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## **APPENDIX H - SUMMARY OF THE MN GENERIC EIS AND MFRC LANDSCAPE COMMITTEE GOALS**

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**Introduction ..... H-2**  
**Minnesota Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota ..... H-2**  
**Estimated Future Forest Conditions ..... H-3**  
**Cumulative Unmitigated Significant Impacts ..... H-7**  
**GEIS Conclusions ..... H-8**  
**Minnesota Forest Resources Council Landscape Committee ..... H-9**  
**Northeast Landscape (Northern Superior Uplands Ecological Section)..... H-10**  
**North Central Landscape (Minnesota Drift and Lake Plains Ecological Section)... H-12**

## Introduction

The purpose of this section of the Final EIS is to provide an overall picture and overarching context on likely scenarios that will be occurring in Minnesota's forested lands within the next 40 years. This context will help to put the actions and effects of the alternatives into context with what is happening within Minnesota as a whole. The information contained in this appendix is used to help assess the impact on the environment which results from the incremental impact of the action (implementation of each of the alternatives) when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

Because the alternatives being analyzed are strategic and apply to an extremely large area (two National Forests), the entire Final EIS is somewhat of a cumulative effects document. It is always difficult to say exactly what will happen on National Forest System land, and other ownerships during the planning period, and over the entire landscape as vast as a National Forest - this is why the critical NEPA disclosure of cumulative impacts is done at the project implementation level [.

Much of the analysis focuses on the direct and indirect effects of each alternative. The cumulative effects portion of the analysis considers these direct and indirect effects within the context of other past, present, and reasonably foreseeable future actions on all lands within the analysis area.

Although it is difficult and there is uncertainty, it is possible to make some basic assumptions about reasonably foreseeable actions in Minnesota. Several initiatives within the State of Minnesota have produced analyses that help describe the condition of the forests within the state in the future, based upon various management scenarios. Two key analyses relevant to the Chippewa and Superior National Forests are the Minnesota Generic Environmental Impact Statement Study on Timber Harvesting and Forest Management in Minnesota, 1994 (GEIS) and the Minnesota Forest Resource Council Landscape Project.

## Minnesota Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota

The GEIS analyzed impacts resulting from timber harvesting and associated management activities in Minnesota, such as logging, site preparation, reforestation, and forest road construction. The GEIS assessed three levels of statewide annual timber harvesting activity:

- **4.0 million cords** – This was the statewide level of timber harvest that occurred in 1990. In the 13 years since then, the statewide level of timber harvest has varied from 3.8 to 4.2 million cords.
- **4.9 million cords** – This is the level of statewide timber harvest that was anticipated to occur by 1995 if all announced or considered forest products industry expansions became reality.
- **7.0 million cords** – This is the estimated maximum sustainable annual volume of timber growth that would be available for harvest statewide in the year 2000.

Because the volume harvested during the past 13 years has been nearest to the 4.0 million cord level, this is the scenario that will be used when discussing likely future effects throughout the State of Minnesota. The following summaries consider the 50-year period of 1990 to 2040 and are either paraphrased or taken directly from the

GEIS.

## Estimated Future Forest Conditions

### Changes to Amount of Forest land

Note: Most of the Superior National Forest is located in Ecoregions 2 (Border Lakes) and 3 (Lake Superior Highlands) and most of the Chippewa National Forest is located in Ecoregion 4 (Central Pine-Hardwood Forest). This section speaks to the amount of land that is forested and the amount expected to become something other than forested (farmland, housing, etc.)

**Ecoregion 2 – Border lakes.** No significant change in forest areas is expected, but projected timberland availability will be reduced by constraints on management and harvest practices, which will effectively diminish the area of available timberland. This reduction will likely exceed 7 percent and is considered a significant impact. (Jaakko Poyry Consulting, Inc., Maintaining Productivity of the Forest Resource Base, 1992, p.251)

**Ecoregion 3 – Lake Superior Highlands.** This region will likely see a significant (greater than 7 percent) decline in forest area and timberland from 1990 to 2040, due primarily to recreation-related development along the North Shore, located mostly in the southern portion of the region. Since it is primarily forest now, any development will diminish the area of private timberland. . (Jaakko Poyry Consulting, Inc., Maintaining Productivity of the Forest Resource Base, 1992, p.251)

