- with Reserves	2015	Aspen	57
Red Lake	Bemidji	151	45	22	103	6.3			Clearcut- with Reserves	2017	Offsite Aspen	17
Red Lake	Bemidji	152	42	36	63	11.3			Clearcut- with Reserves	2015	Aspen	382
Red Lake	Bemidji	152	42	36	76	7.3			SFRMP On-Site Visit	2015	Ash	69
Red Lake	Bemidji	152	42	36	77	41.3			Commercial Thinning	2015	Offsite Oak	70
Red Lake	Bemidji	152	45	29	99	11.5			Clearcut- with Reserves	2017	Aspen	27
Roseau	Warroad	159	40	5	28	9.7			Clearcut- with Reserves	2012	Aspen	56
Roseau	Warroad	159	40	5	422	8.3			Clearcut- with Reserves	2019	balm of Gilead	51
Roseau	Warroad	159	40	5	423	2.6			SFRMP On-Site Visit	2019	Ash	27
Roseau	Warroad	159	40	5	424	5.6			Clearcut- with Reserves	2019	Aspen	45
Roseau	Warroad	159	40	7	428	2.1			SFRMP On-Site Visit	2020	Ash	37
Roseau	Warroad	159	40	8	77	7.1	Y		Clearcut- with Reserves	2020	Aspen	55
Roseau	Warroad	159	40	8	84	5.9	Y		Clearcut- with Reserves	2020	balm of Gilead	41
Roseau	Warroad	159	40	16	130	20.5	Y		Clearcut- with Reserves	2014	balm of Gilead	54
Roseau	Warroad	159	40	17	157	11.5			SFRMP On-Site Visit	2019	Ash	33
Roseau	Warroad	159	40	19	183	21.9			SFRMP On-Site Visit	2019	Ash	119
Roseau	Warroad	159	40	19	229	51.9			Clearcut- with Reserves	2019	Aspen	47
Roseau	Warroad	159	40	20	209	96.8			Clearcut- with Reserves	2014	Aspen	52
Roseau	Warroad	159	40	20	261	7.1			Clearcut- with Reserves	2019	balm of Gilead	50
Roseau	Warroad	159	40	21	202	57.3			Clearcut- with Reserves	2020	Aspen	44
Roseau	Warroad	159	40	21	203	9.3			Clearcut- with Reserves	2014	balm of Gilead	70

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	159	40	21	253	13.8			Clearcut- with Reserves	2020	Aspen	40
Roseau	Warroad	159	40	28	306	9.2			Clearcut- with Reserves	2017	Aspen	53
Roseau	Warroad	159	40	29	305	17.1			Clearcut- with Reserves	2017	balm of Gilead	38
Roseau	Warroad	159	40	29	478	3.3			Clearcut- with Reserves	2017	balm of Gilead	38
Roseau	Warroad	159	40	29	479	1			Clearcut- with Reserves	2017	balm of Gilead	38
Roseau	Warroad	159	40	29	480	0.8			Clearcut- with Reserves	2017	balm of Gilead	38
Roseau	Warroad	159	40	30	314	4.2			Clearcut- with Reserves	2012	Aspen	75
Roseau	Warroad	159	40	31	332	87.8			Clearcut- with Reserves	2020	Aspen	43
Roseau	Warroad	159	40	31	336	7.7			Clearcut- with Reserves	2012	Aspen	63
Roseau	Warroad	159	40	31	350	20.3			Clearcut- with Reserves	2012	Aspen	57
Roseau	Warroad	159	40	31	379	23.5			Clearcut- with Reserves	2017	Aspen	49
Roseau	Warroad	159	40	31	469	24.5			Clearcut- with Reserves	2017	Aspen	37
Roseau	Warroad	159	40	32	320	34.3			Clearcut- with Reserves	2012	Aspen	66
Roseau	Warroad	159	40	32	328	4.8			Clearcut- with Reserves	2017	Aspen	54
Roseau	Warroad	159	40	32	340	11			Clearcut- with Reserves	2020	Aspen	55
Roseau	Warroad	159	40	32	348	48			Clearcut- with Reserves	2012	balm of Gilead	65
Roseau	Warroad	159	40	32	377	18.2			Clearcut- with Reserves	2017	balm of Gilead	62
Roseau	Warroad	159	41	2	53	28.8			Clearcut- with Reserves	2018	balm of Gilead	48
Roseau	Warroad	159	41	2	79	8.6			SFRMP On-Site Visit	2021	Ash	54
Roseau	Warroad	159	41	2	84	29.3			Clearcut- with Reserves	2021	Aspen	48
Roseau	Warroad	159	41	2	98	6.9			SFRMP On-Site Visit	2021	Ash	15
Roseau	Warroad	159	41	2	683	10.7			Clearcut- with Reserves	2021	balm of Gilead	48
Roseau	Warroad	159	41	3	52	20.6			Clearcut- with Reserves	2018	balm of Gilead	55
Roseau	Warroad	159	41	5	61	8.5			Clearcut- with Reserves	2018	balm of Gilead	52
Roseau	Warroad	159	41	6	3	8.7			Clearcut- with Reserves	2012	Aspen	65
Roseau	Warroad	159	41	6	5	9.6			Clearcut- with Reserves	2018	Aspen	40
Roseau	Warroad	159	41	6	8	21.4			Clearcut- with Reserves	2012	Aspen	55
Roseau	Warroad	159	41	6	24	18			Clearcut- with Reserves	2018	Aspen	49

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	159	41	6	81	46.6			SFRMP On-Site Visit	2018	Ash	60
Roseau	Warroad	159	41	9	155	6			SFRMP On-Site Visit	2021	Ash	35
Roseau	Warroad	159	41	11	158	25.8			SFRMP On-Site Visit	2021	Ash	55
Roseau	Warroad	159	41	16	200	21.7			Clearcut- with Reserves	2021	Aspen	36
Roseau	Warroad	159	41	16	228	16.4			SFRMP On-Site Visit	2021	Ash	68
Roseau	Warroad	159	41	16	637	7.3			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	159	41	19	335	6.8			Clearcut- with Reserves	2021	balm of Gilead	46
Roseau	Warroad	159	41	20	292	14.1			Clearcut- with Reserves	2015	balm of Gilead	44
Roseau	Warroad	159	41	20	309	11.6			Clearcut- with Reserves	2021	balm of Gilead	44
Roseau	Warroad	159	41	21	294	3.7			Clearcut- with Reserves	2015	Aspen	49
Roseau	Warroad	159	41	21	296	13.7			SFRMP On-Site Visit	2015	Ash	36
Roseau	Warroad	159	41	21	319	6.6			Clearcut- with Reserves	2015	balm of Gilead	51
Roseau	Warroad	159	41	21	349	9.4			SFRMP On-Site Visit	2015	Ash	53
Roseau	Warroad	159	41	21	639	2.7			Clearcut- with Reserves	0	Aspen	37
Roseau	Warroad	159	41	23	314	25.6			Clearcut- with Reserves	2012	Aspen	57
Roseau	Warroad	159	41	23	323	7.5			Clearcut- with Reserves	2020	balm of Gilead	38
Roseau	Warroad	159	41	23	339	16.3			Clearcut- with Reserves	2015	Aspen	54
Roseau	Warroad	159	41	23	366	35			SFRMP On-Site Visit	2015	Ash	72
Roseau	Warroad	159	41	23	696	1.5			SFRMP On-Site Visit	0	Ash	72
Roseau	Warroad	159	41	23	701	8.6			Clearcut- with Reserves	2015	Aspen	55
Roseau	Warroad	159	41	23	702	9.6			Clearcut- with Reserves	2015	Aspen	52
Roseau	Warroad	159	41	24	674	11.1			Clearcut- with Reserves	2012	Aspen	57
Roseau	Warroad	159	41	25	447	59.4			Clearcut- with Reserves	2018	balm of Gilead	48
Roseau	Warroad	159	41	25	460	15.3			Clearcut- with Reserves	2020	balm of Gilead	49
Roseau	Warroad	159	41	26	408	14.5			Clearcut- with Reserves	2018	Aspen	50
Roseau	Warroad	159	41	26	419	20.6			Clearcut- with Reserves	2018	balm of Gilead	52
Roseau	Warroad	159	41	26	424	12.7			Clearcut- with Reserves	2020	balm of Gilead	45
Roseau	Warroad	159	41	26	434	13.7			Clearcut- with Reserves	2014	balm of Gilead	52

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	159	41	26	435	34.8			Clearcut- with Reserves	2014	Aspen	56
Roseau	Warroad	159	41	26	441	36.3			Clearcut- with Reserves	2020	Aspen	49
Roseau	Warroad	159	41	26	448	5.3			Clearcut- with Reserves	2014	Aspen	53
Roseau	Warroad	159	41	26	454	22.3			Clearcut- with Reserves	2014	balm of Gilead	53
Roseau	Warroad	159	41	26	473	13.6			Clearcut- with Reserves	2017	balm of Gilead	49
Roseau	Warroad	159	41	26	707	1.1			Clearcut- with Reserves	2018	Aspen	37
Roseau	Warroad	159	41	27	456	10.5			SFRMP On-Site Visit	2014	Ash	49
Roseau	Warroad	159	41	30	420	19.9			Clearcut- with Reserves	2014	Tamarack	108
Roseau	Warroad	159	41	30	425	6.3			SFRMP On-Site Visit	2014	Ash	65
Roseau	Warroad	159	41	31	63	131			SFRMP On-Site Visit	2016	Ash	52
Roseau	Warroad	159	41	31	523	8			Clearcut- with Reserves	2016	Aspen	39
Roseau	Warroad	159	41	31	595	1.6			SFRMP On-Site Visit	2016	Ash	37
Roseau	Warroad	159	41	34	484	22.9			Clearcut- with Reserves	2018	balm of Gilead	53
Roseau	Warroad	159	41	34	502	21.5			Clearcut- with Reserves	2018	balm of Gilead	53
Roseau	Warroad	159	41	34	509	7.9			Clearcut- with Reserves	2021	balm of Gilead	46
Roseau	Warroad	159	41	34	554	23.5			Clearcut- with Reserves	2018	balm of Gilead	53
Roseau	Warroad	159	41	34	563	9.7			Clearcut- with Reserves	2021	balm of Gilead	49
Roseau	Warroad	159	41	34	569	29.3			SFRMP On-Site Visit	2014	Ash	75
Roseau	Warroad	159	41	34	571	7.9			Clearcut- with Reserves	2014	balm of Gilead	54
Roseau	Warroad	159	41	34	583	15.1			Clearcut- with Reserves	2014	Aspen	58
Roseau	Warroad	159	41	34	585	15			Clearcut- with Reserves	2014	Aspen	54
Roseau	Warroad	159	41	35	490	43.6			Clearcut- with Reserves	2021	balm of Gilead	44
Roseau	Warroad	159	41	35	491	25.8			Clearcut- with Reserves	2017	balm of Gilead	55
Roseau	Warroad	159	41	35	493	3.1			Clearcut- with Reserves	2017	Aspen	52
Roseau	Warroad	159	41	35	515	4.9			Clearcut- with Reserves	2021	balm of Gilead	46
Roseau	Warroad	159	41	35	524	9.8			Clearcut- with Reserves	2017	Aspen	60
Roseau	Warroad	159	41	35	533	22.9			SFRMP On-Site Visit	2017	Ash	58
Roseau	Warroad	159	41	35	544	3.3			Clearcut- with Reserves	2017	balm of Gilead	58

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	159	41	35	548	11			Clearcut- with Reserves	2017	Aspen	50
Roseau	Warroad	159	41	35	581	15			Clearcut- with Reserves	2012	balm of Gilead	61
Roseau	Warroad	159	41	35	744	2.6			Clearcut- with Reserves	2017	Aspen	52
Roseau	Warroad	159	41	36	547	30.1			Clearcut- with Reserves	2017	balm of Gilead	55
Roseau	Warroad	159	41	36	558	9.5			Clearcut- with Reserves	2012	balm of Gilead	60
Roseau	Warroad	159	42	36	482	2.2			Clearcut- with Reserves	0	Aspen	60
Roseau	Warroad	159	43	19	52	16.6			Clearcut- with Reserves	2014	Aspen	57
Roseau	Warroad	159	43	19	55	7.4			Clearcut- with Reserves	2014	Aspen	57
Roseau	Warroad	160	40	28	123	11.5			Clearcut- with Reserves	2012	balm of Gilead	64
Roseau	Warroad	160	40	28	133	9.9			Clearcut- with Reserves	2012	balm of Gilead	64
Roseau	Warroad	160	40	29	90	9.1			Clearcut- with Reserves	2019	balm of Gilead	41
Roseau	Warroad	160	40	30	88	2.3			Clearcut- with Reserves	2019	balm of Gilead	35
Roseau	Warroad	160	40	30	99	4.9			Clearcut- with Reserves	2014	Aspen	57
Roseau	Warroad	160	40	30	112	2.9			Clearcut- with Reserves	2019	Aspen	45
Roseau	Warroad	160	40	30	122	2.7			Clearcut- with Reserves	2019	balm of Gilead	51
Roseau	Warroad	160	40	30	256	0.4			Clearcut- with Reserves	2019	balm of Gilead	51
Roseau	Warroad	160	40	30	257	0.7			Clearcut- with Reserves	2019	balm of Gilead	51
Roseau	Warroad	160	40	30	305	1.8			Clearcut- with Reserves	2019	balm of Gilead	39
Roseau	Warroad	160	40	33	236	3.5			SFRMP On-Site Visit	2012	Ash	27
Roseau	Warroad	160	41	16	26	123.9			Clearcut- with Reserves	2014	Aspen	44
Roseau	Warroad	160	41	25	106	7.4			Clearcut- with Reserves	2014	Aspen	53
Roseau	Warroad	160	41	25	248	0.6			Clearcut- with Reserves	2014	Aspen	53
Roseau	Warroad	160	41	25	249	1.2			Clearcut- with Reserves	2014	Aspen	53
Roseau	Warroad	160	41	25	250	1			Clearcut- with Reserves	2014	Aspen	53
Roseau	Warroad	160	41	25	251	1.1			Clearcut- with Reserves	2019	Aspen	53
Roseau	Warroad	160	41	26	53	4.2			Clearcut- with Reserves	2017	Aspen	53
Roseau	Warroad	160	41	26	101	35			Clearcut- with Reserves	2017	balm of Gilead	48
Roseau	Warroad	160	41	26	103	11.6			Clearcut- with Reserves	2017	balm of Gilead	48



