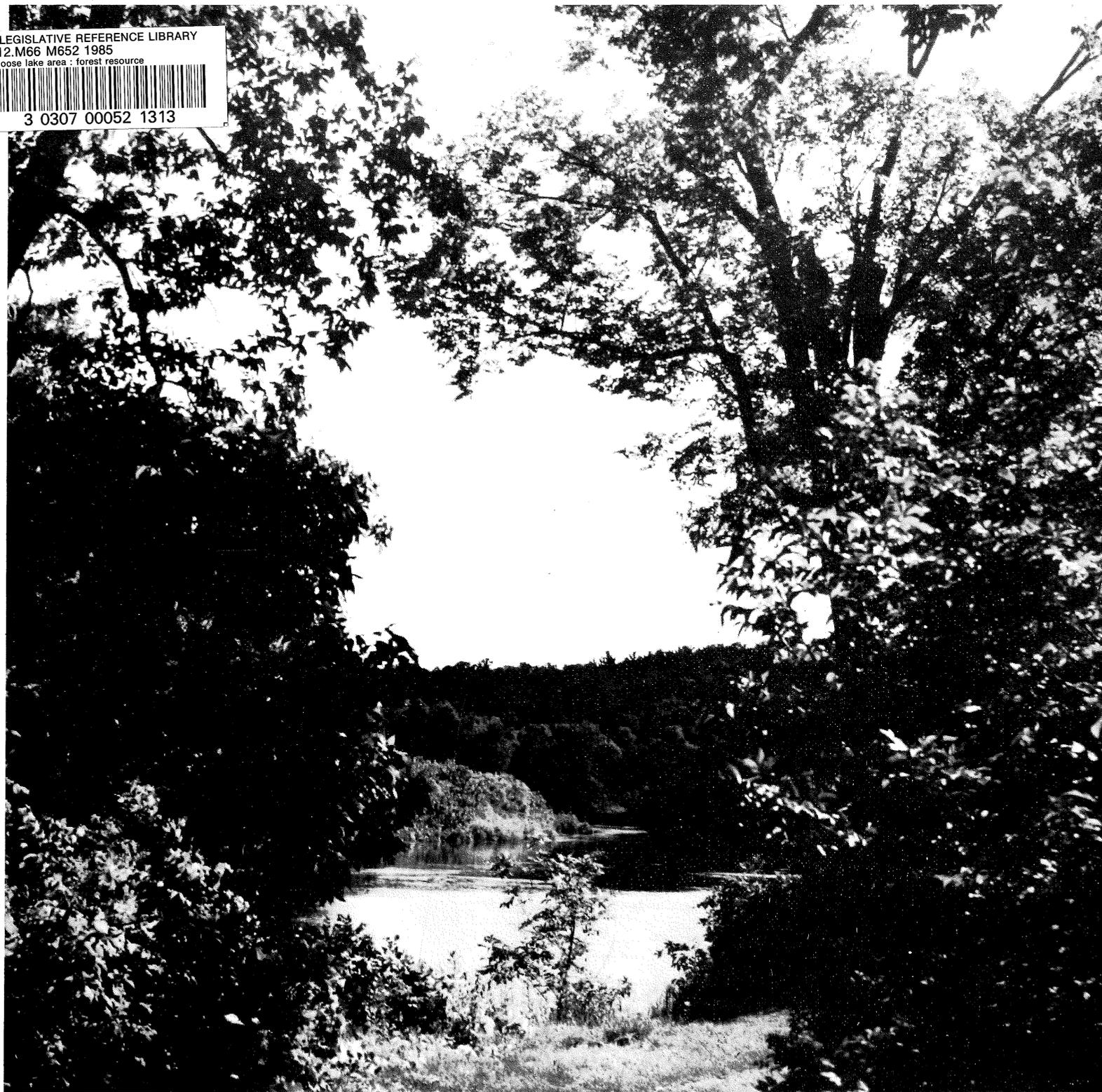


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MOOSE LAKE AREA FOREST RESOURCE MANAGEMENT PLAN



Department of Natural Resources
Division of Forestry
Saint Paul, Minnesota 55146

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Pursuant to 1982Laws, ch 511, sec 6