**Ecoregion 4 – Central Pine-hardwood forest.** This region will likely see an overall decrease in forestland and a somewhat greater reduction in the area of timberland. Lowland forest acreage will remain stable. Timberland availability will be reduced by constraints on management and harvest practices that will effectively diminish the area available for timber production. The estimated decrease in forest area will be 3 to 7 percent. The corresponding decrease in timberland will likely exceed 7 percent and is considered significant. . (Jaakko Poyry Consulting, Inc., Maintaining Productivity of the Forest Resource Base, 1992, p.251)

## Changes to Forest Covertypes:

This section addresses changes in forest covertypes of forested lands, and is summarized for State-wide conditions.

Jack pine, black spruce, balsam fir, and paper birch covertypes on timberlands are expected to decrease by as much as 32, 24, 35, and 32 percent, respectively.

Paper birch is also expected to decrease, largely because of its unbalanced age class structure.

Increase or stable acreages are anticipated for white pine, red pine, northern white cedar, and white spruce. (Jaakko Poyry Consulting, 1994, p. 5-16)

## Amount of old growth

### Old Growth: Upland Hardwoods, Upland Conifers, and Lowland Hardwoods

- Regardless of the level of harvest, timber harvesting, per se will have little impact on the acreage of old growth in these forest types. Political and administrative processes will largely determine the acreage set aside. (Jaakko Poyry Consulting, 1994, p. 5-20) (The MN DNR has recently designated approximately 38,000 to 40,000 acres as old growth or future old growth) (Clarence Turner. Personal Communication, MN DNR)

**Old Growth: Swamp Conifers** – The GEIS anticipated no reduction in the area of old growth lowland conifer forest for the 4.0 million cord harvest scenario because no lowland conifer was projected to be harvested. However, in order to work towards at least some representation of young lowland conifer growth stages, the Chippewa and Superior did project an increase (roughly a doubling of historical levels harvested) in lowland conifers, primarily black spruce. The could result in a decrease in the amount of lowland conifer old growth on the Chippewa and Superior National Forests. (Jaakko Poyry Consulting, 1994, p. 5-20)

## Amount of Old Forest

**Red pine old forest** expected to quadruple from 21,000 acres in 1990 to 84,000 acres in 2040.

**White pine old forest** expected to increase from 12,300 acres to 91,674 acres.

**Swamp Conifer old forests** are generally expected to increase about fourfold from current acreages.

**White Spruce old forest** is expected to increase sevenfold from the 1990 level of 27,400 acres.

**Maple-Basswood** is expected to experience a 10-fold increase, although a large portion of this type statewide occurs in small, privately owned woodlots. (Jaakko Poyry Consulting, 1994, p. 5-20-21)

**Table HEIS-1: Forest type acreage for 1990 and projected for 2040, statewide (thousand acres) (Summarized from table 5.8 MN GEIS, p. 5-15)**

Forest Type	1990 Total	2040 Total
Jack Pine	614.2	387.0
Red Pine	430.1	541.0
White Pine	148.3	174.9
Black Spruce	1,997.9	1637.0
Balsam Fir	1,151.4	748.8
N. White Cedar	367.9	410.1
Tamarack	822.2	803.8
White Spruce	181.0	334.6
Oak Hickory	1,315.6	1,407.6
Elm-Ash-Soft Maple	1,662.5	1,874.6
Maple-Basswood	1,334.5	1497.1
Aspen	4,880.0	5669.0
Paper Birch	1,295.1	933.5
Balsam Poplar	506.1	437.7

## Soil Erosion and Water Resources

**Soil Erosion** – It appears that accelerated erosion within harvest units due to timber harvesting activities will have a minimal effect on forest productivity in Minnesota. Higher erosion rates would occur on haul roads and may be more important in terms of water quality impacts. (Jaakko Poyry Consulting, 1994, p. 5-37)

**Sedimentation** – The levels of harvest projected under the 4.0 million cord scenario are not predicted to significantly affect the quality of the state's waters when assessed at the eco-regional scale. The application of BMPs is an important factor that reduces the likelihood of the impact. (Jaakko Poyry Consulting, 1994, p. 5-38)