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	160	41	26	120	9			Clearcut- with Reserves	2019	Aspen	42
Roseau	Warroad	160	41	26	198	12.8			Clearcut- with Reserves	2017	Aspen	53
Roseau	Warroad	160	41	27	112	22.6			Clearcut- with Reserves	2018	Aspen	50
Roseau	Warroad	160	41	27	117	30.7			Clearcut- with Reserves	2013	Aspen	54
Roseau	Warroad	160	41	27	126	12.6			Clearcut- with Reserves	2018	balm of Gilead	48
Roseau	Warroad	160	41	28	68	10.5			Clearcut- with Reserves	2018	Aspen	38
Roseau	Warroad	160	41	28	69	9.9			Clearcut- with Reserves	2018	balm of Gilead	47
Roseau	Warroad	160	41	28	97	31.3			Clearcut- with Reserves	2018	balm of Gilead	47
Roseau	Warroad	160	41	28	114	17.9			Clearcut- with Reserves	2021	Aspen	43
Roseau	Warroad	160	41	33	134	4.7			Clearcut- with Reserves	2014	Aspen	54
Roseau	Warroad	160	41	33	141	25.2			Clearcut- with Reserves	2021	balm of Gilead	42
Roseau	Warroad	160	41	33	165	22.3			Clearcut- with Reserves	2014	Aspen	52
Roseau	Warroad	160	41	33	168	3.7			Clearcut- with Reserves	2014	Aspen	54
Roseau	Warroad	160	41	34	142	8.9			Clearcut- with Reserves	0	balm of Gilead	49
Roseau	Warroad	160	41	34	143	17			Clearcut- with Reserves	2021	Aspen	44
Roseau	Warroad	160	41	34	155	21.8			Clearcut- with Reserves	2013	Aspen	54
Roseau	Warroad	160	41	34	187	25.1			Clearcut- with Reserves	2012	Aspen	65
Roseau	Warroad	160	41	34	244	3			Clearcut- with Reserves	2012	Aspen	65
Roseau	Warroad	160	41	35	147	2.3			Clearcut- with Reserves	2019	Aspen	61
Roseau	Warroad	160	41	36	163	21.5			Clearcut- with Reserves	2019	balm of Gilead	51
Roseau	Warroad	160	43	19	47	4.2			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	160	43	19	51	16.2			SFRMP On-Site Visit	2021	Ash	72
Roseau	Warroad	160	43	19	53	18.3			SFRMP On-Site Visit	2021	Ash	85
Roseau	Warroad	160	43	19	54	0.4			Commercial Thinning	2012	Norway Pine	27
Roseau	Warroad	160	43	19	57	1.8			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	160	44	30	2	8.7			Clearcut- with Reserves	2013	Aspen	44
Roseau	Warroad	160	44	30	5	10			Clearcut- with Reserves	2013	Aspen	40
Roseau	Warroad	161	44	6	73	11.7			Clearcut- with Reserves	2020	Aspen	37

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	161	44	6	87	6.3			Clearcut- with Reserves	2020	Aspen	57
Roseau	Warroad	161	44	7	90	26.2			Clearcut- with Reserves	2020	Aspen	41
Roseau	Warroad	161	44	8	66	19.6			Clearcut- with Reserves	2020	Aspen	37
Roseau	Warroad	161	44	8	68	25.5			Clearcut- with Reserves	2012	Aspen	57
Roseau	Warroad	161	44	16	64	10.4			Clearcut- with Reserves	2020	Aspen	37
Roseau	Warroad	161	44	16	65	71.1			Clearcut- with Reserves	2020	Aspen	37
Roseau	Warroad	161	44	16	74	0.8			Clearcut- with Reserves	2020	Aspen	37
Roseau	Warroad	161	44	16	83	2.1			Clearcut- with Reserves	2020	Aspen	37
Roseau	Warroad	162	42	2	7	3.9			Clearcut- with Reserves	2020	Aspen	63
Roseau	Warroad	162	42	2	12	8.1			Clearcut- with Reserves	2020	balm of Gilead	70
Roseau	Warroad	162	42	2	66	2.6			Clearcut- with Reserves	2020	Aspen	63
Roseau	Warroad	162	42	6	62	5.6			Clearcut- with Reserves	2020	Aspen	37
Roseau	Warroad	162	42	36	46	16.2			Clearcut- with Reserves	2020	Aspen	43
Roseau	Warroad	162	42	36	51	8.9			Clearcut- with Reserves	2020	Aspen	43
Roseau	Warroad	162	43	2	75	9.9			Clearcut- with Reserves	2019	Aspen	63
Roseau	Warroad	162	43	2	79	18.2			Clearcut- with Reserves	2019	Aspen	52
Roseau	Warroad	162	43	4	19	9.9			Clearcut- with Reserves	2019	Aspen	48
Roseau	Warroad	162	43	4	313	3.4			Clearcut- with Reserves	2019	Aspen	27
Roseau	Warroad	162	43	6	20	9.2			Clearcut- with Reserves	2019	Aspen	56
Roseau	Warroad	162	43	6	86	13.1			Clearcut- with Reserves	2019	Aspen	73
Roseau	Warroad	162	43	6	326	26.5			Clearcut- with Reserves	2019	Aspen	27
Roseau	Warroad	162	43	7	294	4.9			Clearcut- with Reserves	2019	Aspen	27
Roseau	Warroad	162	43	7	303	25.5			Clearcut- with Reserves	2019	Aspen	37
Roseau	Warroad	162	43	19	55	13.2			Clearcut- with Reserves	2012	balm of Gilead	48
Roseau	Warroad	162	44	2	622	0.9			Clearcut- with Reserves	2012	Offsite Aspen	27
Roseau	Warroad	162	44	2	624	25.7			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	4	42	19.9			Clearcut- with Reserves	2012	Aspen	39
Roseau	Warroad	162	44	10	60	20.6			Clearcut- with Reserves	2012	Aspen	42

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	162	44	10	82	26.7			Clearcut- with Reserves	2012	Aspen	71
Roseau	Warroad	162	44	10	585	1.4			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	10	588	4.5			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	12	84	10.6			Clearcut- with Reserves	2012	Aspen	34
Roseau	Warroad	162	44	12	614	0.2			Clearcut- with Reserves	2012	Offsite Aspen	27
Roseau	Warroad	162	44	16	521	2.9			Clearcut- with Reserves	2012	Offsite Aspen	27
Roseau	Warroad	162	44	16	525	2			Clearcut- with Reserves	2012	Aspen	37
Roseau	Warroad	162	44	16	526	7.9			Clearcut- with Reserves	2012	Aspen	37
Roseau	Warroad	162	44	16	527	4.3			Clearcut- with Reserves	2012	Aspen	37
Roseau	Warroad	162	44	16	538	4			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	21	121	9.6			Clearcut- with Reserves	2012	Aspen	44
Roseau	Warroad	162	44	21	556	7.1			Clearcut- with Reserves	2012	Aspen	37
Roseau	Warroad	162	44	22	543	10.2			Clearcut- with Reserves	2012	Aspen	37
Roseau	Warroad	162	44	22	552	8.1			Clearcut- with Reserves	2012	Aspen	44
Roseau	Warroad	162	44	23	130	17.6			Clearcut- with Reserves	2012	Aspen	62
Roseau	Warroad	162	44	23	554	4.5			Clearcut- with Reserves	2012	Aspen	37
Roseau	Warroad	162	44	24	145	4.8			Clearcut- with Reserves	2012	Aspen	63
Roseau	Warroad	162	44	26	179	10			Clearcut- with Reserves	2012	Aspen	63
Roseau	Warroad	162	44	26	186	13.6			Clearcut- with Reserves	2012	Aspen	40
Roseau	Warroad	162	44	26	191	6.9			Clearcut- with Reserves	2012	Aspen	65
Roseau	Warroad	162	44	26	497	10.3			Clearcut- with Reserves	2012	Aspen	63
Roseau	Warroad	162	44	26	498	2.2			Clearcut- with Reserves	2012	Aspen	65
Roseau	Warroad	162	44	26	499	0.8			Clearcut- with Reserves	2012	Aspen	65
Roseau	Warroad	162	44	26	504	5.6			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	26	506	2.2			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	26	508	2.5			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	26	511	0.7			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	26	513	0.4			Clearcut- with Reserves	2012	Aspen	27

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	162	44	27	428	0.9			Clearcut- with Reserves	2012	Offsite Aspen	27
Roseau	Warroad	162	44	27	429	24.5			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	27	432	0.5			Clearcut- with Reserves	0	Aspen	27
Roseau	Warroad	162	44	30	464	5.5			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	30	465	9.6			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	32	236	46.2			Clearcut- with Reserves	2012	Aspen	45
Roseau	Warroad	162	44	32	435	13.6			Clearcut- with Reserves	2012	Aspen	27
Roseau	Warroad	162	44	32	441	4.3			Clearcut- with Reserves	2012	Aspen	45
Roseau	Warroad	163	40	7	311	4.7			Clearcut- with Reserves	2020	Aspen	27
Roseau	Warroad	163	40	16	175	6.3			Clearcut- with Reserves	0	Aspen	33
Roseau	Warroad	163	40	16	313	1.7			Clearcut- with Reserves	0	Aspen	27
Roseau	Warroad	163	40	17	277	31.2			Clearcut- with Reserves	2020	Offsite Aspen	57
Roseau	Warroad	163	40	18	315	2			Clearcut- with Reserves	2020	Aspen	27
Roseau	Warroad	163	40	21	214	25.7			Clearcut- with Reserves	2020	balm of Gilead	38
Roseau	Warroad	163	40	21	275	3.8			Clearcut- with Reserves	2020	Offsite Aspen	47
Roseau	Warroad	163	40	32	265	4.1			SFRMP On-Site Visit	2020	Ash	60
Roseau	Warroad	163	40	32	268	0.6			Clearcut- with Reserves	2020	Offsite Aspen	47
Roseau	Warroad	163	40	32	282	7.5			Clearcut- with Reserves	2020	Aspen	37
Roseau	Warroad	163	41	13	76	2.5			Clearcut- with Reserves	2020	Aspen	47
Roseau	Warroad	163	41	13	78	8.9			Clearcut- with Reserves	2020	Aspen	43
Roseau	Warroad	163	41	13	101	6.3			Clearcut- with Reserves	2020	Aspen	27
Roseau	Warroad	163	42	1	13	12.7			Clearcut- with Reserves	2014	Aspen	34
Roseau	Warroad	163	42	1	165	1.6			Clearcut- with Reserves	2014	Aspen	37
Roseau	Warroad	163	42	1	166	0.7			Clearcut- with Reserves	2014	Aspen	37
Roseau	Warroad	163	42	2	23	18.8			SFRMP On-Site Visit	2014	Ash	64
Roseau	Warroad	163	42	8	232	4.1			Clearcut- with Reserves	2020	balm of Gilead	47
Roseau	Warroad	163	42	18	123	64.8			Clearcut- with Reserves	2020	Aspen	35
Roseau	Warroad	163	42	18	128	28.5			Clearcut- with Reserves	2020	Aspen	68

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	163	42	19	238	24.9			Clearcut- with Reserves	2020	Aspen	27
Roseau	Warroad	163	42	29	260	5			Clearcut- with Reserves	2020	Aspen	37
Roseau	Warroad	163	43	5	15	29.6			Clearcut- with Reserves	2017	Aspen	65
Roseau	Warroad	163	43	5	20	12.6			Clearcut- with Reserves	2017	balm of Gilead	45
Roseau	Warroad	163	43	5	24	10			Clearcut- with Reserves	2017	Aspen	62
Roseau	Warroad	163	43	5	318	11.6			Clearcut- with Reserves	2021	Aspen	27
Roseau	Warroad	163	43	5	458	5.8			Clearcut- with Reserves	2021	Aspen	27
Roseau	Warroad	163	43	5	465	7.7			Clearcut- with Reserves	2021	Aspen	27
Roseau	Warroad	163	43	5	488	8.8			Clearcut- with Reserves	2017	Aspen	27
Roseau	Warroad	163	43	6	487	5			Clearcut- with Reserves	2021	Aspen	27
Roseau	Warroad	163	43	7	45	14.5			Clearcut- with Reserves	2017	balm of Gilead	64
Roseau	Warroad	163	43	25	229	11.2			Clearcut- with Reserves	2020	Aspen	77
Roseau	Warroad	163	43	29	419	1.4			Clearcut- with Reserves	2019	Aspen	27
Roseau	Warroad	163	43	30	445	2.3			Clearcut- with Reserves	2019	Offsite Aspen	27
Roseau	Warroad	163	43	30	449	1.4			Clearcut- with Reserves	2019	Aspen	27
Roseau	Warroad	163	43	30	450	1.3			Clearcut- with Reserves	2019	Aspen	27
Roseau	Warroad	163	43	30	452	9.3			Clearcut- with Reserves	2019	Aspen	27
Roseau	Warroad	163	43	30	453	10.7			Clearcut- with Reserves	2019	Aspen	37
Roseau	Warroad	163	43	31	281	10			Clearcut- with Reserves	2019	Aspen	57
Roseau	Warroad	163	43	31	287	10.7			Clearcut- with Reserves	2019	Aspen	58
Roseau	Warroad	163	43	31	291	46.3			Clearcut- with Reserves	2019	balm of Gilead	45
Roseau	Warroad	163	43	31	433	0.4			Clearcut- with Reserves	2019	Offsite Aspen	27
Roseau	Warroad	163	43	31	437	5.8			Clearcut- with Reserves	2019	Aspen	37
Roseau	Warroad	163	43	32	256	23.8			Clearcut- with Reserves	2019	Aspen	61
Roseau	Warroad	163	43	32	259	18.2			Clearcut- with Reserves	2019	Aspen	59
Roseau	Warroad	163	43	33	264	57.9			Clearcut- with Reserves	2019	Aspen	38
Roseau	Warroad	163	43	33	298	17.8			Clearcut- with Reserves	2019	Aspen	38
Roseau	Warroad	163	43	34	334	7.6			Clearcut- with Reserves	2019	Aspen	38