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MOOSE LAKE AREA
FOREST RESOURCE MANAGEMENT PLAN

October 1985

Prepared Pursuant to the
Forest Resource Management Act of 1982
(1982 Minnesota Laws, Chapter 511, Section 6)

Minnesota Department of Natural Resources
Division of Forestry
St. Paul, Minnesota 55146

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1985

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MOOSE LAKE AREA FOREST RESOURCE MANAGEMENT PLAN

1. INTRODUCTION

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DESCRIPTION OF THE MOOSE LAKE AREA

The Moose Lake Area is one of 19 Division of Forestry administrative areas (Figure 1.1). It includes the entire area of Pine (862,363 acres) and Kanabec (333,070) counties, and the southern half of Carlton County (275,825 acres).

The Division of Forestry presently administers 173,000 acres of land, 6 campgrounds with over 100 campsites, 11 trails totaling 224 miles, and some 250 miles of state forest roads in the Moose Lake Area. Five district offices serve the area with a permanent staff of 20 full time employees.

Timber sales on state and county lands contribute substantially to the local and regional economy. Responsibility for forest fire control, pest management, and private landowner assistance also rests with the Division of Forestry. Other DNR divisions administer state parks, wildlife management areas, water access sites, trails, and other facilities in the area.

PURPOSE OF AREA FOREST RESOURCE MANAGEMENT PLANS

The purpose of an Area Forest Resource Management Plan is to set forth specific goals and objectives for the management, protection, development, and production of forest resources in a Division of Forestry administrative area. Area plans combine land use and program elements and are designed to help coordinate the Division of Forestry's activities in an area with those of other DNR administrative units, other agencies, local governments, and the private sector.