**Nutrient Loading** – In-stream concentrations of nitrate and phosphorous are not likely to increase with increased levels of timber harvest in the Northern Lakes and Forests and the North Central Hardwoods region. However, total loadings are likely to increase temporarily due to increased water yields associated with harvesting. (Jaakko Poyry Consulting, 1994, p. 5-39)

## Endangered, Threatened or Special Concern Species

The GEIS analyzed impacts to populations of forest dependent species based on changes to habitat. The GEIS predicted the following Statewide effects to endangered, threatened, or special concern species that occur on the National Forests (Jaakko Poyry Consulting, 1994, p. 5-48 to 5-50):

### Birds

- Osprey – overall statewide increase is predicted.
- Bald Eagle – stable statewide populations are predicted.
- Red Shouldered Hawk – overall statewide significant decrease is predicted.

### Herps

- Wood turtle – stable or slightly increasing habitat statewide is predicted.

### Mammals

- Pine Marten – stable or increasing populations are projected.
- Timber wolf – no appreciable or direct impact on the timber wolf is expected.
- Canada lynx – significant statewide decline is predicted

### Plants

- State-wide, of the 67 plant species listed as endangered, threatened, or of special concern in 1990, 53 are species are likely to have individuals be adversely impacted directly by harvesting . This figure assumes that any harvest that would allow heavy equipment to drive through a population of rare plant species would cause adverse impacts. (Site-specific mitigations would tend to avoid sites that were inventoried or known to have presence of these species.) (Jaakko Poyry Consulting, 1994, p. 5-50)

## Aquatic Ecosystems

- **Light and temperature** – if watersheds are harvested in compliance with BMPs, no significant effects on light or temperature would be expected. The level of light reaching small streams is expected to increase in eco-regions 2 and 4. This will probably cause a small localized increase in average temperature, lasting for 2 to 5 years following harvest.
- **Organic Matter** – Changes resulting from the input of organic matter are expected to be minimal under the 4 million cord scenario.
- **Coarse Woody Debris** – Analysis predicted that large woody inputs to lakes will not change and inputs to streams will be significantly reduced in the three eco-regions.
- **Macroinvertebrates** – analysis predicts that macroinvertebrate communities in lakes will not change in response to timber harvest at the 4 million cord level. Substantial increases in macroinvertebrate populations are predicted in streams in eco-region 4 and small increases in the other eco-regions are predicted.
- **Forest Dependant fish and their habitat** – If BMPs are employed, no great impacts to fish communities are predicted under the 4.0 million cord scenario. If BMPs are not enforced, the amount of suitable coldwater fish habitat in eco-regions 3, 4 is predicted to be reduced by 1 to 3 percent. (Jaakko Poyry Consulting, 1994, p. 5-52)

## Forest Insect and Disease Concerns

- The overall increase in tree age in the spruce-fir forest type group will increase vulnerability and susceptibility of stands to budworm damage. (Jaakko Poyry Consulting, 1994, p. 5-84)
- The incidence of some insect pests, such as white pine weevil and white pine blister rust are likely to increase as a consequence of the increase in acreage of susceptible younger stands. The incidence of some diseases is also likely to increase, including *Diplodia* shoot blight and canker and possibly *Scleroderris* canker of red pine. (Jaakko Poyry Consulting, 1994, p. 5-56)

## Outdoor Recreation Opportunities

- Harvesting at the 4 million cord scenario would subject about 50 percent of the FIA timberland plots to harvesting. Of these, 7.6 percent are currently classified as non-motorized areas. When all forest land is considered, 5 and 25 percent of FIA plots in the primitive non-motorized and semi-primitive non-motorized classes, respectively, are subject to harvesting. (Jaakko Poyry Consulting, 1994, p. 5-59)

## Aesthetics and Visual Quality

- On state and federal lands there appears to be a tendency to harvest areas of high visual sensitivity at a lower rate than areas of moderate to low sensitivity. This is because of the constraints and mitigations of goals and policies to be directly responsible to the public. The converse was found on private lands. Under the 4 million cord scenario, 38 percent of nonfederal/non-State timber plots were projected to be impacted by harvesting. (Jaakko Poyry Consulting, 1994, p. 5-60)
- Most future forest covertypes would have an average age older than that in 1990. Given 50 years of growth, the oldest ages would be greater than found today for many areas. It follows that average tree size, which is an important component of attractiveness, would not be negatively impacted for most covertypes under the 4 million cord scenario. The covertypes that would be adversely impacted are those

subject to substantial harvesting, including aspen, balsam poplar and maple-basswood. (Jaakko Poyry Consulting, 1994, p. 5-60)