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	163	43	34	336	6			Clearcut- with Reserves	2019	Aspen	38
Roseau	Warroad	163	43	35	319	27.6			Clearcut- with Reserves	2019	Aspen	66
Roseau	Warroad	163	43	36	276	20.7			Clearcut- with Reserves	2020	Aspen	39
Roseau	Warroad	163	43	36	277	34.2			Clearcut- with Reserves	2020	Aspen	47
Roseau	Warroad	163	43	36	289	18.1			Clearcut- with Reserves	2019	balm of Gilead	51
Roseau	Warroad	163	43	36	342	10			Clearcut- with Reserves	2019	Aspen	52
Roseau	Warroad	163	43	36	360	94.8			Clearcut- with Reserves	2019	Aspen	44
Roseau	Warroad	163	44	4	32	81			Clearcut- with Reserves	2013	Aspen	73
Roseau	Warroad	163	44	4	33	55			Clearcut- with Reserves	2015	balm of Gilead	42
Roseau	Warroad	163	44	4	684	2			Clearcut- with Reserves	2013	balm of Gilead	42
Roseau	Warroad	163	44	6	567	4			Clearcut- with Reserves	2015	Aspen	37
Roseau	Warroad	163	44	6	568	0.6			Clearcut- with Reserves	2015	Aspen	27
Roseau	Warroad	163	44	6	585	2.1			Clearcut- with Reserves	2013	Aspen	37
Roseau	Warroad	163	44	6	589	3			Clearcut- with Reserves	2015	Aspen	27
Roseau	Warroad	163	44	7	91	43.2			Clearcut- with Reserves	2013	Aspen	77
Roseau	Warroad	163	44	7	95	6.1			Clearcut- with Reserves	2015	balm of Gilead	77
Roseau	Warroad	163	44	7	103	7.3			SFRMP On-Site Visit	2015	Ash	88
Roseau	Warroad	163	44	7	118	8.7			SFRMP On-Site Visit	2013	Ash	106
Roseau	Warroad	163	44	7	573	5.6			Clearcut- with Reserves	2013	Aspen	27
Roseau	Warroad	163	44	7	580	6.8			Clearcut- with Reserves	2015	Aspen	27
Roseau	Warroad	163	44	7	599	1.5			Clearcut- with Reserves	2015	Aspen	27
Roseau	Warroad	163	44	7	600	6.9			Clearcut- with Reserves	2015	Aspen	37
Roseau	Warroad	163	44	7	678	3.9			SFRMP On-Site Visit	2015	Ash	88
Roseau	Warroad	163	44	7	679	17.5			Clearcut- with Reserves	2013	Offsite Aspen	47
Roseau	Warroad	163	44	7	681	4.7			Clearcut- with Reserves	2015	Offsite Aspen	27
Roseau	Warroad	163	44	8	606	4			Clearcut- with Reserves	2015	Aspen	37
Roseau	Warroad	163	44	8	648	24.9			Clearcut- with Reserves	2015	Aspen	27
Roseau	Warroad	163	44	8	649	3.2			Clearcut- with Reserves	2013	Offsite Aspen	47

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	163	44	8	650	6.8			Clearcut- with Reserves	2015	Offsite Aspen	27
Roseau	Warroad	163	44	8	657	6.4			Clearcut- with Reserves	2015	Aspen	27
Roseau	Warroad	163	44	8	658	1			Clearcut- with Reserves	2013	Offsite Aspen	47
Roseau	Warroad	163	44	8	673	12.5			Clearcut- with Reserves	2013	Aspen	37
Roseau	Warroad	163	44	11	558	3.7			Clearcut- with Reserves	2015	Aspen	27
Roseau	Warroad	163	44	13	158	4.7			Clearcut- with Reserves	2013	Aspen	75
Roseau	Warroad	163	44	13	555	20.4			Clearcut- with Reserves	2015	Aspen	37
Roseau	Warroad	163	44	14	166	21.1			Clearcut- with Reserves	2013	Aspen	91
Roseau	Warroad	163	44	17	172	23.8			Clearcut- with Reserves	2018	Aspen	42
Roseau	Warroad	163	44	17	675	13.8			Clearcut- with Reserves	2015	Aspen	60
Roseau	Warroad	163	44	20	216	19.5			Clearcut- with Reserves	2016	Aspen	42
Roseau	Warroad	163	44	20	244	70.7			Clearcut- with Reserves	2016	Aspen	36
Roseau	Warroad	163	44	20	247	31.6			Clearcut- with Reserves	2016	Aspen	45
Roseau	Warroad	163	44	21	234	93.4			Clearcut- with Reserves	2018	Aspen	33
Roseau	Warroad	163	44	21	251	13.5			Clearcut- with Reserves	2016	Aspen	62
Roseau	Warroad	163	44	26	316	29.7			Clearcut- with Reserves	2016	Aspen	41
Roseau	Warroad	163	44	27	325	16			Clearcut- with Reserves	2018	Aspen	67
Roseau	Warroad	163	44	27	363	29			Clearcut- with Reserves	2018	Aspen	60
Roseau	Warroad	163	44	27	450	2.5			Clearcut- with Reserves	2016	Aspen	27
Roseau	Warroad	163	44	27	458	6.1			Clearcut- with Reserves	2018	Aspen	37
Roseau	Warroad	163	44	27	473	14.2			Clearcut- with Reserves	2016	Aspen	67
Roseau	Warroad	163	44	29	269	45.2			Clearcut- with Reserves	2018	Aspen	27
Roseau	Warroad	163	44	29	273	12.1			Clearcut- with Reserves	2018	Aspen	27
Roseau	Warroad	163	44	29	310	7.7			Clearcut- with Reserves	2018	Aspen	27
Roseau	Warroad	163	44	29	346	24.9			Clearcut- with Reserves	2018	Aspen	27
Roseau	Warroad	163	44	29	527	41.6			Clearcut- with Reserves	2016	Aspen	27
Roseau	Warroad	163	44	34	411	9.8			Clearcut- with Reserves	2018	Aspen	84
Roseau	Warroad	163	44	34	476	3.7			Clearcut- with Reserves	2016	Aspen	27

County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	163	44	36	398	31.4			Clearcut- with Reserves	2016	Aspen	65
Roseau	Warroad	163	44	36	459	5.7			Clearcut- with Reserves	2016	Aspen	37
Roseau	Warroad	163	44	36	460	10.3			Clearcut- with Reserves	2016	Aspen	37
Roseau	Warroad	164	42	25	21	30.8			Clearcut- with Reserves	2014	Aspen	42
Roseau	Warroad	164	42	25	61	4.2			Clearcut- with Reserves	2014	Jack Pine	71
Roseau	Warroad	164	42	26	52	14.6			Clearcut- with Reserves	2014	Jack Pine	64
Roseau	Warroad	164	42	26	202	15.7			Clearcut- with Reserves	2014	Aspen	47
Roseau	Warroad	164	42	35	73	25.8	Y		Clearcut- with Reserves	2014	Aspen	67
Roseau	Warroad	164	42	36	90	6.3			Clearcut- with Reserves	2014	Jack Pine	74
Roseau	Warroad	164	42	36	137	5.4			Clearcut- with Reserves	2014	Aspen	37
Roseau	Warroad	164	42	36	155	2.9	Y	Y	Commercial Thinning	2014	White Pine	37
Roseau	Warroad	164	42	36	172	4			Clearcut- with Reserves	2014	Aspen	37
Roseau	Warroad	164	42	36	180	0.7	Y	Y	Commercial Thinning	2014	White Pine	17
Roseau	Warroad	164	42	36	196	5.7			Clearcut- with Reserves	2014	Jack Pine	74
Roseau	Warroad	164	42	36	205	2.1			Commercial Thinning	2014	Norway Pine	27
Roseau	Warroad	164	43	28	68	5.2			Clearcut- with Reserves	2021	Aspen	27
Roseau	Warroad	164	43	29	67	25.2			Clearcut- with Reserves	2017	Aspen	37
Roseau	Warroad	164	43	29	69	12.6			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	164	43	29	70	1			Clearcut- with Reserves	2021	Aspen	27
Roseau	Warroad	164	43	29	90	3.1			Clearcut- with Reserves	2017	Aspen	37
Roseau	Warroad	164	43	30	71	4.5			Clearcut- with Reserves	2017	Aspen	37
Roseau	Warroad	164	43	30	72	1.7			Clearcut- with Reserves	2021	Offsite Aspen	27
Roseau	Warroad	164	44	26	36	11.5			Clearcut- with Reserves	2017	Aspen	41
Roseau	Warroad	164	44	26	151	5.2			Clearcut- with Reserves	2017	Aspen	37
Roseau	Warroad	164	44	26	154	2.3			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	164	44	26	164	10.2			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	164	44	26	206	1.2			Clearcut- with Reserves	2021	Aspen	41
Roseau	Warroad	164	44	27	152	1.2			Clearcut- with Reserves	2021	Aspen	37



County	Forestry Area	Twp	Rng	Sec	Stand ID	Treatment Acres	ERF	White Pine Component	Preliminary Prescription	Exam Year	Cover Type	2010 Age
Roseau	Warroad	164	44	28	95	56.1			SFRMP On-Site Visit	2021	Ash	86
Roseau	Warroad	164	44	33	163	1.6			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	164	44	34	131	10.2			Clearcut- with Reserves	2017	Aspen	67
Roseau	Warroad	164	44	34	132	816.2			Clearcut- with Reserves	0	Lowland Brush	0
Roseau	Warroad	164	44	34	145	3.4			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	164	44	34	160	3.7			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	164	44	34	202	3.3			Clearcut- with Reserves	2021	Aspen	38
Roseau	Warroad	164	44	35	51	10			Clearcut- with Reserves	2017	Aspen	45
Roseau	Warroad	164	44	35	57	8.1			Clearcut- with Reserves	2021	Aspen	33
Roseau	Warroad	164	44	35	69	17.6			Clearcut- with Reserves	2017	balm of Gilead	57
Roseau	Warroad	164	44	35	74	16.5			Clearcut- with Reserves	2017	balm of Gilead	57
Roseau	Warroad	164	44	35	138	47			Clearcut- with Reserves	2021	Aspen	38
Roseau	Warroad	164	44	35	208	4.9			Clearcut- with Reserves	2021	Aspen	37
Roseau	Warroad	164	44	35	210	6.4			Clearcut- with Reserves	2017	balm of Gilead	57
Roseau	Warroad	164	44	36	65	69.2			Clearcut- with Reserves	2017	balm of Gilead	68

## 6.15 Appendix O. New Access Needs List

### Purpose

The primary purpose of identifying new access needs in SFRMP planning is to provide an estimate of general location, miles, and type of new access needed to implement the 10-year plan. The preliminary access needs information also:

- Provides a general assessment of new state forest road construction needs for budget development;
- Identifies access that will require a USFS (or other public or private) road use permit or special use permit; and,
- Addresses access, habitat fragmentation, and road density concerns via post-sale access management intentions.

Most temporary roads will not be maintained after harvest is completed. These access routes should be used again for future forest management activities instead of disturbing new areas.

### Scope

The scope of identifying new access needs in the SFRMP is limited to:

- Estimating the miles of new state forest road and new temporary access needed to access stands identified for treatment in the 10-Year Stand Exam List; and,
- Identifying (tagging) stands for which new access is needed.

Developing a comprehensive access plan for all land ownerships within the subsections is beyond the scope SFRMP. Establishing a guideline for maximum road/trail density in these subsections is also beyond the scope of this plan. The DNR cooperates and coordinates with other landowners on road and trail use and development. This cooperation and coordination will be used to minimize new road/access development, forest fragmentation, and disturbance to wildlife.

As part of the *Interdisciplinary Forest Management Coordination Framework*, staff from the DNR Section of Wildlife, and the Divisions of Forestry and Ecological and Water Resources have an opportunity to review the New Access Needs Lists and advise on the type of access needed and post-use disposition. In addition, as part of annual coordination meetings, prior to completion of the Forestry Area annual stand exam lists, consultation with the appropriate staffs on the location of new access routes will occur where endangered, threatened, or special concern species, rare native plant communities, or other significant non-timber forest resources may be affected.

### DNR Road Classifications

The following DNR forest road classifications were used in identifying new access needs:

#### System Roads

These roads are the major roads in the forest that provide forest management and recreational access. These roads are open to all motorized vehicles but can be closed temporarily to address seasonal road or fire conditions.

**Minimum Maintenance Roads**

These roads are used for forest management access on an intermittent, as-needed basis. Recreational users may use them, but the roads are not promoted or maintained for recreation. The roads are open to all motorized vehicles but can be temporarily closed to address road deterioration or fire conditions.

**Resource Management Access Routes**

These routes are used only during management activity. They are not immediately needed after management activity ends but the corridor is preserved for future management activity. Specific closure methods (e.g., gate, berm, rocks, or felled timber) are determined at the time the route is established. These routes are closed to all motorized recreation use (for hunting, trapping, etc. exceptions, see Minnesota Statutes 84.926).

**Temporary Access Routes**

If the access route does not fit into one of the first three options, it must be abandoned and the site reclaimed so evidence of a travel route is minimized. Temporary access routes are used only during management activity. They are closed to all motorized recreation use (for hunting, trapping, etc. exceptions, see Minnesota Statutes 84.926).

**Interdisciplinary Review of Access Planning**

Anticipated new access needs were identified by field personnel (with interdisciplinary input and/or review) after stands were identified for inclusion on the 10-Year Stand Exam List. The SFRMP process does not identify, map, or digitize detailed routes for the identified new access needs. Actual route layout will occur on the ground at the time of project implementation.

**New Access Needs Results**

The Aspen Parklands Plan identifies stands requiring new access. Of the 1,945 stands on the 10-year Stand Exam List, the 509 stands requiring new access were designated as winter season, Temporary Access, totaling 344 miles. The road classification, mileage, and closure method will be finalized when field staff completes the actual on-the-ground road layout. Interdisciplinary review process will be followed if significant changes or alterations are made following the stand site visits. Most temporary roads will not be maintained after harvest is completed. These access routes should be used again for future forest management activities instead of disturbing new areas.

## 6.16 Appendix P. Glossary

**Access route:** A temporary access or permanent road connecting the most remote parts of the forest to existing public roads. Forest roads provide access to forestlands for timber management, fish and wildlife habitat improvement, fire control, and a variety of recreational activities. Also, see *Forest road*.

