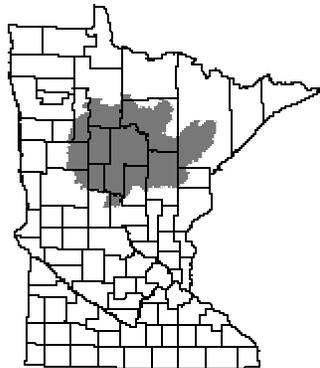Minnesota
Forest
Resources
Council
Landscape Program

RECOMMENDED
DESIRED OUTCOMES, GOALS AND STRATEGIES

NORTH CENTRAL LANDSCAPE REGION

A REPORT TO THE
MINNNESOTA FOREST RESOURCES COUNCIL

March 25, 2003
LP0303b

Prepared by: MFRC Staff
       North Central Regional Landscape Committee
   MFRC Landscape Committee

INTRODUCTION

The Minnesota State Legislature enacted the Sustainable Forest Resources Act (SFRA) in 1995, which established the MN Forest Resource Council (MFRC) and formalized the state's policy to:

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

The MFRC Landscape Program establishes landscape committees on a regional basis to implement these state policies at the landscape level throughout the State.

The North Central Landscape Region includes Itasca, Aitkin, Cass, Becker, Clearwater, Crow Wing, Hubbard, Mahnomen, east half of Polk and south half of Beltrami counties (approximately 8.3 million acres). The North Central Landscape Regional Committee (the Committee) was organized in June, 2000 and began working to find agreement on how best to achieve long-term forest sustainability by determining the desired future forest conditions and developing goals and strategies to achieve the agreed-upon desired future conditions.
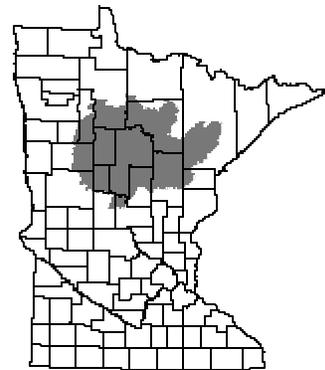
According to participants, the landscape planning processes have developed useful scientific approaches and information and valuable tools for landscape assessment; fostered working relationships with a diverse set of people; produced landscape direction for agencies and other landowners on a voluntary basis; developed strategies for implementing this landscape direction; and facilitated better communication between diverse groups. Also, the landscape planning processes have helped land managers recognize that individual land management choices must be viewed in the context of those of their neighbors and that the multiple management objectives of the various land managers can provide for a diverse and balanced landscape condition in terms of ecological health and biodiversity.

This report summarizes the work of the Committee from 2000 through 2003.

PROCESS SUMMARY

The Committee was organized in June, 2000 with over 70 people expressing interest in participating. Currently, there are over 40 people on the mailing list and a core, active group of 20-25 attending bi-monthly, all day meetings (see appendix 1, mailing list). Small ad-hoc groups of committee members are used for specific tasks as needed.

The Committee learned from the experience of the Northeast Regional Landscape Committee and as a result was able to complete the process in a shorter timeframe. Also, the Committee was able to apply the technical knowledge gained about landscape analysis in the Northeast Landscape Region to the North Central Landscape Region. Early in the process the Committee chose to follow an ecological approach based on native plant communities rather than forest cover types and on site productivity/potential rather than what currently exists on the site. Also, the Committee decided to complete the ecological analysis first and then determine the economic impact of any proposed changes. The Committee did not develop explicit social and economic goals.

A brief description of the steps the Committee followed is given below:

Current Trends and Conditions Assessment
Existing information on the social, ecological and economic aspects of the landscape was compiled by staff prior to organizing the Committee. This assessment served as a starting point for discussion, definition of new information, and initial issue identification (refer to MFRC web site, at www.frc.state.mn.us for the assessment).
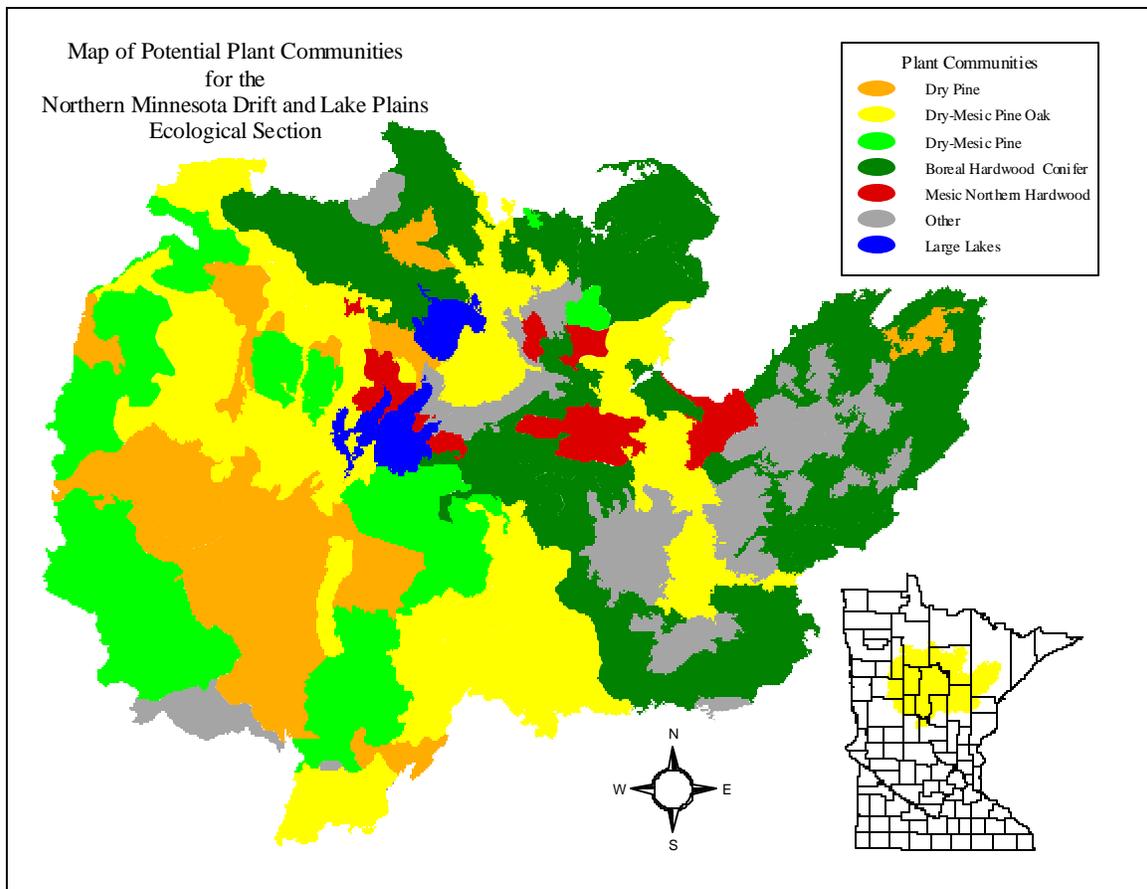
Issue Identification
Participants were asked to identify their highest priority issues when they decided to become a member of the Committee. The issues, grouped into broad categories, are summarized in the table below (number indicates how many individual people were concerned with that issue):

Category	Issue
Fragmentation of Landscape by Development	• Land taken out of production due to housing starts (3) • Fragmentation of forests
Development of Riparian Corridors	• Water quality (2) • Riparian and watershed management (2)
Ecosystem Sustainability	• Concerned about future sustainability of forests in regards to forest products, recreation, biodiversity and habitat preservation. (9) • Maintain forest health (2) • Maintain a broad distribution of species on landscape (10)

	• Public perception of biodiversity • Maintain healthy wildlife populations (2) • Old growth forestry (2) • Fire suppression greatly reduces the natural role of fire
Harvest Level Sustainability	• Level of timber harvest (10) • Increased forest productivity (2)

Ecological Analysis

UPM Kymmine Paper Company, with support from the MFRC, led the effort to consolidate public and some private forest inventory data across the landscape. This covered approximately half of the landscape. Frelich modeled the landscape age structure of different forest types in the Drift and Lake Plains Section of north central Minnesota under the natural disturbance regime in effect during pre-settlement times (1600-1900), and using recent studies of disturbance ecology (Frelich 2002). He based the forest types on data from land surveyor records and a recent classification of the new native plant communities by Minnesota DNR Natural Heritage and County Biological Survey staff. Eight plant communities were described (see appendix 2 for Frelich model description). The plant communities represent the potential of what can grow on a site, not what is currently growing on the site. Refer to appendix 9 for a detailed description of each plant community (see map).