## Unique Cultural and Historical Resources

- The maximum number of sites potentially impacted is 105,000 sites or 55 percent of the estimated total number of sites. The actual number of sites affected can be confidently predicted to be less than this total because of several factors.
- Impacts on National Forest System lands are negligible because the USDA Forest Service locates sites prior to harvest and routinely avoids them. (Jaakko Poyry Consulting, 1994, p. 5-63)

## Cumulative Unmitigated Significant Impacts

The GEIS concluded that mitigation strategies will likely mitigate many, but not all, of the significant impacts projected to occur under the base level of harvesting. This section identifies the cumulative unmitigated impacts that are likely to remain despite implementation of the mitigation strategies.

These impacts are quoted from the GEIS that was prepared prior to the development of Minnesota Forest Resources Council (MFRC) site level guidelines. The MFRC guidelines would mitigate some of these effects. On National Forest System lands, the MFRC guidelines and Plan objectives, standards and guidelines would also serve to mitigate effects

**Loss of Forest Area and Timberlands** – The area of forest in the northern Minnesota is likely to continue to decline, as is the area of timberlands, some of the loss coming from management for non-timber values. (Jaakko Poyry Consulting, 1994, p. 5-148)

**Changes to Age Class and Covertypes Structure** – Several of the less frequently harvested covertypes or tree species will shift toward the older age classes. Some of these will succeed to other covertypes or to uneven-aged stand conditions. (Jaakko Poyry Consulting, 1994, p. 5-148)

**Incidence of Pests and Diseases** – The incidence of losses to pests and diseases will likely increase as a result of the increased ages of some covertypes. Age class changes as a result of broad scale mortality may occur in some covertypes, an example being spruce budworm outbreaks in the balsam fir type. (Jaakko Poyry Consulting, 1994, p. 5-149)

**Impacts on Biodiversity** – Harvesting will likely lead to ongoing localized impacts on endangered, threatened, and special concern species. Populations of Red-shouldered Hawk will likely be maintained with implementation of mitigations, although there is uncertainty due to inadequate knowledge of precise habitat requirements. (Jaakko Poyry Consulting, 1994, p. 5-149)

**Impacts on Forest Soils** – Soil nutrient depletion will be most severe on sites with low nutrient capital, and as the nutrient capital of a site is depleted over many rotations. Decline in productivity will be most apparent on sites low in nutrients (i.e. coarse textured soils) that are currently occupied by aspen-birch or upland hardwood forests.

With mitigations in place, compaction in lightly trafficked areas is expected to be reduced, however, compaction

will remain unmitigated in the heavily trafficked areas. (Jaakko Poyry Consulting, 1994, p. 5-149)

**Erosion** from roads and other compacted areas will continue, but mitigation measures and improved road design practices will likely reduce the rates of soil loss. As improved riparian management practices are put into effects, localized water quality impacts will continue, but will be reduced. (Jaakko Poyry Consulting, 1994, p. 5-150)

**Archaeological Sites** – Other than on National Forest System land (where inventories are conducted and sites protected) and for operations during frozen ground conditions, impacts to sites will continue, although due to lack of inventory, the amount of impact is difficult to quantify. (Jaakko Poyry Consulting, 1994, p. 5-151)

**Impacts on Traditional Use Sites** – There will likely be a reduction in the incidence to impacts to traditional use sites from roading due to increased liaisons between forest managers and Native American groups. Impacts are difficult to quantify because of lack of inventory. (Jaakko Poyry Consulting, 1994, p. 5-151)

**Primitive and SPNM Recreation Opportunities** – Roading in these areas will likely reduce the areas of primitive and semi-primitive non-motorized recreational experiences that are potentially available in the state. Use of Visual management guidelines and development of a coordinated road and trail plan will likely reduce the amount and duration of impacts. (Jaakko Poyry Consulting, 1994, p. 5-151)

**Motorized Recreational Use** – Harvesting in visually sensitive areas without visual management guidelines will adversely impact existing users of these sites. However, the maturing of many areas of forest will likely provide new or replacement opportunities for recreational activities. As new roads are constructed, motorized users will find additional sites. (Jaakko Poyry Consulting, 1994, p. 5-151)

**Tourism and Travel-based Industries** – Although difficult to quantify, resorts and other tourism based facilities may be adversely impacted by visually obtrusive harvesting operations occurring within their viewshed or along access routes. Use of Visual Management Guidelines would likely reduce the area and duration of the impacts. (Jaakko Poyry Consulting, 1994, p. 5-151)

## GEIS Conclusions

There will be changes to the forest; however, the most profound of these will be a consequence of the natural aging process.