**Acre:** An area of land containing 43,560 square feet, roughly the size of a football field, or a square that is 208 feet on a side. A “forty” of land contains 40 acres and a “section” of land contains 640 acres.

**Age class:** An interval, commonly 10 years, into which the age range of trees or forest stands is divided for classification or use.

**Age-class distribution:** The proportionate amount of various age classes of a forest or forest cover type within a defined geographic area (e.g., ecological classification system subsection).

**All-aged:** Describes an uneven-aged stand that represents all ages or age classes from seedlings to mature trees.

**Animal aggregations:** A concentration of animals that occurs during part or all the species life cycle, such that when these animals are in these aggregations, they are highly vulnerable to disturbance. Examples are colonial water bird nesting sites, bat hibernacula, and mussel beds.

**Annual stand examination list:** List of stands to be considered for treatment in a particular year that was selected from the 10-year stand examination list. Treatment may include harvest, thinning, regeneration, prescribed burning, re-inventory, etc.

**Annual work plan:** The annual work responsibilities at the area (i.e., Division of Forestry administrative boundary) documented for the fiscal year.

**Area forest resource management plan (AFRMP):** Successor to timber management planning (TMP), recognizing that TMP discussions and decisions affected or included a lot more than the decision to harvest. This should not be confused with the comprehensive FRMPs developed for a number of areas in the mid-to late-1980s.

**Artificial regeneration:** Renewal of a forest stand by planting seedlings or sowing seeds.

**Aspen/balm of Gilead/offsite aspen (A/BG) category definitions:** The A/BG stands were divided up into the following five categories: “T”; “O”; “S”; “R”; and, “C”. Designations for specific A/BG stands were based primarily on area staff input, and adjusted by existing soil series data in combination with soil types expected to be associated with Native Plant Community classes. Area staff will use NPC data obtained from each site prior to establishing final management options for the individual stands.

These categories are defined as:

**T – Timber**

Stands that will be managed as a forested cover type and held to at least normal rotation (45 years). These stands generally have a higher site index, are usually associated with forested NPC classes, and are within areas desired to be managed for forest plant and wildlife species. Extended Rotation Forest (ERF) goals were derived from T stands.

**O – Conversion to other forested cover type**

Stands that will be converted to another forested cover type to better represent the ecological characteristics of the site (i.e. aspen to oak).

**S – Short rotation**

Stands that will be managed as a forested cover type, but harvested prior to normal rotation age (20 to 44 years). These stands generally have a lower site index, may or may not be associated with forested NPC classes, and are within areas desired to be managed for early successional forest plant and wildlife species. It should be noted that for this 10-year planning cycle, stands that would not meet age of merchantability (35 years) were not selected for examination.

**R – Regeneration**

Stands that will be managed as a short rotation cover type (less than 20 years). These stands generally have very low site indexes, are usually not associated with forested NPC classes, and are within areas desired to be managed for open landscape plant and wildlife species.

**C – Conversion to non-forested cover type**

Stands that will be converted or restored to a non-forested cover type (i.e., upland/lowland grass, upland/lowland brush). These stands have often invaded prairie or oak savannah habitats and the management goal is to greatly reduce or eliminate aspen/balm of Gilead from the site.

**Assessment:** A compilation of information about the trends and conditions related to natural and socio-economic resources and factors. The initial round of SFRMPs will focus primarily on trends and conditions of forest resources. Standard core assessment information sources and products have been defined.

**Basal area:** The cross-sectional area of a tree taken at the base of the tree (i.e., measured at 4.5 feet above the ground). Basal area is often used to measure and describe the density of trees within an geographic area using an estimate of the sum of the basal area of all trees cross-sectional expressed per unit of land area (e.g., basal area per acre).

**Biodiversity (biological diversity):** The variety and abundance of species, their genetic composition, and the communities and landscapes in which they occur, including the ecological structures, functions, and processes occurring at all of these levels.

**Biodiversity Significance:** The relative value, in terms of size, condition and quality, of native biological diversity for a given area of land or water. (*Adapted from: Guidelines for MCBS Statewide Biodiversity Significance Rank*): The Minnesota County Biological Survey uses a statewide ranking system to evaluate and communicate the biodiversity significance of surveyed areas (MCBS sites) to natural resource professional, state and local government officials, and the public. MCBS sites are ranked according to several factors, including the quality and types of *Element Occurrences*, the size and quality of native plant communities, and the size and condition of the landscape within the Site. Areas are ranked as *Outstanding, High, Moderate, or Below the Minimum Threshold* for statewide biodiversity significance. (*Draft definition 3/24/2004*)

**Outstanding Sites:** Those containing the best occurrences of the rarest species, the most outstanding examples of the rarest native plant communities, and/or the largest, most intact functional landscapes present in the state.

**High Sites:** Those containing very good quality occurrences of the rarest species, high quality examples of the rarest native plant communities, and/or important functional landscapes.

**Moderate Sites:** Those containing significant occurrences of rare species, and/or moderately disturbed native plant communities and landscapes that have a strong potential for recovery.

**Sites Below the Minimum Threshold:** Those lacking significant populations of rare species and/or natural features that meet MCBS minimum standards for size and condition. These include areas of conservation value at the local level, such as habitat for native plants and animals, corridors for animal movements, buffers surrounding higher quality natural areas, and open space areas.

**Board foot:** A unit of measuring wood volumes equaling 144 cubic inches. A board foot is commonly used to measure and express the amount of wood in a tree, sawlog, veneer log, or individual piece of lumber. For example, a 16-inch diameter at breast height (DBH) standing tree that is 80 feet tall, contains approximately 250 board feet of wood and a tree with a 30-inch DBH and 80 feet tall contains about 1000 board feet or one metric board foot (MBF). A piece of lumber one cubic foot (1 foot x 1 foot x 1 inch) contains one board foot of lumber.

**Browse:** (n) Portions of woody plants including twigs, shoots, and leaves used as food by such animals like deer and rabbits. (v) To feed on leaves, young shoots, and other vegetation.

**Carr:** Deciduous woodland or scrub on a permanently wet, organic soil. A carr develops from a bog, fen or swamp.

**Clearcut:** The removal of all or most trees during harvest to permit the re-establishment of an even-aged forest. A harvest method used to regenerate shade-intolerant species, such as aspen and jack pine.

**Coarse filter:** Management of lands from a local to landscape scale that addresses the needs of all or most species, communities, environments, and ecological processes. In using a coarse filter approach (Hunter, 1990), it assumes that a broad range of habitats encompassing the needs of most species needs will be met, and their populations will remain viable on the landscape.

**Coarse woody debris:** Stumps and fallen tree trunks or limbs of more than 6-inch diameter at the large end.

**Cohort:** a group of trees developing after a single disturbance, commonly consisting of trees of similar age.

**Collaboration:** A group in which members identify with the group and seriously consider the group's overall charge. Group members assume collective responsibility for outcomes, are interdependent, and have a joint ownership of decisions.

**Common forest inventory:** Also, known as CCSA (Common Cooperative Stand Assessment). Forest inventory stand data compiled by the Minnesota Interagency Information Cooperative from public agencies including the Minnesota DNR, Superior and Chippewa National Forests, and county land departments (2001). The common format contains the common attributes found in the state, federal, and counties forest inventories.

**Competition:** The struggle between trees to obtain sunlight, nutrients, water and growing space. Every part of the tree, from the roots to the crown, competes for space and food.

**Comprehensive DNR subsection plans:** Address Minnesota Department of Natural Resources (DNR) programs and activities within the subsection. Involves programs and activities of multiple DNR Divisions, not just the Division of Forestry.

**Comprehensive Division of Forestry SFRMPs:** Address other aspects of forest resource management on DNR Forestry lands (e.g., recreation, land acquisition/sales, fire management, private forest management).

**Connectivity:** An element of spatial patterning where patches of vegetation such as, forest types, native plant communities or wildlife habitats, are connected to allow the flow of organisms and processes between them.

**Conversion:** Changing a stand or site from one cover type to another through active management. Conversions can be accomplished via restoring or enhancing a stand or site.

**Cooperative stand assessment (CSA):** The forest stand mapping and information system used by the Minnesota Department of Natural Resources to inventory the approximately five million acres (7,800 square miles) owned and administered by the state. The spatial information and stand attributes are now maintained in the Forest Inventory Module (FIM).

**Cord:** A pile of wood four feet high, four feet wide, and eight feet long, measuring 128 cubic feet, including bark and air space. Actual volume of solid wood may vary from 60 to 100 cubic feet, depending on size of individual pieces and how tight the wood is stacked. In the lake states, pulpwood cords are usually four feet x four feet x 100 feet and contain 133 cubic feet. Pulpwood volume of standing trees is estimated in cords. For example, a 10-inch DBH tree, which is 70 feet tall, is about 0.20 cords; or five trees of this size would equal one cord of wood.

**Corridor:** A defined tract of land connecting two or more areas of similar habitat type through which wildlife species can travel.

**Cover type:** Expressed as the tree species having the greatest presence (i.e., in terms of volume for older stands or number of trees for younger stands) in a forest stand. A stand where the major species is aspen would be called an aspen cover type.

**Cover type distribution:** The location and/or proportionate representation of cover types in a forest or a given geographic area.

**Critical habitat:** habitat or habitat elements that must be present and properly functioning to assure the continued existence of the species in question.

**Crop tree:** any tree selected or retained to be a component of a future commercial harvest.

**Cruise:** (v) A survey of forestland to locate timber and estimate its quantity by species, products, size, quality, or other characteristics. (n) An estimate derived from such a survey.

**Cubic foot:** A wood volume measurement containing 1,728 cubic inches, such as a piece of wood measuring one foot on a side. A cubic foot of wood contains approximately six to 10 usable board feet of wood. A cord of wood equals 128 cubic feet.

**Cultural resource:** An archaeological site, cemetery, historic structure, historic area, or traditional use area that is of cultural or scientific value.

**Desired future forest composition (DFFC):** Broad vision of landscape vegetation conditions in the long-term future. For the purposes of the initial round of subsection planning, DFFCs will focus on future desired forest composition looking ahead 50 years. DFFCs may include aspects like 1) the amount of various forest cover types within the subsection, 2) age-class distribution of forest cover types, 3) the geographic distribution of these across the subsection, and the related level of management for even-aged forest, 4) extended rotation forest, etc.

**Disturbance:** Any event, either natural or human induced, that alter the structure, composition, or functions of an ecosystem. Examples include forest fires, insect infestation, windstorms, and timber harvesting.

**Disturbance regime:** Natural or human-caused pattern of periodic disturbances, such as fire, wind, insect infestations, or timber harvest.

**Dominant trees:** Trees that are in the upper layer of the forest canopy, larger than the average trees in the stand.



**Early Successional Forest:** The forest community that develops immediately following a removal or destruction of vegetation in an area. Plant succession is the progression of plants from bare ground (e.g., after a forest fire or timber harvest) to mature forest consisting primarily of long-lived species such as sugar maple and white pine. Succession consists of a gradual change of plant and animal communities over time. Early successional forests commonly depend on and develop first following disturbance events (e.g., fire, windstorms, or timber harvest). Examples of *early successional forest* tree species are aspen, paper birch, and jack pine. Each stage of succession provides different benefits for a variety of species.

**Ecological classification system (ECS):** A method to identify, describe, and map units of land with different capabilities to support natural resources. This is done by integrating climatic, geologic, hydrologic, topographic, soil, and vegetation data. (See Appendix A.)

**Ecological evaluation:** A concise report containing descriptions of the significant natural features of a site, such as the flora, fauna, rare features, geology, soils, and any other factors that provide interpretation of the site's history, present state, and biodiversity significance. Management and protection recommendations are often included in these reports. Evaluations are produced by the Minnesota County Biological Survey (MCBS) at the completion of MCBS work in a given county or ecological classification system (ECS) subsection, and are generally reserved for those sites with the highest biodiversity significance in a geographic region, regardless of ownership.

**Ecological integrity:** In general, ecological integrity refers to the degree to which the elements of biodiversity and the processes that link them together and sustain the entire system are complete and capable of performing desired functions. Exact definitions of integrity are relative and may differ depending on the type of ecosystem being described.

**Ecologically important lowland conifers (EILC):** includes stands of black spruce, tamarack, and cedar, including stagnant lowland conifer stands, which are examples of high quality native plant communities (NPCs) that are representative of lowland conifer NPCs found in the subsections. The designated EILC stands will be reserved from treatment during this 10-year planning period. Future management/designation of these stands is yet to be determined.

**Ecosystem based management:** The collaborative process of sustaining the integrity of ecosystems through partnerships and interdisciplinary teamwork. Ecosystem based management seeks to sustain ecological health while meeting social and economic needs.

**Element Occurrence (EO):** An area of land and/or water where a rare feature (plant, animal, natural community, geologic feature, animal aggregation) is, or was present. An Element Occurrence Rank provides a succinct assessment of estimated viability or probability of persistence (based on condition, size, and landscape context) of occurrences of a given Element. An *Element Occurrence Record* is the locational and supporting data associated with a particular *Element Occurrence*. *Element Occurrence Records* for the State of Minnesota are managed as part of the rare features database by the Natural Heritage and Nongame Research Program. (*Draft definition 3/24/2004, Adapted from Biotics EO Standards: Chapter 2*)

**Endangered species:** A plant or animal species that is threatened with extinction throughout all or a significant portion of its range in Minnesota.

**Enhance:** To modify a vegetative community component for the purpose of favoring a certain function or value. For example, changing the structure of a degraded plant community to bring it closer to a native plant community.

**Even-aged:** A forest stand composed of trees of primarily the same age or age class. A stand is considered even-aged if the difference in age between the youngest and oldest trees does not exceed 20 percent of the rotation age (e.g., for a stand with a rotation age of 50 years, the difference in age between the youngest and oldest trees should be 10 years).

**Evenflow:** Providing a relatively consistent amount of timber (or other products) in successive management periods.

**Exotic species:** Any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem, and whose introduction does or is likely to cause economic or environmental harm or harm to human health.