Map of Potential Plant Communities
for the
Northern Minnesota Drift and Lake Plains
Ecological Section

Plant Communities
- Dry Pine
- Dry-Mesic Pine Oak
- Dry-Mesic Pine
- Boreal Hardwood Conifer
- Mesic Northern Hardwood
- Other
- Large Lakes

The data was analyzed by comparing current composition with historical composition as well as the range of natural variation (appendix 2, 3). Using this information as a guide, four ad-hoc groups developed alternative management goals and strategies for the five upland native plant communities. The Committee combined the results from the four groups into two and finally into one recommended set of goals and strategies for each plant community in the landscape.

In October, 2001 an ecological analysis for all ownerships in the Northern Drift and Lake Plains section landscape was completed at the Natural Resources Research Institute (NRRI) using the same methodologies developed for the Northeast Landscape Region (appendix 4, 5, 6).

The ecological analysis of the North Central Landscape Region did not include a spatial analysis of recommended patch sizes or how vegetation is spatially located on the landscape. This aspect of the ecological analysis is being conducted by the MFRC "Spatial Analysis Project". The project is scheduled for completion in June, 2003. It will produce a variety of models and tools to begin to analyze spatial patterns on the landscape. The Committee will then decide how to conduct a spatial analysis for the Landscape.

Economic Impacts of Recommended Management Strategies

An analysis of the overall economy of northern Minnesota, published in July 2001 by Lichty et al., found that the region is economically diverse (appendix 7). While very dependent on natural resources, primarily the mining and forest product industries, a significant share of the region's economy is provided by the tourism industry, services, and government, followed by manufacturing, trade, and construction.

The UMD Bureau of Business and Economic Research (BBER) modeled potential impacts to the current economy of north central Minnesota if the wood supply were to change in volume and species mix due to ecological considerations (appendix 8). The study analyzed possible bottlenecks for forest products industries if appropriate species of trees are not available. The project analyzed various scenarios, both long term (15 years) and short term, to determine the impact from changing forest species mixes on the paper industry as well as on other wood product industries. BBER used the economic modeling software and data system known as IMPLAN to show bottlenecks in supply given changes in demand.

For north central Minnesota, five scenarios were modeled in addition to the current harvest level. Current harvest volume was determined by using three year averages of data collected by DNR mill surveys and growth data from 1990 (*Input data for IMPLAN Model*, Chad Skally June 12, 2002, Revised July 9, 2002).

- **Scenario 1:** Moving landscape toward desired forest conditions.
- **Scenario 2:** Harvest levels are above scenario 1 for the next 10-20 years, then decline; landscape moving toward desired forest conditions.
- **Scenario 3:** Total growth minus mortality based on 1990 FIA data.
- **Scenario 4:** Total growth minus 50% of the mortality based on 1990 FIA data.
- **Scenario 5:** Harvest all annual growth for all species; assumes all mortality is captured.

DESIRED FUTURE FOREST CONDITION

The future forest of the North Central Landscape Region will have the following characteristics when compared to the existing 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 (use FIA definitions for timberland and forestland). Large blocks of contiguous forest land that have minimal inclusion of conflicting land uses have been created and/or retained for natural resource and ecological benefits and minimize land use conflicts.

GOALS AND STRATEGIES

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

- ❑ 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.

Goals and strategies for the third desired future forest condition statement have yet to be decided upon. The Committee is just beginning to gather information and discuss how best to develop goals and strategies for this bullet:

- ❑ The amount of forestland and timberland will not decrease use FIA definitions for timberland and forestland). Large blocks of contiguous forest land that have minimal inclusion of conflicting land uses have been created and/or retained for natural resource and ecological benefits and minimize land use conflicts.