Mitigation measures will likely reduce the likelihood of significant impacts that might degrade the long-term sustainability of the state's forest resources. The only exception is the projected reductions in the nutrient capital of some low productivity sites. These reductions will need to be carefully monitored.

The 4.0 million cord level of harvesting is well below the level of sustainable yield of Minnesota's forests as defined from a biological standpoint. Consequently, there is considerable flexibility in terms of meeting timber supply demands while making provisions for non-timber values. (Jaakko Poyry Consulting, 1994, p.5-152)

Supply of aspen will be constrained during the middle of the 50-year period modeled because of the increased demand and the unbalanced age class distribution. It is assumed that 25% of the demand for aspen will be transferred to the northern hardwood species. (Jaakko Poyry Consulting, 1994, p. 5-153)

## Minnesota Forest Resources Council Landscape Committee

The Minnesota Sustainable Forest Resources Act authorized a landscape level program and coordination effort. This effort is a way of assessing and promoting forest resource sustainability across large forested landscapes. It is a forum where forestland owners and stakeholders can collaborate to address forest resource issues over broad regions of Minnesota's forests, enabling long-range forest resources planning across land ownerships and forest types.

Through the Minnesota Forest Resources Council Landscape committees the major landowners and other interested groups and individuals in Minnesota have generally agreed to an overall vision of how these landscapes may look over the next 50 years. The vision, goals, and strategies have not yet been approved by the Forest Resource Council.

As a participant in that process, the Forest Service will coordinate management with other land managers in each landscape. Through continued coordination and interaction among land managers within the landscape, different landowners may adjust their management to account for, compliment, and/or compensate for management by other landowners in order for all to work toward the overall vision. That is to say, not all landowners may manage with the same emphasis, but with a coordinated effort progress can be made toward working together toward the vision

The work of the Landscape committees contains five main steps:

1. Preparing an assessment that provides information on the landscape region's existing and potential ecological, social and economic conditions; (completed)
2. Determining a desired future forest condition, goals and issues that address existing and potential conditions considered desirable for the region; (completed)
3. Developing strategies for working toward the goals, and to resolve issues, for the region; (in progress)
4. Encouraging voluntary implementation of the strategies by facilitating coordination between public and private landowners; (on-going) and
5. Conducting an evaluation to determine how well the strategies accomplish the vision and goals as well as resolve issues.

### Overall Goals for all Landscapes

- Maintain or expand total forested land areas within each region over time.
- Ensure that forests in each region are in a variety of ownerships, serving both public and private interests.
- Maintain healthy, resilient, functioning forest ecosystems with an appropriate mix of forest cover types and age classes within in landscape region to promote timber production, biological diversity, and viable forest-dependent fish and wildlife habitats.
- Ensure that each landscape region's forests provide a full range of products, services, and values that contribute to economic stability, environmental quality, social satisfaction and community well being.
- Encourage citizens to view their region's forests as integral contributors to the quality of life enjoyed by current as well as future generations, to become knowledgeable about their region's forest conditions and opportunities, and to actively engage in forest stewardship. Assist the Minnesota Forest Resources Council in understanding for issues and conditions within each regional landscape.

## Northeast Landscape (Northern Superior Uplands Ecological Section)

(Summarized from Recommended Desired Outcomes, Goals and Strategies. Northeast Landscape Region. A Report to the Minnesota Forest Resources Council. March 25, 2003)

### Desired Future Forest Condition for Northeast Landscape

The Northeast Regional Landscape Committee desires a forest that:

- Approximates/moves toward the range of variability (the spectrum of conditions possible in ecosystem composition, structure, and function considering both temporal and spatial factors) for plant communities naturally living and reproducing in NE Minnesota.
- Has spatial patterns (size and location of openings) that are consistent with the ecology of northeastern Minnesota.
- Provides diverse habitat to maintain natural communities and viable populations (the ability of a wildlife or plant population to maintain sufficient size to persist over time in spite of normal fluctuations in numbers) for the species native to northeastern Minnesota.