**Extended rotation forests (ERF):** Forest stands for which the harvest age is extended beyond the normal or economic harvest age. ERF provides larger trees, old forest wildlife habitat, and other non-timber values. Additional detail regarding management of ERF on DNR-administered lands is contained in the DNR Extended Rotation Forest Guidelines (1994). **Prescribed ERF** is the cover type acreage designated for management as ERF. Stands designated as ERF will be held beyond the recommended normal rotation (harvest) age out to the established ERF rotation age(s). A stand of any age can be prescribed as ERF. **Effective ERF** is defined as the portion of the prescribed ERF acreage that is actually over the normal rotation age for the cover type at any one time.

**Extirpated:** The species is no longer found in this portion of its historical range.

**Fen:** Peatlands that receive water both from precipitation and ground water, which has percolated through mineral soil, are classified as *fens*. The water supply in a fen is only slightly acidic or nearly neutral, and it carries minerals and other nutrient content. Fens look like watery meadows, with sedges, reeds, grass-like plants, occasional shrubs, and scattered, stunted trees.

**Fine filter:** Management that focuses on the welfare of a single or only a few species rather than the broader habitat or ecosystem. For example, individual nests, colonies, and habitats are emphasized. A *fine filter* approach (Hunter, 1990) considers the specific habitat needs of selected individual species that may not be met by the broader coarse filter approach.

**Forest inventory and analysis (FIA):** A statewide forest survey of timber lands jointly conducted by the Minnesota Department of Natural Resources and the U.S. Department of Agriculture—Forest Service that periodically, through a system of permanent plots, assesses the current status of, and monitors recent trends in, forest area, volume, growth, and removals.

**Forest Inventory Module (FIM):** The FIM provides a database and application through which field foresters can maintain an integrated and centralized inventory of the forests on publicly owned lands managed by the Division of Forestry and other Divisions. In the field, foresters collect raw plot and tree data. Those data are summarized in stand-level data that are linked to a spatial representation of stand boundaries. Part of the DNR's **FOR**estry Information **Sys**Tem (FORIST).

**Forestland:** Consists of all lands included in the forest inventory from aspen and pine cover types to stagnant conifers, muskeg, lowland brush, and lakes.

**Forest management:** The practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization, and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest. Note: forest management includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, and other forest resource values.

From: The Dictionary of Forestry. 1998. The Society of American Foresters. J.A. Helms, ed.

**Forest road:** A temporary or permanent road connecting the remote parts of the forest to existing public roads. Forest roads provide access to public land for timber management, fish and wildlife habitat improvement, fire control, and a variety of recreational activities. The Division of Forestry has three classifications for roads and access routes:

**System roads** - These roads are the major roads in the forest that provide forest management access, recreational access and may be connected to the state, county, or township public road systems. These roads are used at least on a weekly basis and often used on a daily basis. The roads should be graveled and maintained to allow travel by highway vehicles, and road bonding money can be used to fund construction and reconstruction of these types of roads. The level and frequency of maintenance will be at the discretion of the Area Forester and as budgets allow.

**Minimum maintenance roads** - These roads are used for forest management access on an intermittent, as-needed basis. Recreational users may use them, but the roads are not promoted or maintained for recreation. The roads will be open to all motorized vehicles but not maintained to the level where low clearance licensed highway vehicles can travel routinely on them. The roads will be graded and graveled as needed for forest management purposes. Major damage such as culvert washouts or other conditions that may pose a safety hazard to the public will be repaired as reported and budgets allow.

**Temporary access** – If the access route does not fit into one of the first two options, the access route has to be abandoned and the site reclaimed so that evidence of a travel route is minimized. The level of effort to effectively abandon temporary accesses will vary from site to site depending on location of the access (e.g., swamp/winter vs. upland route), remoteness, and existing recreational use pressures.

**Forest stand:** A group of trees occupying a given area and sufficiently uniform in species composition, age, structure, site quality, and condition so as to be distinguishable from the forest on adjoining areas.

**FORIST:** The **FOR**estry **IN**formation **Sys**tem (FORIST) is a collection of integrated spatial applications and datasets supporting day-to-day operations across the Division of Forestry. The first two parts of the system are in operation: Forest Inventory Module (FIM) and Silviculture and Roads Module (SRM). A Timber Sales Module is scheduled to be operational in 2006.

**Fragmentation:** Breaking up of large and contiguous ecosystems into patches separated from each other by different ecosystem types. Breaking up a contiguous or homogeneous natural habitat through conversion to different vegetation types, age classes, or uses.

**Forest fragmentation** occurs in landscapes with distinct contrasts between land uses, such as between woodlots and farms. **Habitat fragmentation** occurs where a contiguous or homogeneous forest area of a similar cover type and age is broken up into smaller dissimilar units. For example, a conifer-dominated forest (or portion of it) is fragmented by clearcutting if it is converted to another type, such as an aspen-dominated forest.

**Fully stocked stand:** A forest stand in which all the growing space is effectively occupied but having ample space for development of the crop trees.

**Game Species:** In this plan, *game* species include those terrestrial species that are hunted and trapped.

**Gap:** the space occurring in forest stands due to individual tree or groups of trees mortality or blowdown. *Gap management* uses timber harvest methods to emulate this type of forest spatial pattern.

**Geographic information system (GIS):** Computer software used to manipulate, analyze, and visually display inventory and other data and prepare maps of the same data.

**Group selection:** A process of harvesting patches of selected trees to create openings in the forest canopy and to encourage reproduction of uneven-aged stands.

**Growth stage:** Growth stages of native plant communities as presented in the *Field Guide to the Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province* are periods of stand maturation where the mixture of trees in the canopy is stable. Growth stages are separated by periods of transition where tree mortality is high and different among the species, usually involving the death of early successional species and replacement by shade-tolerant species or longer-lived species.

**Habitat:** An area in which a specific plant or animal normally lives, grows and reproduces; the area that provides a plant or animal with adequate food, water, shelter and living space.

**Herbivory:** Plant communities resulting from the browsing and grazing of wildlife. A plant-animal interaction whereby an organism eats some or all of a plant and the plant responds immediately (stress, decline or death) or over time (evolutionary adaptation). Herbivory occurs both above and below ground. As defined for the issues concerned with herbivory in the plan; the influence by dominant herbivores on forest composition, structure, forest dynamics and spatial patterns. Dominant herbivores include beaver, deer, moose, hares, rabbits, small mammals, and forest tent caterpillars.

**High quality native plant community:** A community that has experienced relatively little human disturbance, has few exotic species, and supports the appropriate mix of native plant species for that community. A high quality native plant community may be unique or have a limited occurrence in the subsection, have a known association with rare species, or an exemplary representative of the native plant community diversity prior to European settlement.

**High-risk, low-volume (HRLV):** HRLV stands are identified based on one or more of the following: 1) stands coded as high risk in CSA forest inventory, 2) significant insect or disease damage to the main species in the stand, 3) stands over normal rotation age at time of survey with total stand volume eight cords per acre (low volume), 4) or very old stand, e.g., aspen over 80 years old.

**Intensive management:** Intensity of management refers to the degree of disturbance associated with silvicultural treatments. In this plan, references to it range from less intensive to more intensive management. Examples of more intensive management are: 1) Site preparation techniques such as rock-raking that disrupts the soil profile and leaves coarse woody debris in piles; 2) broadcast herbicide use that eliminates or dramatically reduces herbaceous plant and shrub diversity; 3) Conversions of mixed forest stands through clearcutting and/or site preparation that result in the establishment of a more simplified monotypic stand such as mostly pure aspen regeneration or high-density pine plantations. Examples where more intensive management may be needed are: to regenerate a site successfully to a desired species, control of insect or disease problems, and wildlife habitat management (e.g., maintenance of wildlife openings).

**Intermediate cut:** The removal of immature trees from the forest sometime between establishment and major harvest with the primary objective of improving the quality of the remaining forest stand.

**Issue:** A natural resource-related concern or conflict that is directly affected by, or directly affects, decisions about the management of vegetation on lands administered by the Minnesota Department of Natural Resources (DNR)—Divisions of Forestry and Fish and Wildlife. Relevant issues will likely be defined by current, anticipated, or desired resource conditions and trends, threats to resources, and vegetation management opportunities. The key factor in determining the importance of issues for SFRMP is whether vegetation management issues can address the issue in whole or substantial part on DNR-administered lands.

**Landform:** Any physical, recognizable form or feature of the earth's surface, having a characteristic shape, and produced by natural causes. Examples of major landforms are plains, plateaus, and mountains. Examples of minor landforms are hills, valleys, slopes, eskers, and dunes. Together, landforms make up the surface configuration of the earth. The "landform" concept involves both empirical description of a terrain (land-surface form) class and interpretation of genetic factors ("natural causes"). (An Ecological Land Classification Framework for the United States. 1984. p. 40)

**Landscape:** A general term referring to geographic areas that are usually based on some sort of natural feature or combination of natural features. They can range in scale from very large to very small. Examples include watersheds (from large to small), the many levels of the Ecological Classification System (ECS), and Minnesota Forest Resources Council (MFRC) regional landscapes. The issue being addressed usually defines the type and size of landscape to be used.

**Landscape region:** A geographic region that is defined by similar landforms, soils, climatic factors, and potential native vegetation. The landscape region used for this planning effort is the subsection level of the Ecological Classification System.

**Land Type Association:** Divisions within Subsections that are delineated using glacial landforms, bedrock types, topographic roughness lake and stream distributions, wetland patterns, depth to the groundwater table, soil parent material, and pre-European settlement vegetation.

**Landscape study area (LSA):** A large geographic area identified by the Minnesota County Biological Survey (MCBS) as a core area for the MCBS survey process in northern Minnesota. The LSA is intended to represent some of the landscapes within an ecological subsection (a unit in Minnesota's Ecological Classification System). A LSA 1) generally captures the range of environmental gradients and ecological conditions found in large landscapes, 2) generally encompasses the range of native plant community complexes which exhibit repeatable patterns at the landform or ecological landtype association (LTA) scale, 3) exhibits the potential for intact landscape-level processes to occur, 4) contains representative native plant communities functioning under relatively undisturbed conditions, and 5) often contains habitat for rare species. An LSA area is typically thousands of acres and contains two to several MCBS sites. An LSA may encompass portions of one or more ecological landtype associations (LTAs) and lie in more than one county. LSAs are identified prior to MCBS field surveys and boundaries are modified during the survey process. At the completion of the MCBS surveys, an LSA becomes a macrosite, two or more sites, or a combination of macrosites and sites. In some cases an LSA is eliminated from further survey consideration during the MCBS survey process.

**Leave trees:** Live trees selected to remain on a site to provide present and future benefits, such as shelter, resting sites, cavities, perches, nest sites, foraging sites, mast, and coarse woody debris.

**Legacy patch:** An area within a harvest unit that is excluded from harvest; this area is representative of the site and is to maintain a source area for recolonization, gene pool maintenance, and establishment of microhabitats for organisms that can persist in small patches of mature forest.

**Macrosite:** A large area, generally thousands of acres, containing two or more sites that have some geographical and ecological connection relevant to conservation planning. MCBS sites within a macrosite are generally close to one another but are not necessarily contiguous. Thus, macrosites may contain some disturbed areas. In northern Minnesota, MCBS macrosites correspond to the final (post field-evaluation) boundaries of LSAs. (Areas less than 2000 acres formerly labeled "preserve designs " are also macrosites).

**Managed acres:** Timberland acres that are available for timber management purposes.

**Management pool:** In this plan, the acres available for timber management purposes.

**Marketable timber:** Merchantable timber that is accessible now.

**Mast:** Nuts, seeds, catkins, flower buds, and fruits of woody plants that provide food for wildlife.

**Mature tree:** A tree that has reached the desired size or age for its intended use. Size or age will vary considerably depending on the species and the intended use.

**Maximum rotation age:** In this plan, the maximum age at which a forest cover type will retain its biological ability to regenerate to the same cover type and remain commercially viable as a marketable timber sale.

**Mean annual increment (MAI):** Average annual growth of a stand up to a particular age. It is calculated by dividing yield at that age by the age itself (e.g., the mean annual increment for a stand at age 50 with 25 cords per acre total volume:  $25 \div 50 \text{ years} = 0.5 \text{ cords per year}$ ).

**Merchantable timber:** Trees or stands having the size, quality, and condition suitable for marketing under a given economic condition, even if not immediately accessible for logging.

**Mesic:** Moderately moist.

**MCBS Sites:** Areas of land identified by Minnesota County Biological Survey (MCBS) staff, ranging from tens to thousands of acres in size, selected for survey because they are likely to contain relatively undisturbed native plant communities, large populations and/or concentrations of rare species, and/or critical animal habitat. The MCBS site provides a geographic framework for recording and storing data and compiling descriptive summaries.

**Minnesota forest resources plan (MFRP):** Statewide DNR strategic forest resources plan. Includes statewide vision, mission, preferred future, goals, strategies and objectives. For each of the Division's programs, it includes goals, statewide direction, and major strategies and objectives.

**Minnesota TAXA:** Minnesota Taxonomy Database maintained by the Division of Ecological and Water Resources.

**Minnesota Wildlife Resource Assessment Project (MNWRAP):** A wildlife species database and related information system that provides the overall data management, framework, analysis functions, and long-term support for statewide, landscape, and site-level wildlife resource assessment efforts. It will cover the total spectrum of wildlife diversity and habitat associations in Minnesota.

**Mixed forest or stand:** A forest or stand composed of two or more prominent species.

**Mixed forest conditions:** In this plan, refers to vegetative composition and structure that is moving toward the mix and relative proportion (e.g., dominated by, common, occasional, or scattered) of species found in the native plant community for that site. Tree species mix and proportion depends not only on the targeted growth stage (based on the rotation age for the desired cover type) but also species found in older growth stages.

**Mortality:** Death or destruction of forest trees as a result of competition, disease, insect damage, drought, wind, fire, or other factors.

**Multi-aged stand:** A stand with two or more age classes.

**Multiple use:** Using and managing a forested area to provide more than one benefit simultaneously. Common uses may include wildlife, timber, recreation, and water.

**Native plant community:** A group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plants form recognizable units, such as an oak forest, prairie, or marsh that tend to reoccur over space and time. Native plant communities are classified and described by physiognomy, hydrology, landforms, soils, and natural disturbance regimes (e.g., wild fires, wind storms, normal flood cycles).