Boreal Hardwood-Conifer (1,324,000 acres; 26% of the landscape)

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-age aspen
- Emphasize mixed stands of spruce, balsam fir, aspen, birch, red maple in the plant community.

Boreal Hardwood-Conifer
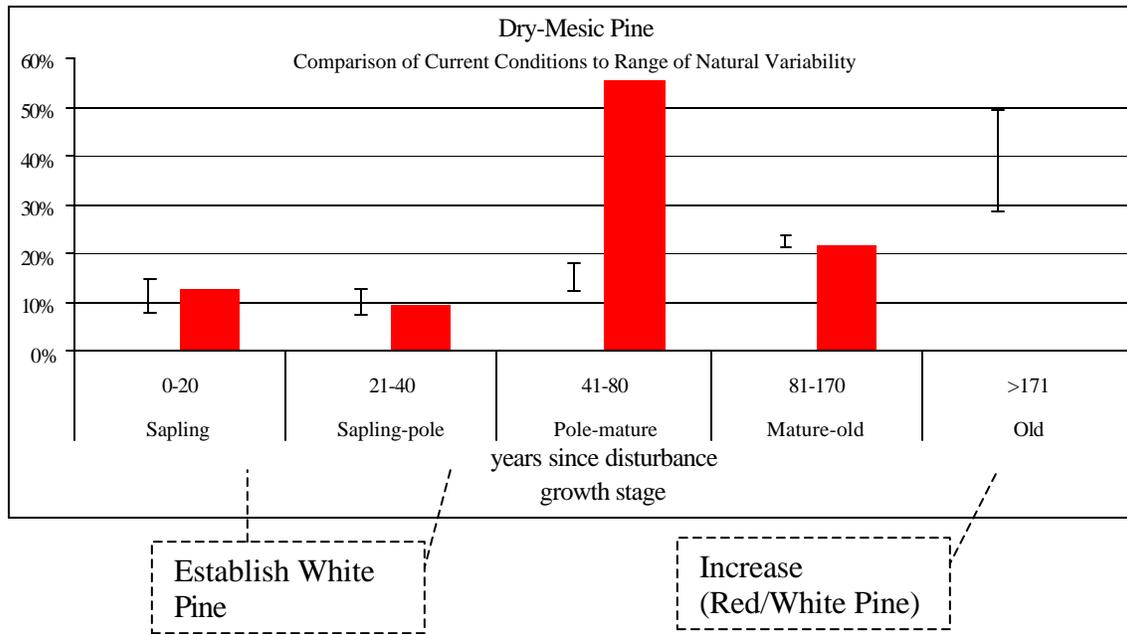Comparison of Current Conditions to Range of Natural Variability
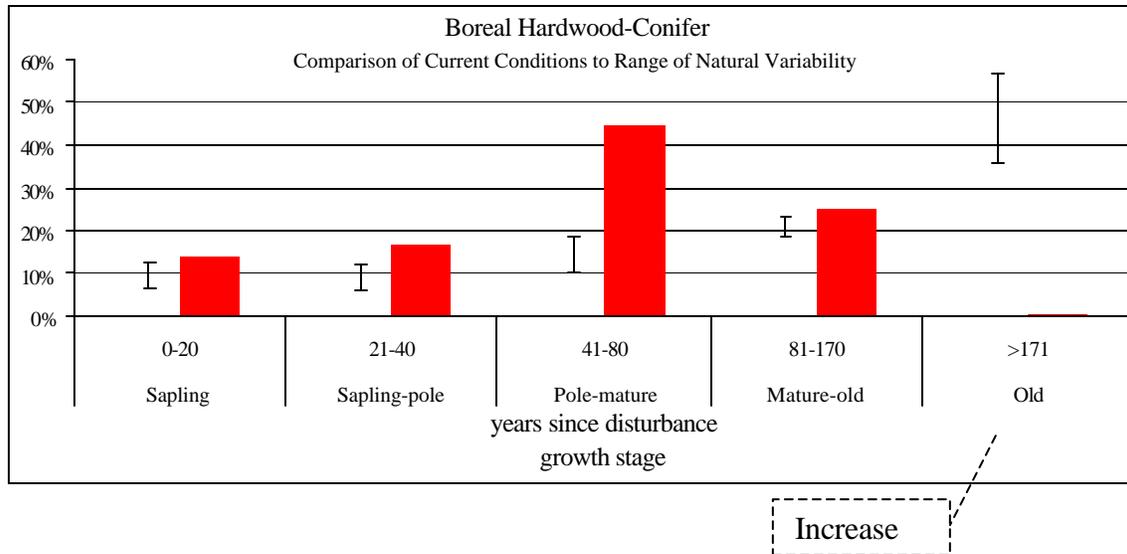
Strategies:
- Underplant aspen with white pine, balsam fir, white spruce in the 21-40 year growth stage.
- Examine aspen stands over 70 years of age for natural conifer regeneration, access difficulty, local soil and edaphic conditions and other evidence that suggests the stand should be advanced to later successional stages - those lacking these traits should be regenerated to aspen type.
- Focus short-term management on 81+ old aspen (70-100) .
- Perform shelterwood harvests in old northern hardwood stands and underplant white spruce, pines and upland tamarack.