The Committee recognizes that the desired future forest condition is a long-term condition and can only be achieved by moving in incremental steps giving full consideration to the social and economic impacts that may occur.

To that end the following goals and strategies are for the long-term (100+ years) management of the Northeast Landscape Region and relate direction to the first bullet statement of the desired future forest condition. Goals and strategies for the remaining two bullets (spatial patterns and diverse habitat) will need further analysis by the Committee when spatial analytical tools become available and monitoring data is analyzed. .

### Goals and Strategies by Landscape Ecosystem

#### Mesic Birch-Aspen-Spruce-Fir Landscape Ecosystem

##### Long Term Goals

- Increase the 81+ multi-aged conifer growth stage
- Increase the white pine, white spruce,, and tamarack component

##### Strategies

- Seed-tree cuts from non-white pine stands that have an existing mature white pine component allowing for whit pine regeneration; encourage spruce/fir regeneration to protect pine.
- Harvest by mimicking natural patterns of disturbance using regeneration harvest with variable retention of residuals as the primary tool in the 40-60 year age class.
- Identify additional acres in 51-80 year mature birch-conifer growth stage (4-8% of all stems)
- Select harvest areas with good potential for upland tamarack and encourage tamarack (need to determine silvicultural prescription).
- Select acres in 11-50 year pole mature birch and 51-80 year mature birch-conifer growth stages for

underplanting white spruce at rates that are representative of its natural range (5-9% of all stems).

- Identify and manage approximately half of the 51-80 year mature birch-conifer growth stage for structural features found in the 81+ growth stage (need to further evaluate feasibility of doing this).

### **Mesic Red and White Pine Landscape Ecosystem**

#### Long Term Goals

- Increase the white and red pine component
- Increase the 101+ growth stage of red and white pine.

#### Strategies

- Harvest aspen and birch out of the mature birch-conifer growth stage (51-100 years) for the first 30 years, implement conifer retention where conifers are present.
- Harvest aspen and birch out of the mature birch-conifer growth stage (51-100 years) and birch out of the mature white pine growth stage (101-140 years) from year 30 to year 130. Implement conifer retention where conifers are present.
- Salvage trees damaged by wind disturbance in growth stages over 50 years. Implement conifer retention where conifers are present.

### **Dry-Mesic Red and White Pine Landscape Ecosystem**

#### Long Term Goals

- Increase the red and white pine and white spruce components.
- Increase the older growth stages (121+ years)

#### Strategies

- Concentrate harvest activities in the mature birch-conifer growth stages (51-80 years) with an emphasis on restoring pine on stands currently dominated by deciduous species, especially aspen.
- Identify areas that will be managed to enhance the mature white pine, multi-aged pine-spruce-fir, and multi-aged spruce-fir growth stages.
- Emphasize maintenance of stands that are currently dominated by white and red pine.
- Underplant with red and white pine toward the older end of the pole-mature birch stage.
- Underplant white spruce in pole-mature birch growth stage (11-50 years)

### **Jack Pine-Black Spruce Landscape Ecosystem**

#### Long Term Goal

- Increase jack pine component throughout the entire plant community.

#### Strategies

- Maintain JP composition where it currently exists in areas being treated
- Ecological goals should be accomplished in the BWCA Wilderness through natural fire if policy allows
- Harvest in the large jack pine, mature jack pine and pole jack pine growth stages and restore jack pine through a variety of methods as site dictates (seeding, planting, prescribed fire).

### **Sugar Maple Landscape Ecosystem**

#### Long Term Goals

- Increase the white pine, yellow birch, white spruce, and white cedar components.
- Move every growth stage toward RNV over the next 150 years.

### Strategies

- Apply uneven-aged management in pole-mature fir-maple growth stage (51-100 years) to increase characteristics of multi-aged growth stage (150+ years).
- Allow unmanaged acres from mature multi-aged growth stage to succeed to the multi-aged growth stage.
- Apply even-aged management in pole-mature maple growth stage (51-100 years) to maintain younger age classes.