**Natural Area:** An area of land, with significant native biodiversity, where a primary goal is to protect, enhance or restore ecological processes and Native Plant Community composition and structure. An MCBS site of Outstanding or High biodiversity significance is often recommended for nomination as a natural area. For these MCBS sites, an MCBS *Ecological Evaluation* is written to characterize the ecological significance of the MCBS site as a whole and to serve as a guide for conservation action by the various landowners. MCBS sites (or portions of MCBS sites) that are recommended as natural areas may be identified by the landowner or land management agency for conservation activities such as designation as a (city, county, state, private) park, non-motorized recreation area, scientific and natural area, reserve, special vegetation management (e.g., natural disturbance based forest management for maintenance of mature growth stage), etc. (*Draft definition 3/24/2004*)

**Natural Area Registry (NAR) Agreement:** a memorandum of understanding between the Ecological and Water Resources Division and another governmental unit. The other governmental unit can be Division of Forestry, Fish and Wildlife, or Parks and Trails, depending on who the land administrator is for the parcel in question. It can also be city, county, tribal, or federal government. The NAR generally identifies the site, explains its significance, sets a proposed management direction, and states that before any management contrary to that direction occurs, the parties will get together and talk about it first. It is not a binding agreement. Examples of NAR's: an old-growth yellow birch stand in Crosby-Manitou State Park; the South Fowl Lake cliff community on Division of Forestry land in Cook County; and a ramshead orchid site on Hubbard County land.

**Natural disturbances:** Disruption of existing conditions by natural events such as wildfires, windstorms, drought, flooding, insects, and disease. May range in scale from one tree to thousands of acres.



**Natural regeneration:** The growth of new trees from one of the following ways: (a) from seeds naturally dropped from trees or carried by wind or animals, (b) from seeds stored on the forest floor, or (c) from stumps that sprout or roots that sucker.

**Natural spatial patterns:** refers to the size, shape, and arrangement of patches in forested landscapes as determined primarily by natural disturbance and physical factors.

**Non-forestland:** Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses such as crops, improved pasture, residential areas, city parks, improved roads, and power line clearings.

**Nongame species:** In this plan, *nongame species* include amphibians, reptiles, and those mammal and bird species that are not hunted or trapped.

**Non-timber forest products:** Non-timber Forest Products, also known as special forest products, can be categorized into five general areas: foods, herbs, medicinals, decoratives and specialty items. Special forest products might include berries, mushrooms, boughs, bark, Christmas trees, lycopodium, rose hips and blossoms, diamond willow, birch tops, highbush cranberries, burls, conks, Laborador tea, seedlings, cones, nuts, aromatic oils, extractives.

**Normal rotation age:** For even-aged managed cover types, the rotation age set by the SFRMP Team for non-ERF timberland acres. It is based on the culmination of mean annual increment (CMAI), other available data related to forest productivity that also considers wood quality, and local knowledge.

**Old forest:** A forest stand of any particular forest cover type is considered old forest whenever its age exceeds the normal rotation age established by the landscape team for that cover type. In this plan, it does not include designated old-growth, state park lands, etc.

**Old forest conditions:** forest that has the age and structural conditions typically found in mature to very old forests, such as large diameter trees, large snags, downed logs, mixed species composition, and greater structural diversity. These older forest conditions typically develop at stand ages greater than the normal rotation ages identified for even-aged managed forest cover types.

**Old forest management complex:** Represents an area of land, made up of several to many stands that are managed for old-growth, special management zone (SMZ), and extended rotation forest (ERF) in the vicinity of designated old-growth stands.

**Old-growth forests:** Forests defined by age, structural characteristics, and relative lack of human disturbance. These forests are essentially free from catastrophic disturbances, contain old trees (generally over 120 years old), large snags, and downed trees. Additional details on the management of old-growth forests on DNR-administered lands are contained in *Old-Growth Forests Guidelines* (1994) and amendments.

**Operational planning:** What specifically will happen. The specific actions (i.e., projects, programs, etc.) that will be taken to move toward the desired future established by the various sources of strategic direction. Examples include stand examination lists, road projects, recreational trail/facilities projects, staffing, annual work plan targets, etc. Operational planning is also referred to as tactical planning.

**Overmature:** A tree or even-aged stand that has reached an age where it is declining in vigor and health and reaching the end of its natural life span resulting in a reduced commercial value because of size, age, decay, and other factors.

**Overstocked:** The situation in which trees are so closely spaced that they are competing for resources, resulting in less than full growth potential for individual trees.

**Overstory:** The canopy in a stand of trees.

**Partial cut:** A cutting or harvest of trees where only some of the trees in a stand are removed.

**Patch:** An area of forest that is relatively homogenous in structure, primarily in height and stand density, and differs from the surrounding forest. It may be one stand or a group of stands.

**Plantation:** A stand composed primarily of trees established by planting or artificial seeding.

**Prescribed burn:** To deliberately burn wildlands (e.g., forests, prairie or savanna) in either their natural or modified state and under specified conditions within a predetermined area to meet management objectives for the site. A fire ignited under known conditions of fuel, weather, and topography to achieve specific objectives.

**Prescription:** A planned treatment (clear-cut, selective harvest, thin, reforest, reserve, etc.) designed to change current stand structure to one that meets management goals. A written statement that specify the practices to be implemented in a forest stand to meet management objectives. These specifications reflect the desired future condition at the site and landscape level and incorporate knowledge of the special attributes of the site.

**Pulpwood:** Wood cut or prepared primarily for manufacture into wood pulp or chips, for subsequent manufacture into paper, fiber board, or chip board. Generally, trees five to 12 inches diameter at breast height are used.

**Pure forest or stand** is defined as composed principally of one species, conventionally at least 80 percent based on numbers, basal areas, or volumes.

**Range of natural variation (RNV):** Refers to the expected range of conditions (ecosystem structure and composition) to be found under naturally functioning ecosystem processes (natural climatic fluctuations and disturbance cycles such as fire and windstorms). RNV provides a benchmark (range of reference conditions) to compare with current and potential future ecosystem conditions.

**Rare Features Database** is maintained by the Natural Heritage and Nongame Research Program and is comprised of locational records of the following features:

**Animal aggregations.** Certain types of animal aggregations, such as nesting colonies of waterbirds (herons, egrets, grebes, gulls and terns), bat hibernacula, prairie chicken booming grounds, and winter bald eagle roosts are tracked regardless of the legal status of the species that comprise them. The tendency to aggregate makes these species vulnerable because a single catastrophic event could result in the loss of many individuals.

**Geologic features.** Noteworthy examples of geologic features throughout Minnesota are tracked if they are unique or rare, extraordinarily well preserved, widely documented, highly representative of a certain period of geologic history, or very useful in regional geologic correlation.

**Natural communities.** Natural communities are functional units of landscape that are characterized and defined by their most prominent habitat features - a combination of vegetation, hydrology, landform, soil, and natural disturbance cycles. Although natural communities have no legal protection in Minnesota, the Natural Heritage and Nongame Research Program and the Minnesota County Biological Survey have evaluated and ranked community types according to their relative rarity and endangerment throughout their range. Locations of high quality examples are tracked in the Rare Features Database.

**Rare plants.** Rare plants tracked are all species that are listed as Federally endangered, threatened or as candidates for Federal listing; all species that are State listed as endangered, threatened or special concern. Several rare species are also tracked which currently have no legal status but need further monitoring to determine their status.

**Rare animals.** All animal species that are listed as Federally endangered or threatened (except the gray wolf) are tracked, as well as all birds, small mammals, reptiles, amphibians, mussels, and butterflies that are listed as State endangered, threatened or special concern.

**Rare species:** A plant or animal species that is designated as **endangered**, **threatened**, or a species of **special concern** by the state of Minnesota (this includes all species designated as endangered or threatened at the federal level), or an uncommon species that does not (yet) have an official designation, but whose distribution and abundance need to be better understood.

**Refuge/refugia:** Area(s) where plants and animals can persist through a wind and/or fire event.

**Regeneration:** The act of renewing tree cover by establishing young trees naturally (e.g., stump sprouts, root suckers, natural seeding) or artificially (e.g., tree planting, seeding).

**Regional landscapes (MFRC):** The Minnesota Forest Resources Council (MFRC) established eight regional landscapes covering Minnesota based on ecological, socio-economic, and administrative factors. These landscapes were established to undertake landscape based planning and coordination across all forest ownerships.

**Release:** Freeing a tree, or group of trees, from competition that is overtopping or closely surrounding them.

**Releve':** Vegetation survey plot.

**Reserved forestland:** Forestland withdrawn from timber utilization through statute, administrative regulation, or designation.

**Restore:** To return a stand, site, or ecosystem to its original structure and species composition through active management actions.

**Riparian area:** The area of land and water forming a transition from aquatic to terrestrial ecosystems along streams, lakes, and open water wetlands.

**Riparian management zone (RMZ):** That portion of the riparian area where site conditions and landowner objectives are used to determine management activities that address riparian resource needs. It is the area where riparian guidelines apply.

**Rotation age:** The period of years between when a forest stand (i.e., primarily even-aged) is established (i.e., regeneration) and when it receives its final harvest. This time period is an administrative decision based on economics, site condition, growth rates, and other fact

**Salvage cut:** A harvest made to remove trees killed or damaged by fire, wind, insects, disease, or other injurious agents. The purpose of salvage cuts is to use available wood fiber before further deterioration occurs to recover value that otherwise would be lost.

**Sanitation cut:** A cutting made to remove trees killed or injured by fire, insects, disease, or other injurious agents (and sometimes trees susceptible to such injuries), for the purpose of preventing the spread of insects or disease.

**Sapling:** A tree that is one to five inches in diameter at breast height.

**Sawlog:** A log large enough to produce lumber or other products that can be sawed. Its size and quality vary with the utilization practices of the region.

**Sawtimber:** Trees that yield logs suitable in size and quality for the production of lumber.

**Scarify:** To break up the forest floor and topsoil preparatory to natural regeneration or direct seeding.

**Scientific and natural area (SNA):** Areas established by the Minnesota Department of Natural Resources, Division of Ecological and Water Resources, to preserve natural features and rare resources of exceptional scientific and educational value.

**Seedbed:** The soil or forest floor on which seed falls.

**Seed tree:** Any tree that bears seed; specifically, a tree left standing to provide the seed for natural regeneration.

**Selective harvest:** Removal of single scattered trees or small groups of trees at relatively short intervals. The continuous establishment of reproduction is encouraged and an all-aged stand is maintained. A management option used for shade-tolerant species.

**Shade tolerance:** Relative ability of a tree species to reproduce and grow under shade. The capacity to withstand low light intensities caused by shading from surrounding vegetation. Tolerant species tolerate shade, while intolerant species require full sunlight.

**Shelterwood harvest:** A harvest cutting in which trees on the harvest area are removed in a series of two or more cuttings to allow the establishment and early growth of new seedlings under partial shade and protection of older trees. Produces an even-aged forest.

**Silviculture:** The art and science of establishing, growing, and tending stands of trees. The theory and practice of controlling the establishment, composition, growth, and quality of forest stands to achieve certain desired conditions or management objectives.

**Silviculture and Roads Module (SRM):** The SRM provides a database and application through which field foresters can record planned and actual forest development prescriptions (e.g., site preparation, tree planting projects, timber harvest, road maintenance, etc.) and follow-up surveys. SRM supports the geographic description of the extent of a development project separate from FIM stand boundaries. A variety of maps and other reports can be generated by the development system. SRM will also produce maps and reports that roll up forestry area data to the regional or statewide level. Part of the DNR's **FOR**estry Information **Sys**Tem (FORIST).

**Site index (SI) :** A species-specific measure of actual or potential forest productivity or site quality, expressed in terms of the average height of dominant trees at specific key ages, usually 50 years in the eastern U.S.

**Site preparation:** Treatment of a site (e.g., hand or mechanical clearing, prescribed burning, or herbicide application), to prepare it for planting or seeding and to enhance the success of regeneration.

**Site productivity:** The relative capacity of a site to sustain a production level over time. The rate at which biomass is produced per unit area. For example, cords per acre growth of timber.

**Size class:** A category of trees based on diameter class. The DNR's forest inventory has size classes such as Size Class 1 = 0 - 0.9 inch diameter; 2 = 1 - 2.9 inches diameter; 3 = 3 - 4.9 inches; 4 = 5 - 8.9 inches; 5 = 9 - 14.9 inches, etc. Also, size class may be referred to as seedling, sapling, pole timber, and saw timber.

**Slash:** The non-utilized and generally unmarketable accumulation of woody material in the forest, such as limbs, tops, cull logs, and stumps, that remain in the forest as residue after timber harvesting.

**Snag:** A standing dead tree.

**Soil productivity:** The capacity of soils, in its normal environment, to support plant growth.

**Special concern species:** A plant or animal species that is extremely uncommon in Minnesota, or has a unique or highly specific habitat requirements, and deserves careful monitoring. Species on the periphery of their ranges may be included in this category, as well as species that were once threatened or endangered but now have increasing, or stable and protected, populations.

**Special management zone (SMZ):** A buffer immediately surrounding designated old-growth forest stands. It is intended to minimize edge effects and windthrow damage to old-growth stands. Minimum width is 330-feet from the edge of the old-growth stand. Timber harvest is allowed in the SMZ, but there are limitations on how much can be clearcut at any given time.

**Species of Greatest Conservation Need:** Animals whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long term health and stability.

**Stand:** A contiguous group of vegetation similar in age, species composition, and structure, and growing on a site of similar quality, to be a distinguishable unit. A forest is comprised of many stands. A **pure stand** is composed of essentially a single species, such as a red pine plantation. A **mixed stand** is composed of a mixture of species, such as a northern hardwood stand consisting of maple, birch, basswood, and oak. An **even-aged stand** is one in which all of the trees present are essentially the same age, usually within 10 years of age for aspen and jack pine stands. An **uneven-aged stand** is one in which a variety of ages and sizes of trees are growing together on a uniform site, such as a northern hardwood stand with three or more age classes.

**Stand age:** In the DNR's forest inventory, the average age of the main species within a stand.

**Stand density:** The quantity of trees per unit area. Density usually is evaluated in terms of basal area, numbers of trees, volume, or percent crown cover.

**Stand examination list:** DNR forest stands to be considered for treatment (e.g., harvest, thinning, regeneration, prescribed burning, reinventory, etc.) over the planning period based on established criteria (e.g., rotation age, site index, basal area, desired future cover type composition, etc.). These stands will be assigned preliminary prescriptions and most will receive the prescribed treatment. However, based on field appraisal visit, prescriptions may change for some stands because of new information on the stand or its condition.