Dry-Mesic Pine (654,000 acres; 13% of plant community)

Long-term Goals:
- Increase red and white pine and tamarack
- Increase >171+ year growth stages
- Increase oak/hardwood composition

Dry-Mesic Pine

Comparison of Current Conditions to Range of Natural Variability

0-20	21-40	41-80	81-170	>171
Sapling	Sapling-pole	Pole-mature	Mature-old	Old

years since disturbance
growth stage

Establish White Pine

Increase (Red/White Pine)

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 Hardwoods (188,000 acres; 4% of plant community)

Long-term Goals:
- Increase >171 year growth stage
- Maintain some better quality aspen stands; use even-age management
- Establish or maintain white pine, balsam fir and white spruce as stand components starting at the 21-40 growth stage.
- Create a more natural composition of plant community starting at the 40-80 year growth stage.
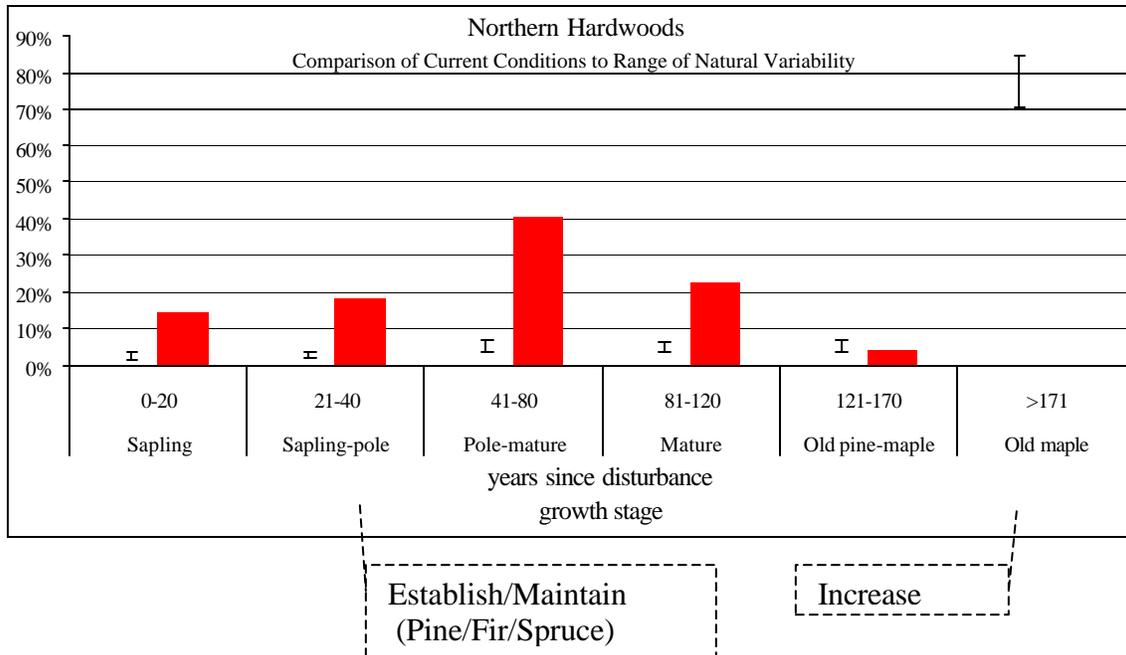
Strategies:
- Manage rich basswood/maple to older growth stages
- Manage on an uneven age system
- Manage richer sites for yellow birch component.
- Selectively harvest northern hardwoods stands as they age.
- Perform shelterwood harvests in northern hardwoods and underplant with pine and spruce where site aspect and soils are appropriate.
- Maintain aspen inclusions on good sites to provide age class and structural diversity.