## North Central Landscape (Minnesota Drift and Lake Plains Ecological Section)

(Summarized from Recommended Desired Outcomes, Goals, and Strategies. North Central Landscape Region. A Report to the Minnesota Forest Resources Council. March 25, 2003, Amended January 27, 2004)

### Desired Future Forest Condition for the North Central Landscape

The future forest of the North Central landscape will have the following characteristics when compared to the current forests of the year 2000:

- There will be an increased component of red, white and jack pine, cedar, tamarack, spruce and fir.
- The forest will have a range of species, patch sizes, and age classes that more closely resemble natural patterns and functions within this landscape.
- The amount of forestland and timberland will not decrease using FIA definitions for timberland and forestland. Large blocks of contiguous forest land that have minimal inclusion of conflicting land uses will be created and/or retained for natural resource and ecological benefits and minimize land use conflicts (hereafter referred to as “natural resource emphasis areas”).
- In large blocks of contiguous forestland, retain critical natural shoreline on lakes for scenic, wildlife, water quality, and other natural resource values.

### Goals and Strategies for North Central Landscape

The following recommended goals and strategies are for the long term (100+ years) management of the North Central Landscape Region and relate directly to the first two bullet statements of the desired future forest condition:

#### Boreal Hardwood/Conifer Landscape Ecosystem

##### Long Term Goals

- Increase >171 year growth stage.
- Restore historic components of white pine, upland tamarack, and cedar; include spruce fir.
- Maintain a substantial amount in even-aged aspen.
- Emphasize mixed stands of spruce, balsam fir, aspen, birch, and red maple in the plant community.

##### Strategies

- Under plant aspen with white pine, balsam fir, and white spruce in the 21-40 year growth stage.
- Examine aspen stands over 70 years for natural conifer regeneration., access difficulty, local soil and

edaphic conditions and other evidence that suggests stand should be advanced to later successional stages - those lacking evidence should be regenerated to aspen type.

- Focus short-term management on old 81+ aspen (71-100 years).
- Perform shelterwood harvests in old northern hardwood stands and under plant white spruce, pines, and upland tamarack.

### **Dry-Mesic Pine Landscape Ecosystem**

#### Long Term Goals

- Increase red and white pine and tamarack
- Increase >171 year growth stages
- Increase oak/hardwood composition

#### Strategies

- Restore white pine in aspen stands in the 41-80 year growth stage.
- Introduce white pine in red pine 21-40 year growth stage

### **Mesic Northern Hardwood Landscape Ecosystem**

#### Long Term Goals

- Increase >171 year growth stage
- Maintain some better quality aspen stands; use even-aged management
- Establish or maintain white pine, balsam fir, and white spruce as stand components starting in the 21-40 year growth stage.
- Create a more natural composition of plant community starting at the 40-80 year growth stage.

#### Strategies

- Manage rich basswood/maple to older growth stages
- Manage on an uneven-aged system
- Manage richer sites for yellow birch component
- Selectively harvest northern hardwood stands as they age.
- Perform shelterwood harvests in northern hardwoods and under plant with pine and spruce where site aspect and soils are appropriate.
- Maintain aspen inclusions on good sites to prove age class and structural diversity

### **Dry-Mesic Pine/Oak Landscape Ecosystem**

#### Long Term Goals

- Increase jack pine and oak in 1-20 and 21-40 year growth stages.
- Decrease aspen in 41-80 year growth stage and restore red, white, and jack pine.
- Increase red/white pine in 81+ growth stages
- Increase 81+ year growth stages.

#### Strategies

- Manage pine and longer lived hardwood by maintaining trees already present and/or under planting
- Manage pine and hardwood in mixed stand condition
- Under plant aspen with white spruce
- Under plant red pine in 16-35 growth stage with white pine
- Focus short term harvest on regenerating 60-70 year old jack pine and aspen.

### **Dry Pine Landscape Ecosystem**

#### Long Term Goals

- Increase younger age classes of jack pine (0-40 years).
- Increase older growth stages (81+) dominated by red and white pine.