**Stand selection criteria:** Criteria used to help identify stands to be treated as determined by the subsection team. Criteria will likely be based on include rotation ages, site index, basal area, cover type composition, understory composition, location, etc. Factors considered in developing stand selection criteria will include 1) desired forest composition goals, 2) timber growth and harvesting, 3) old-growth forests, 4) extended and normal rotation forests, 5) riparian areas, 6) wildlife habitat, 7) age and cover type distributions, 8) regeneration, 9) thinning and 10) prescribed burning needs, and 11) etc.

**State forest road:** Any permanent road constructed, maintained, or administered by the Minnesota Department of Natural Resources for the purposes of accessing or traversing state forestlands.

**Stocking:** An indication of the number of trees in a stand as compared to the desirable number for best growth and management, such as well stocked, overstocked, and partially stocked. A measure of the proportion of an area actually occupied by trees.

**Strategic planning:** A process to plan for desired future states. Includes aspects of a plan or planning process that provide statements and guides for future direction. The geographic, programmatic, and policy focus can range from very broad and general to more specific in providing tiers/levels of direction. Strategic planning is usually long-term (i.e., at least five years, often longer). Usually includes an assessment of current trends and conditions (e.g., social, natural resource, etc.), opportunities and threats; identification of key issues; and the resulting development of goals (e.g., desired future conditions), strategies, and objectives. Vision and mission statements may also be included.

**Stumpage:** The value of a tree as it stands in the forest uncut. Uncut trees standing in the forest.

**Stumpage price:** The value that a timber appraiser assigns to standing trees or the price a logger or other purchaser is willing to pay for timber as it is in the forest.

**Subsection:** A subsection is one level within the Ecological Classification System (ECS). From largest to smallest in terms of geographic area, the ECS is comprised of the following levels: Province --> Section --> **Subsection** --> Land Type Association --> Land Type --> Land Type Phase. Subsections areas are generally one to four million acres in Minnesota, with the average being 2.25 million acres. Seventeen subsections are scheduled for the SFRMP process.

**Subsection forest resource management plan (SFRMP):** A Department of Natural Resources (DNR) plan for vegetation management on forestlands administered by DNR Divisions of Forestry and Fish and Wildlife that uses ECS subsections as the basic unit of delineation. Initial focus will be to identify forest stands and road access needs for the duration of the 10-year plan. There is potential to be more comprehensive in the future.

**Succession:** The natural replacement, over time, of one plant community with another.

**Sucker:** A shoot arising from below ground level from a root. Aspen regenerates from suckers.

**Suppressed:** The condition of a tree characterized by low growth rate and low vigor due to competition from overtopping trees or shrubs.

**Sustainability:** Protecting and restoring the natural environment, while enhancing economic opportunity and community well-being. Sustainability addresses three related elements: the environment, the economy, and the community. The goal is to maintain all three elements in a healthy state indefinitely. Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

**Sustainable treatment level:** A treatment level (e.g., harvest acres per year) that can be sustained over time at a given intensity of management without damaging the forest resource base or compromising the ability of future generations to meet their own needs. Treatment levels may need to be varied above and/or below the sustainable treatment level until the desired age-class structure or stocking level is reached.

**Tactical planning:** See operational planning.

**Temporary access:** A temporary access route for short-term use that will not be needed for foreseeable future forest management activities. It is usually a short, temporary, dead-end access route.

**Thermal cover:** Habitat component (e.g., conifer stands such as white cedar, balsam fir, and jack pine) that provides wildlife protection from the cold in the winter and heat in the summer.  
Vegetative cover used by animals against the weather.

**Thinning:** A silvicultural treatment made to reduce the density of trees within a forest stand primarily to improve growth, enhance forest health, or recover potential mortality. **Row thinning** is where selected rows are harvested, usually the first thinning, which provides equipment operating room for future selective thinnings. **Selective thinning** is where individual trees are marked or specified (e.g., by diameter, spacing, or quality) for harvest. **Commercial thinning** is thinning after the trees are of merchantable size for timber markets. **Pre-commercial thinning** is done before the trees reach merchantable size, usually done in overstocked (very high stems per acre) stands to provide more growing space for crop trees that will be harvested in future years.

**Threatened species:** A plant or animal species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range in Minnesota.

**Timberland:** Forestland capable of producing timber of a marketable size and volume at the normal harvest age for the cover type. It does not include lands withdrawn from timber utilization by statute (e.g., Boundary Waters Canoe Area Wilderness) or administrative regulation such as designated old-growth forest and state parks. On state forestlands this includes stands that can produce at least three cords per acre of merchantable timber at the normal harvest age for that cover type. It does not include very low productivity sites such as those classified as stagnant spruce, tamarack, and cedar, offsite aspen, or non-forestland.

**Timber management plan:** If used with the SFRMP process, a timber management plan means the same thing as the vegetation management plan described below.

**Timber management planning (TMP):** Successor to the TMP information system (TMPIS). Recognizes the entire timber management planning process as being more than just the computerized system. Incorporates GIS technology and an interactive process with other resource managers.

**Timber management planning information system (TMPIS):** Circa mid-1980s. Original computerized system for developing 10-year stand treatment prescriptions by area.



**Timber productivity:** The quantity and quality of timber produced on a site. The rate at which timber volume is produced per unit area over a period of time (e.g., cords per acre per year). The relative capacity of a site to sustain a level of timber production over time.

**Timber stand improvement (TSI):** A practice in which the quality of a residual forest stand is improved by removing less desirable trees and large shrubs to achieve the desired stocking of the best quality trees or to improve the reproduction, composition, structure, condition, and volume growth of a stand.

**Tolerant:** A plant capable of becoming established and growing beneath overtopping vegetation. A tree or seedling capable of growing in shaded conditions.

**Two-aged stand:** a stand with trees of two distinct age classes separated in age by more than 20 percent of the rotation age.

**Underplant:** The planting of seedlings under an existing canopy or overstory.

**Understocked:** A stand of trees so widely spaced that even with full growth potential realized, crown closure will not occur.

**Understory:** The shorter vegetation (shrubs, seedlings, saplings, small trees) within a forest stand that forms a layer between the overstory and the herbaceous plants of the forest floor.

**Uneven-aged management:** Forest management that results in forest stands comprised of intermingling trees or small groups that have three or more distinct age classes. Best suited for shade tolerant species.

**Uneven-aged stand:** A stand of trees of a variety of ages and sizes growing together on a uniform site. A stand of trees having three or more distinct age classes.

**Variable density:** Thinning or planting in a clumped or dispersed pattern so that tree spacing more closely replicates patterns after natural disturbance (e.g., use gap management, vary the residual density within a stand when thinning, or plant seedlings at various densities within a plantation).

**Variable retention:** a harvest system based on the retention of structural elements or biological legacies (e.g., retain tree species and diameters present at older growth stages, snags, large downed logs, etc.) from the harvested stand for integration into the new stand to achieve various ecological objectives. **Aggregate retention** retains these structural elements in small patches or clumps within the harvest unit. **Dispersed retention** retains these structural elements as individual trees scattered throughout the harvest unit.

**Vegetation growth stage:** The vegetative condition of an ecosystem resulting from natural succession and natural disturbance, expressed as vegetative composition, structure and years since disturbance. The vegetation growth stage describes both the successional changes (i.e., the change in the presence of different tree species over time) and developmental changes (i.e., the change in stand structure overtime due to the regeneration, growth, and mortality of trees). Vegetation growth stages express themselves along the successional pathways for a particular ecosystem depending on the type and level of natural disturbance that has occurred. Forest tree and other vegetation composition, habitat features, and wildlife species use change with the various growth stages.

**Vegetation management plan:** In the process of developing the 10-year stand examination list, many decisions and considerations go beyond identifying what timber will be cut (i.e., broader than timber management). This includes designation of old-growth forests, extended rotation forests, ecologically important lowland conifers, patches, special management areas, visually sensitive travel corridors, etc., all of which are intended to address wildlife habitat, biodiversity, aesthetic, and other concerns. Prescriptions assigned to stands reflect decisions based on these multiple considerations and are broader than decisions relative to final harvest (e.g., ERF designation, uneven-aged management, thinning, regeneration, underplanting, prescribed burning, etc.).

**Viable populations:** The number of individuals of a species sufficient to ensure the long-term existence of the species in natural, self-sustaining populations that are adequately distributed throughout their range.

**Volume:** The amount of wood in a tree or stand according to some unit of measurement (board feet, cubic feet, cords), or some standard of use (pulpwood, sawtimber, etc.).

**Well stocked:** The situation in which a forest stand contains trees spaced widely enough to prevent competition yet closely enough to utilize the entire site.

**Wildlife management area (WMA):** Areas established by the Department of Natural Resources, Section of Wildlife, to manage, preserve and restore natural communities, perpetuate wildlife populations, and provide recreational and educational opportunities.

**Windthrow:** A tree pushed over by the wind. Windthrows are more common among shallow-rooted species.

## 6.17 Appendix Q. Acronyms

AFRMP	Area Forest Resource Management Plan
AMA	Aquatic Management Area
AP	Aspen Parklands
BMP	Best Management Practices
CMAI	Culmination of Mean Annual Increment
CSA	Cooperative Stand Assessment
CWCS	Comprehensive Wildlife Conservation Strategy
DBH	Diameter at Breast Height
DFC	Desired Future Condition
DFFC	Desired Future Forest Composition
DNR	Department of Natural Resources
DRS	Data Resource Site
EAB	Emerald Ash Borer
ECS	Ecological Classification System
EERF	Effective Extended Rotation Forestry
EILC	Ecologically Important Lowland Conifers
ERF	Extended Rotation Forestry
ETS	Endangered, Threatened, or Special Concern
FIA	Forest Inventory and Analysis
FIM	Forest Inventory Module
FORIST	Forest Information System
FY	Fiscal Year
GAP	Gap Analysis Program
GDS	General Direction Statements
GIS	Geographic Information System
HCVF	High Conservation Value Forest
HRLV	High Risk/Low Volume
LCMR	Legislative Committee on Minnesota Resources
LSA	Landscape Study Area
LTA	Land Type Association
MAI	Mean Annual Increment
MBF	Metric Board Foot
MCBS	Minnesota County Biological Survey
MFRC	Minnesota Forest Resources Council
MFRP	Minnesota Forest Resources Plan
MnWRAP	Minnesota Wildlife Resource Assessment Project
MRA	Maximum Rotation Age
NAR	Natural Area Registry Agreement
NPC	Native Plant Community
NRA	Normal Rotation Age
OFMC	Old Forest Management Complex

OG	Old Growth
OLA	Open Landscape Area
RMZ	Riparian Management Zone
RNV	Range of Natural Variability
RSA	Representative Sample Area
RSPS	Remsoft Spatial Planning System
SFRMP	Subsection Forest Resource Management Plan
SGCN	Species in Greatest Conservation Need
SI	Site Index
SMA	Special Management Area
SMZ	Special Management Zone
SNA	Scientific and Natural Area
SPP	Species
SRM	Silviculture and Roads Module
SWG	State Wildlife Grants
TMP	Timber Management Plan
TMPIS	Timber Management Plan Information System
TNC	The Nature Conservancy
TSI	Timber Stand Improvement
TSM	Timber Sales Module
USDA-FS	U.S. Department of Agriculture Forest Service
USDA-APHIS	U.S. Department of Agriculture Animal and Plant Health Inspection Service
WMA	Wildlife Management Area
WPA	Waterfowl Production Area

## 6.18 Appendix R. Response to Public comments on the draft Aspen Parklands SFRMP

The draft Aspen Parklands (AP) SFRMP was released for public review and comment on February 24, 2011. The 30-day comment period ended on March 26, 2011. Comments on the draft plan were accepted via e-mail, letter, or fax.

The DNR received two (2) comment letters from the public during the comment period.

Comments were received from the following organizations:

Minnesota Forest Industries (MFI); and,  
Minnesota Timber Producers Association (MTPA).

The comments have been summarized, and responses to the comments and any changes to the draft plan resulting from the comments are listed below in this appendix.

### **Remsoft modeling process comments:**

1. Both organizations supported the DNR's "use of a forest planning model in the development of subsection plans." The organizations went on to state that the modeling process could be improved if the DNR modeled and presented more scenarios (e.g. use a scenario that uses economic rotations as a base and then compare to other scenarios with various constraints applied to the model). The organizations believe that this comparison of modeling scenarios "would allow the DNR to view the cost of constraints on timber production and other values."

### **DNR response:**

The DNR agrees with the organizations support of the use of the forest planning model in the selection of stands that will be managed during the 10-year implementation period for the AP SFRMP. The DNR also agrees with the organizations suggestion of improving the modeling process via comparison of multiple modeling scenarios. The DNR is currently revising the SFRMP process for future SFRMPs. One of the issues that has been identified to improve the current SFRMP process, is the use of multiple modeling scenarios that would detail how the various constraints used in the model affect the subsections goals for sustainability, even-flow of timber, age-class distributions, old forest percentages, harvest levels, etc. Modeling of multiple scenarios will be used at an early stage of future SFRMP projects.

2. In addition, the organizations requested that the DNR represent the anticipated costs and revenues associated with the proposed actions contained in the draft SFRMP, in the modeling scenarios that are presented in the draft SFRMP. An example was given that the DNR could determine:

"...what types of revenues will be generated via timber harvest/sold. Additionally, what are the costs of stand conversions and or maintaining stands at a young age through shearing or burning? The revenues and costs could then be compared across scenarios modeled and presented for review."