Dry-Mesic Pine-Oak (1,582,000 acres; 31% of plant community)

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+ year growth stages
- Increase 81+ year growth stages
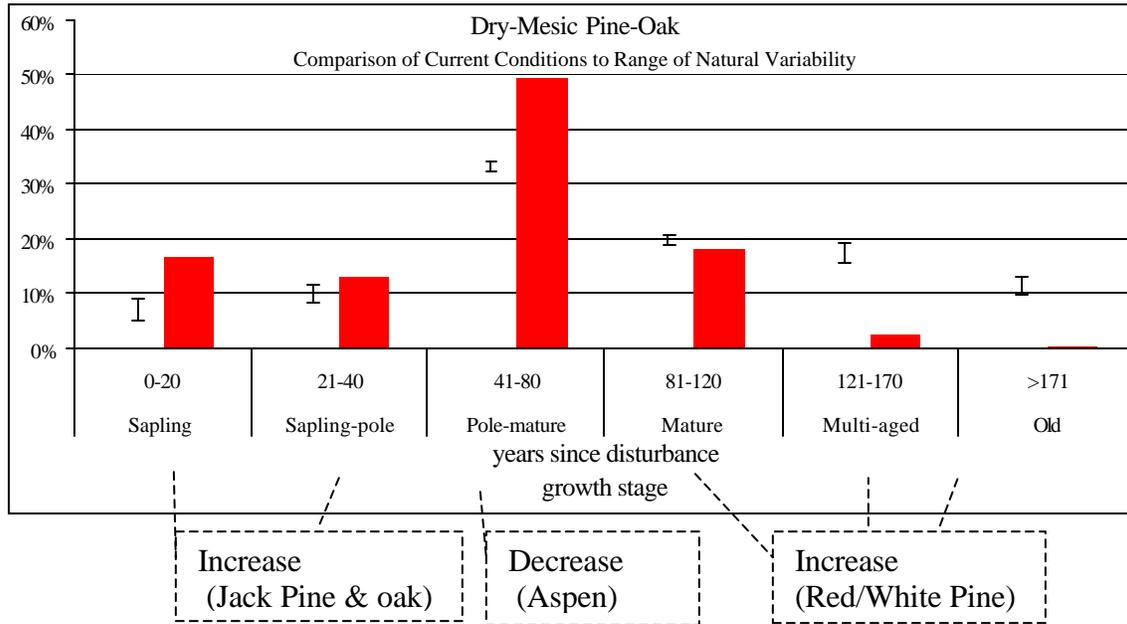
Strategies:
- Manage pine and longer-lived hardwood by maintaining trees already present and/or underplanting
- Manage pine and hardwood in mixed stand condition.
- Underplant aspen with white spruce
- Underplant red pine in 21-40 year growth stage with white pine
- Focus short term harvest on regenerating 60-70 year old jack pine and aspen.

Dry Pine (245,000 acres, 5% of plant community)

Long-term Goals:

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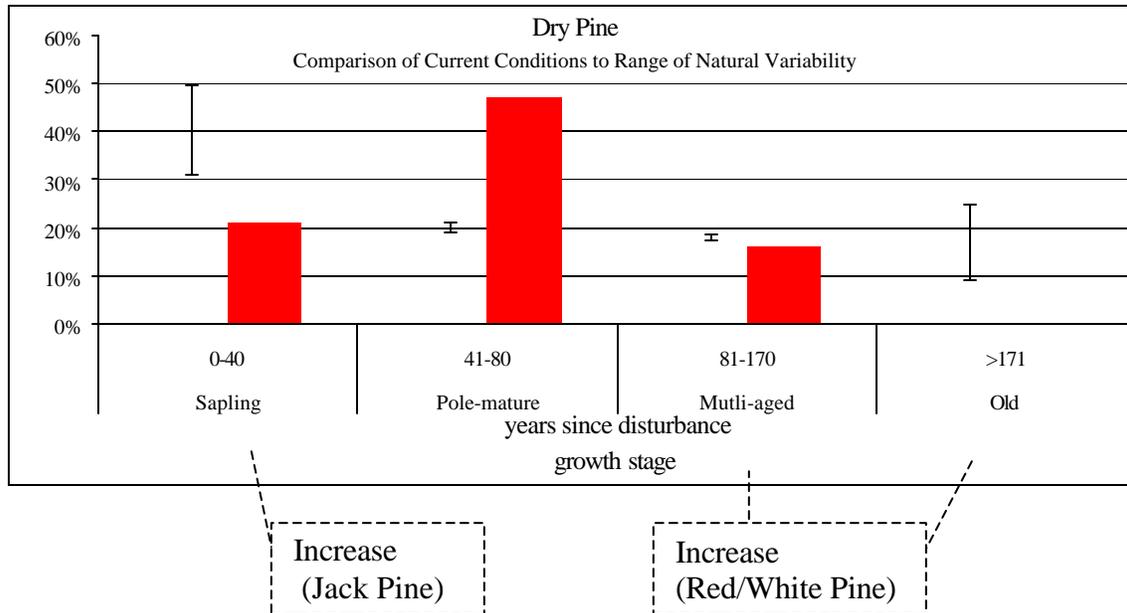
Strategies:

- 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 moister sites.

COORDINATION FRAMEWORK

The Committee previously established an ad-hoc group of landowners to complete several specific tasks. It is recommended that this group as well as any additional members of the Committee who would like to participate be designated as the permanent Coordination Work Group for the landscape. The primary purpose of the Coordination Work Group is to coordinate the voluntary implementation of the landscape goals and strategies across the landscape.

The Coordination Work Group will meet on a quarterly basis, as needed, to do the following:
- Look at existing plans and see how they fit with landscape goals – for example National Forest Plan, DNR Sub-section etc. Highlight the opportunities for cooperation and the areas of challenge.
- Determine how much each landowner can voluntarily contribute toward the landscape goals on a yearly basis.
- Look for ways to cooperate and coordinate on the ground management activities to achieve landscape goals.
- Analyze the cumulative effects of current and planned activities across the landscape.
- Assist MFRC Staff in collecting necessary monitoring information as described in the "Monitoring Framework" section of this report.

MONITORING FRAMEWORK

The MFRC Landscape Committee agreed that a high quality monitoring system is needed to measure progress at five-year intervals and analyze the rate of change relative to the landscape as well as to measure long-term progress toward desired conditions. The MFRC Landscape Committee recommends that the historical context (Range of Natural Variation) be used as the benchmark and the current condition as a baseline. Each five-year assessment would use the current condition as a baseline and measure it against the Committee's desired future forest conditions, goals and strategies. Rate of change would be a comparison with the previous five-year baseline to the current five-year baseline.

The MFRC Landscape Committee recommends that the following measures and measuring protocols be used as part of the monitoring process:

Measurement	Protocol
Acres of each major forest plant community by species. Acres of each major forest plant community by growth stage.	• Forest Inventory and Analysis data The following technical papers (Appendix 3,4,5) will be used: • *Mapping Range of Natural Variation Ecosystem Classes for the Northern Superior Uplands, Draft Map and Analytical Methods.* Mark A. White and George E. Host. August 9, 2000. • *Northeast Landscape - Range of Natural Variation Analysis: Methods, Data and Analysis.* Mark A. White, George E. Host, Terry N. Brown. January. 25, 2001. • *Drift and Lake Plains: A Comparison of Range of Natural Variation and Current Conditions.* Terry Brown and Mark White. October 11, 2001
Acreage goals for each major forest plant community specified in public agency land management plans and in other plans if available.	MFRC Staff and Coordination Work Group review plans and compile acreage goal summary for landscape
Harvest goals for each major forest plant community specified in public agency plans and in other plans if available.	MFRC Staff and Coordination Work Group review plans and compile acreage goal summary for landscape
Acres affected by specific silvicultural practices	GEIS Silviculture Technical Paper and 1996 Survey Report (appendix 10,11) should be used as a baseline. MFRC Staff compile data for landscape