Strategies

- Concentrate harvests in the 41-80 year growth stage and regenerate to jack pine
- Where possible, regenerate to a jack/red/white pine mixed stand; harvest jack pine and hold red and white pine for older growth stages on more moist sites

The following recommended goals and strategies relate directly to the third and fourth bullet statements of the desired future forest conditions:

**Definitions:**

***Conflicting land uses:*** Land uses that conflict with natural resource management and/or ecological benefits. Examples include but are not limited to residential development, agriculture, industrial sites, amusement parks, golf courses, airports, etc. Harvest of timber and associated activities (hunting, trapping, reforestation, etc) are not considered a conflicting land use in this document. The intent is to promote land uses that are more compatible within natural resource areas so the net effect is greater ecological and natural resource benefit to society than having a similar acreage that is dispersed. The intent is not to favor one type of natural resource benefit over another, or to dictate what the balance between different types of natural resource benefits should be.

***Fragmentation:*** Interspersing contiguous tracts of forest with conflicting land uses.

***“Natural resource emphasis areas”:*** Large blocks of contiguous forest land that have minimal inclusion of conflicting land uses. They have been created and/or retained for natural resource and ecological benefits and to minimize land use conflicts.

**GOAL:** Minimize the loss of forestland and timberland.

***Strategy:*** Educate landowners on the value of forests to society, the economy, and the environment (including wildlife), and the importance of not reducing current acreage and tract sizes.

- Encourage incentives for both forest retention and forest management.
- Provide educational material on the positive benefits of larger parcel sizes on forest values and their management.

***Strategy:*** Encourage use of conservation easements and similar conservation tools.

***Strategy:*** Where appropriate, encourage the establishment of forests in areas previously forested (ie. abandoned cropland) and retain natural openings, brushland, etc.

**GOAL:** Retain contiguous blocks of forest land.

***Strategy:*** Encourage creation and/or retention of “natural resource emphasis areas” which encompass national forests, state forests, county memorial forests, and other large, contiguous blocks of forest land through mutual agreement. Manage “natural resource emphasis areas” in the following way:

- Discourage development of properties within these areas to minimize conflicting land uses.
- Encourage the retention of public lands within “natural resource emphasis areas”, except small tracts needed to provide public services, or isolated tracts too small to manage effectively.
- In cases where a government entity wants to dispose of lands within a “natural resource emphasis area” and those lands are desired by another public agency, encourage exchange of natural resource emphasis areas (NREA) lands for non-NREA lands held by the interested public entity.

- Encourage the State to acquire in-holdings of private lands within “natural resource emphasis areas” as they become available in exchange for disposal of isolated parcels that are better suited for development or private ownership leading to no net loss of public land.
- Encourage the exchange of federal, state, and county tax-forfeited lands lying outside of “natural resource emphasis areas” for private lands lying within “natural resource emphasis areas” where both parties agree.
- Minimize further fragmentation and loss of forest land within “natural resource emphasis areas” by:
  - Minimizing cross-country overhead lines.
  - Encouraging private landowners to keep their lands in forest use.
  - Encouraging interagency cooperation and coordination in road planning and design.
  - Encouraging road corridors to be the minimum size necessary to provide public service
  - Manage roadsides within “natural resource emphasis areas” to retain natural beauty and to reflect the natural variation in forest age and composition.
  - Encourage the use of MN Forest Resource Council Site-Level Guidelines and Landscape-Level goals and strategies for forest management.

**Strategy:** Minimize fragmentation of forests by encouraging innovative development that keep forestland intact.

- Encourage residential and commercial development to occur in areas already fragmented by housing, urban uses and existing road corridors.
- Encourage cluster development.

**GOAL:** Minimize the loss of publicly held shorelines.

**Strategy:** Discourage the sale and development of publicly held shorelines.

**Strategy:** Exchange land for critical shoreline when available.

**GOAL:** Increase the natural benefits of developed shorelines

**Strategy:** Educate lakeshore owners and lake associations on the environmental benefits of natural shorelines and available cost share programs to improve shorelines.

**Strategy:** Encourage private shoreline owners to practice “lakescaping” (maintaining/ creating natural habitat along shoreline) or retain natural shoreline.

**GOAL:** Protect sensitive and/or undeveloped shoreline

**Strategy:** Encourage local, grassroots government, and organizations (townships, lake associations, etc.) to identify and promote protection of these shorelines.

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