### **DNR response:**

The AP SFRMP outlines management plans for state lands administered by the Division of Forestry, and the Section of Wildlife. The total acreage of state administered lands in the subsection is approximately 344,000 acres. Of this total, the Section of Wildlife administers approximately 337,000 acres (98%), and the Division of Forestry administers approximately 7,000 acres (2%). The purpose and management objectives of lands administered by the state vary by management unit. For example, Wildlife Management Areas (WMAs),

administered by the Section of Wildlife, are managed for these primary reasons: wildlife production; public hunting; trapping; and other compatible recreation uses. On WMAs silviculture is used as a tool to perpetuate and reestablish quality wildlife habitat. The economics of proposed management activities for the various state administered lands is difficult to estimate with any reliable level of accuracy. The volume and value of timber sold in the past can be tracked and projected into the future under a number of assumptions. However, market conditions and natural disturbances can dramatically affect these figures moving forward. In addition, the costs associated with managing the lands is difficult to project into the future due to the uncertainties associated with: the viability of markets for biomass moving forward; the percentage of stands offered for sale that are not sold; the costs associated with management of non-timber sites (i.e. with a viable biomass market costs associated with these lands would likely become revenues). A comprehensive cost-benefit analysis should also consider recreational and environmental costs and revenues when evaluating various scenarios, but they are generally very difficult to quantify in a comprehensive manner. DNR is in the process of developing modeling scenarios and associated outputs (including timber revenue estimates), for use and consideration, early in future SFRMP revisions. However, these are not fully vetted at this time for inclusion in the AP SFRMP.

The plan does provide estimates of acres treated by decade for even-aged cover types, proposed and past roundwood volumes, potential green tons of biomass, and potential acres of biomass harvest.

**Aspen management regimes comments:**

1. The organizations asked what criteria was used to establish the aspen management regimes (i.e. Aspen/balm of Gilead “T”, “O”, “S”, “R”, and “C” stands) presented in the draft plan.

**DNR response:**

More information on this subject can be found in Chapter 3 GDS 1C, Chapter 4.2, and Appendix F

GDS 1C states that “vegetation will be managed according to ecological classifications to more closely reflect vegetation that developed under natural disturbance regimes.” The proposed cover type change goals reflect the DNR’s desire to increase the acreage of cover types that have declined historically.

The primary strategy for achieving this general direction is to increase the acres of upland and lowland brush and prairie, oak savannah and oak by reducing the acres of aspen/balm of Gilead cover type. To implement this strategy the AP SFRMP team (the team) developed five aspen/balm of Gilead management categories (T, O, S, R and C) and assigned each stand to one of the categories. These management category designations are preliminary and will be adjusted when necessary based on the outcome of a stand’s field visit.

**Aspen categories (extracted from Chapter 4.2B):**

**T – Timber**

Stands that will be managed as a forested cover type and held to at least normal rotation (45 years). These stands generally have a higher site index, are usually associated with forested NPC classes, and are within areas desired to be managed for forest plant and wildlife species. Extended Rotation Forest (ERF) goals were derived from T stands.

**O – Conversion to other forested cover type**

Stands that will be converted to another forested cover type to better represent the ecological characteristics of the site (i.e. aspen to oak).

**S – Short rotation**

Stands that will be managed as a forested cover type, but harvested prior to normal rotation age (20 to 44 years). These stands generally have a lower site index, may or may not be associated with forested NPC classes, and are within areas desired to be managed for early successional forest plant and wildlife species. It should be noted that for this 10-year planning cycle, stands that would not meet age of merchantability (35 years) were not selected for examination.

**R – Regeneration**

Stands that will be managed as a short rotation cover type (less than 20 years). These stands generally have very low site indexes, are usually not associated with forested NPC classes, and are within areas desired to be managed for open landscape plant and wildlife species.

**C – Conversion to non-forested cover type**

Stands that will be converted or restored to a non-forested cover type (i.e., upland/lowland grass, upland/lowland brush). These stands have often invaded prairie or oak savannah habitats and the management goal is to greatly reduce or eliminate aspen/balm of Gilead from the site.

However, prior to the aspen/balm of Gilead management category designation process, the Priority Open Landscape Area designation began. The team reviewed DNR Wildlife's 2002 "An Assessment of Open Landscapes for Management of Brushland Wildlife Habitat in Northern and Central Minnesota" report which included Land Type Association (LTA) summaries for the Aspen Parklands subsection. Staff also reviewed other spatial and descriptive information by subsection or LTAs, including pre-settlement vegetation (from Marshner's map); bearing tree, corner, and line note information from the original public land survey; current land cover; current forest inventory data; forest management activities; habitat management history including burn units, shearing projects, etc.; detailed county soil survey information including classification and drainage class; NPC occurrence by LTA; openland species occurrences including records from the natural heritage database and locations of surveyed sharp-tailed grouse leks; management emphasis areas; conservation lands; and, boundaries of public natural resource management units (i.e. WPAs, SNAs, etc.).

Based on the above information, along with local field knowledge and management objectives for particular areas, staff nominated all or portions of LTAs as Priority Open Landscape Areas. These Priority Open Landscape Areas were classified as either Openland (a habitat consisting of an open complex of vegetation with <1/3 total cover by shrubs and/or trees) or Brushland (a habitat consisting of a semi-open complex of vegetation with >1/3 total cover by shrubs and/or 1/3-2/3 total cover by trees). These nominated areas and associated management recommendations received interdisciplinary review and finally AP SFRMP team approval. The final product of this effort was a management agreement (Appendix H) and designation map (see: Priority open landscape area and special management area designations map in *Appendix M: Maps*).

The process used to assign aspen/balm of Gilead stands to the management categories involved information from many sources and was completed primarily by area wildlife and forestry staff at meetings coordinated by the AP SFRMP team. It was very much intertwined with the Priority Open Landscape Area designations, which framed the broad cover type management direction for each LTA. For example, most of the stands in the “T” management category are found in either non-open landscape LTA areas or in Brushland LTA areas. Much effort was spent to identify areas where traditional forest management is appropriate. Extracted from the information sources listed above, specific attributes used to support forest management (or “T” designations) included historic timber sale records, the presence of conifer species by cover type, secondary species or advance regeneration, site index, proximity to markets, land acquisition, site accessibility and wildfire history. Most of the deliberations focused on the amount and locations of the “T” and the “S” stands which laid the ground work for determining where traditional forest management would be emphasized. After this step in the process, the designation of stands in the “R” “O” and “C” categories fell in line with the LTA open land designation, management emphasis of particular units or SMA’s, location within burn-units, etc. In summary, no one factor determined which management category a stand was assigned to, rather, all available information was used to assign a stand to a management category that was judged to be a good fit in the broader context of its location in both the management unit and the LTA’s Priority Open Landscape Area designation.

2. The organizations were concerned with the amount of aspen/balm of Gilead acres that were assigned to the “R”, “S”, and “C” management regimes that are identified in table 4.2a of the draft plan (i.e. 56,649 acres - combined, ~66% of aspen/balm of Gilead cover type). The organizations stated that their concern was based on the fact that “R” and “C” designated stands would be removed from long-term timber production. Additionally, the organizations expressed concern that management of the “S” stands “...may not produce timber product...” due to the rotation ages that were established for these stands (i.e. 20-44 years).

The organizations recommended that the DNR only target off-site aspen/balm of Gilead stands with site indices below 50 for conversion to other cover types:

“MFI [and MTPA] does not support conversion of aspen stands that are on medium to good sites. A review of the data shows that aspen is on poor sites, site index less than 50 is present on approximately 19,000 acres. This would suggest that the DNR is going to manage more than 45,000 acres of productive aspen timberlands to ages that will not produce timber over the long-term or convert these stands to other cover types.

MFI [and MTPA] recommends that the DNR place emphasis on the 19,000 acres of off-site aspen. These areas should then be targeted for different management regimes or conversions. MFI [and MTPA] recommends that the DNR consider modeling this scenario and compare it with the proposed actions presented in the draft plan.

...MFI [and MTPA] recommends that where you have off-site aspen intermixed with productive sites that efforts are made to convert the poor site aspen to another forest type pine, oak, northern hardwoods, spruce. This would improve economies of scale in the area for future timber management options.

To contrary, MFI [and MTPA] does not support the conversion “C” or regeneration “R” regime type management on medium to good aspen sites intermixed with poor quality aspen sites.”



**DNR response:**

As stated previously, the majority of state lands included in the plan (98%) are administered by the DNR's Section of Wildlife. Silviculture will be used on WMAs to meet wildlife species' needs and achieve habitat management goals and objectives for each unit. In this subsection, managing for openland/brushland habitats and associated openland dependant wildlife species is a priority on WMAs and throughout the landscape (see Appendix H).

Prior to the start of the AP SFRMP, a trial re-inventory process was used to update the forest inventory information for the entire subsection. When the team was preparing the inventory data for the modeling process, it became evident that many of the aspen/balm of Gilead stands were missing site index information. A site index for these stands, therefore, was estimated either by the modeler from an average site index for the subsection, through the re-inventory process by using a site index based on cover type size/density, or by using the site index of an adjacent stand. However, site index information was only one of many considerations in the process of assigning stands to the different management categories.

Natural-origin pine, northern hardwoods, and spruce cover types are quite uncommon in the AP and are not ecologically appropriate in most parts of this subsection, therefore it is generally inappropriate to convert aspen in this landscape to these cover types.

The age of merchantability for the "S" stands was set at 35 years old (see Appendix I) and the desired age-class distribution is balanced through the 35 age-class midpoint (Chapter 4; Figure 4.2d), so most "S" stands are planned for treatment between 35-45 years of age. The modeled average stand treatment age for "S" stands over the next five decades is 46, ranging from age 35 to 53 (Table 3.5c on page 3.34 of the plan.) Considering the variability of timber markets, merchantable timber products can be expected to be harvested from these stands.

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**Extended rotation forest (ERF) comments:**

1. The organizations asked for clarification on the amount of acres prescribed to an ERF management regime.

**DNR response:**

The DNR acknowledges the fact that prescribed ERF percentages and acreages were not presented in a table in the draft plan. A summary of the total acres, prescribed ERF percentages designated and prescribed ERF acres designated is presented below:

Cover Type	Total acres (2010)	Prescribed ERF percent designated	Prescribed ERF acres designated
Aspen/balm of Gilead*	29,309	13%**	3,809
Tamarack SI=40 & above	1,996	18%	357
Tamarack SI<40	1,758	23%	397
Black spruce, lowland SI=40 and above	1,160	43%	495
Black spruce, lowland SI<40	536	79%	422
Oak	967	100%	967
White cedar	215	100%	215
Balsam fir	98	48%	47
Birch	94	60%	56
White pine	4	100%	4

\*ERF was designated only for the aspen/balm of Gilead “T” and “O” management regimes.

\*\* The ERF percentage presented in the table was calculated based on the future aspen/balm of Gilead acres to be managed as “T” and “O” stands (i.e. 3,809/29,309 x 100). The 3,809 acres to be managed as ERF in this plan is 4.4% of the current (2010) aspen/balm of Gilead cover type acres (i.e. 3,809/85,958 x 100).

- The organizations expressed concern over the amounts of ERF and non-ERF stands that would be held beyond normal rotation age in the first two decades of the planning period in the draft plan:

“ The proposed plan states that in order to achieve older stands that non-ERF stands were held beyond normal rotation ages. MFI *[and MTPA]* disagrees with this concept. ERF was never intended to limit timber harvest production. ERF was designed to provide older forests over time. It was understood that given some age-class imbalances that ERF would fluctuate until a more balanced age- class was achieved. Further, holding stands beyond rotation ages increases the likelihood of higher mortality and a decline in timber volume per acre. MFI *[and MTPA]* recommends that these stands be harvested at [normal] rotation age. MFI *[and MTPA]* additionally recommends that ERF be applied to no more than 20 percent of forest type acres. Additionally, ERF maximum ages should not exceed 1.5 times minimum economic rotation ages as identified in the DNR ERF Guidelines. Table 3.5c shows average harvest age by forest type. For [aspen/balm of Gilead] stands this ranges from 55-87 for the first two decades. Stands greater than 70 years of age should be harvested during the first decade. Stands of this age are likely already experiencing high mortality rates and should be harvested prior to additional timber volume and value loss.”

#### DNR response:

One of the goals in SFRMPs is to balance the age-classes of even-aged managed cover types. Balanced age-classes provide a sustainable yield and even-flow of forest timber

products over time and provide for a variety of forest habitat ages now and into the future. Due to the age-class imbalances that currently exist for the aspen/balm of Gilead cover types, the Remsoft model determined that holding some non-ERF stands to an older age was necessary in the first two decades of the planning period to move the current age-class structure to a more balanced age-class structure. The Remsoft model also selected younger stands over non-ERF (older) stands in the first two decades because of stand volume considerations.

#### **Ecologically important lowland conifers (EILC) comments:**

The organizations expressed concern over the amount of acres that were designated as EILC in the draft plan:  
 “[Table 3.5i] displays the amount of acres reserved from timber harvest due to EILC status. Approximately 20% of black spruce stands are being deferred based on EILC concept. Further, the plan additionally recommends that 16% to 18% of the lowland black spruce be managed as old forests. The DNR should recognize that black spruce beyond 100 years of age may have significant red-rot making it undesirable to timber purchasers or paper mills. MFI *[and MTPA]* recommends that no ERF be applied to black spruce stands given the large amount of acres already reserved from timber harvest in the SNA program. MFI *[and MTPA]* does not support deferring productive stands under this category. The MN-DNR program has a substantial amount of lowland forest areas identified and reserved from timber management. The EILC status should be removed from these stands.”

#### **DNR response:**

Each subsection (and resulting SFRMP) establishes goals to provide older forest habitat via ERF, EILC and old forest management complex (OFMC) designations. These goals are “subsection specific” and do not consider designations that have occurred outside of the subsection. The team determined the EILC designations presented in the draft, based on department policy and area managers’ input, in order to provide old forest habitat for wildlife and plant species that exist in the subsection. Due to the factors stated above, the DNR will maintain the EILC designations presented in the draft plan.

It should also be pointed out that even though the percent of acres designated as EILC in the subsection is higher than other SFRMPs, the actual amount of acres designated is low (1659 acres). In addition, all EILC is located on WMAs where habitat needs have been identified as a priority.

#### **Timber harvest volume comments:**

The organizations wanted an explanation of the timber harvest volumes presented in table 3.5j of the draft plan:  
 “...It is unclear if the total volume [presented in the table] includes biomass harvest in this estimate. Please indicate if the estimated volume is round wood only or a combination of round wood and biomass. Distinction between round wood and biomass volume should be made.”

**DNR response:**

The projected even-aged treatment volumes presented in table 3.5j of the draft plan do not contain estimates of biomass harvest volumes. Estimates and information on potential biomass harvest is presented on page 3.38 of the draft plan and in the openland and brushland sections of Chapter 4 of the draft plan. During the first decade of the planning period aspen/balm of Gilead management will occur in stands old enough to support traditional roundwood harvest.