Number of land managers trained at silvicultural workshops	MFRC Staff and Coordination Work Group survey agencies, organizations and companies and compile data
Number of conifer seedlings produced by species at Minnesota tree nurseries.	DNR nursery records

The Minnesota Forest Resource Council will have overall responsibility for implementing the monitoring framework, including:
- Preparing the five-year monitoring report.
- Keeping landowners, agencies, non-government organizations, private consultants, participants in the North Central Committee and other interested parties informed of the results of implementation and monitoring activities in the landscape.

The MFRC Landscape Committee recognized that models will change and improve in the future, and that landscape goals should be adjusted based on improved models.

APPENDIX

1. Mailing list of North Central Regional Landscape Committee participants

2. Range of Natural Variability Estimates for Forest Vegetation Growth Stages of Minnesota's Drift and Lake Plains. Lee E. Frelich. April 16, 2000.

3. Vegetation Comparisons of Current Conditions to RNV and Historical Conditions on Public and selected Private Land in Drift and Lake Plains. A combination of forest inventory data compiled by MFRC and UPM Kynnine Paper Company, 2000.

4. Northeast Landscape Range of Natural Variation Analysis: Methods, Data and Analysis. Mark A. White, George E. Host and Terry Brown.

5. Mapping Range of Natural Variation Ecosystem Classes for the Northern Superior Uplands: Draft Map and Analytical Methods. Mark A. White and George E. Host. August 9, 2000.

6. Drift and Lake Plains: A Comparison of Range of Natural Variation and Current Conditions. Terry Brown and Mark White. October 11, 2001 (Introduction, methodology and one plant communty)

7. Executive Summary, Northern Minnesota Forestry Analysis. Richard Lichty et al. July 2001. UMD Bureau of Business and Economic Research

8. Executive Summary, Forestry Bottleneck Analysis. September 2002. UMD Bureau of Business and Economic Research

9. Landscape Ecosystem Descriptions. Chippewa NF - Minnesota Drift and Lake Plains

10. Summary, Sections, 1,2; Silvicultural Systems, A Background Paper for a Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota; Jaakko Poyry Consultants, Inc, December, 1992

11. Executive Summary, Sections 1,2; Status of Minnesota Timber Harvesting and Silvicultural Practice in 1996 - A Report to the Minnesota Forest Resource Council. Klaus J. Puettman, Charles R. Blinn, Helen W. McIver and Alan Ek.

REFERENCES

1. Natural Range of Variability Estimates for Forest Vegetation Growth Stages of Minnesota's Drift and Lake Plains**;** Lee E. Frelich; Final Version, April 16, 2000

2. Model by George Host that gave numbers to Frelich's ecosystems and growth stages (available on CD – various Power Point presentations)

3. Mapping Range of Natural Variation Ecosystem Classes for the Northern Superior Uplands: Draft Map and Analytical Methods. Mark A. White and George E. Host. August 9, 2000.

4. Northeast Landscape - Range of Natural Variation Analysis: Methods, Data and Analysis. Mark A. White, George E. Host, Terry N. Brown. January 25, 2001.

5. Growth Stage Summaries for Drift and Lake Plains Upland Landscape Ecosystems;. Mark A White, February 18, 2002

6. Drift and Lake Plains: A Comparison of Range of Natural Variation and Current Conditions. Terry Brown and Mark White, NRRI, October 11, 2001

7. Northern Minnesota Forestry Analysis. Richard Lichty et al. July 2001. UMD Bureau of Business and Economic Research

8. Forestry Bottleneck Analysis. September 2002. UMD Bureau of Business and Economic Research

9. Input data for IMPLAN Model being developed in the MFRC Northeast and North Central Landscape Regions, Chad Skally, June 12, 2002, Revised July 9, 2002