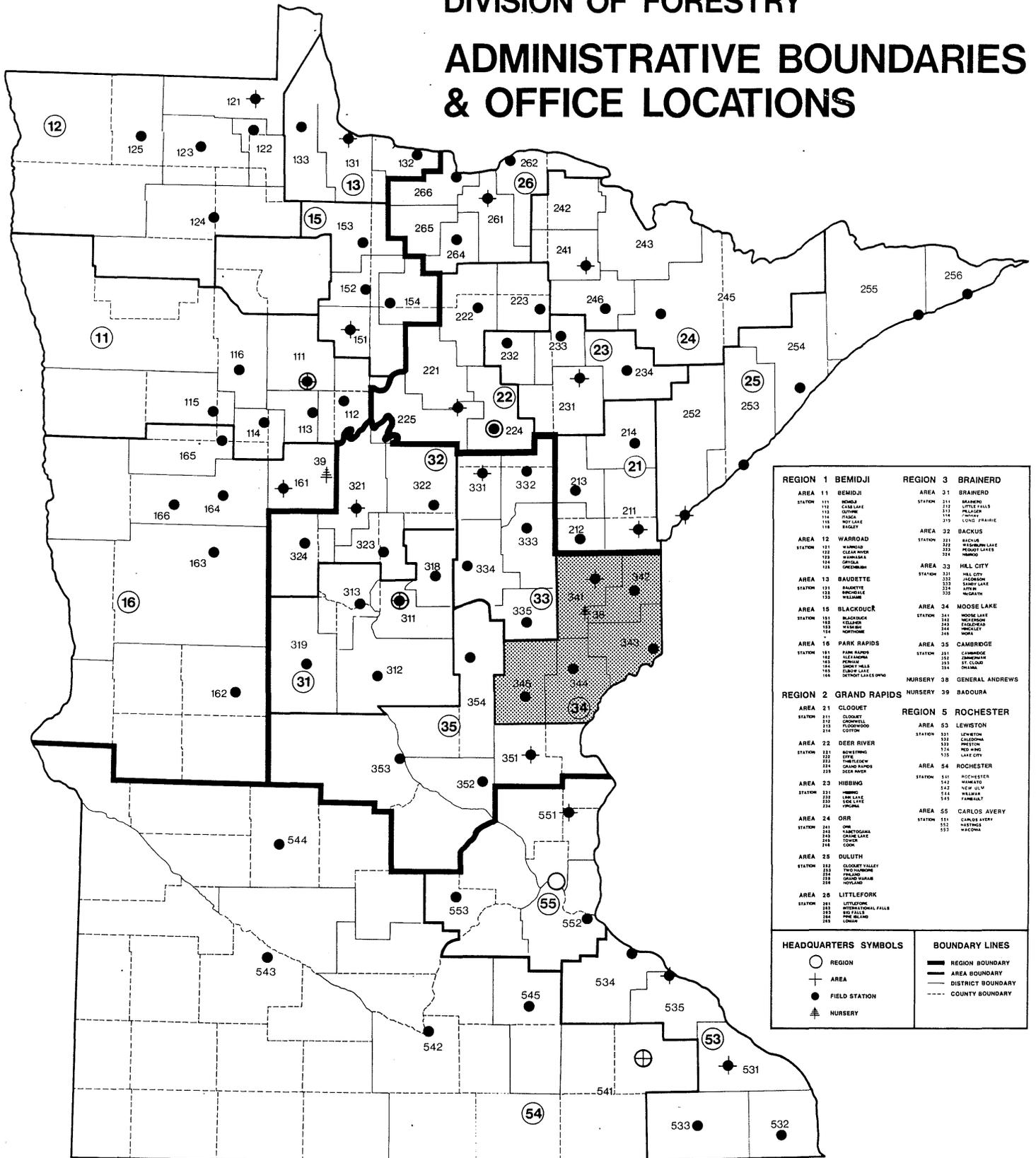
LEGAL REQUIREMENTS

The Department of Natural Resources is required by state law to complete forest resource plans for geographic administrative areas. Section 6 of the Forest Resource Management Act of 1982 contains the following language:

FIGURE 1.1

DIVISION OF FORESTRY

ADMINISTRATIVE BOUNDARIES & OFFICE LOCATIONS



| | |
|--|---|
| <p>REGION 1 BEMIDJI</p> <p>AREA 11 BEMIDJI STATION 111 BEMIDJI 112 CLEAR LAKE 113 OUSTON 114 FRAGA 115 MUD LAKE 116 BRADLEY</p> <p>AREA 12 WARROAD STATION 121 WARROAD 122 CLEAR LAKE 123 WARROAD 124 OYAMA 125 OREDAWBI</p> <p>AREA 13 BAUDETTE STATION 131 BAUDETTE 132 BAUDETTE 133 WELLS</p> <p>AREA 15 BLACKDUCK STATION 151 BLACKDUCK 152 BLACKDUCK 153 NORTHBROOK</p> <p>AREA 16 PARK RAPIDS STATION 161 PARK RAPIDS 162 ALFA ROMEO 163 ST. CLOUD 164 SHERIDAN HILLS 165 CLOUD LAKE 166 DETROIT LAKE SPRING</p> <p>REGION 2 GRAND RAPIDS</p> <p>AREA 21 CLOQUET STATION 211 CLOQUET 212 CROSWELL 213 FLOORSWOOD 214 COTTON</p> <p>AREA 22 DEER RIVER STATION 221 DEER RIVER 222 BAYVIEW 223 EFFE 224 BLACKDUCK 225 GRAND RAPIDS 226 DEER RIVER</p> <p>AREA 23 HIBBING STATION 231 HIBBING 232 NEW ULU 233 SIOUX LAKE 234 OYAMA</p> <p>AREA 24 ORR STATION 241 ORR 242 HARTWOOD 243 CLEAR LAKE 244 TOWN 245 COOK</p> <p>AREA 25 DULUTH STATION 251 CLOQUET VALLEY 252 DULUTH 253 DULUTH 254 GRAND MARSH 255 HIGHLAND</p> <p>AREA 26 LITTLEFORK STATION 261 LITTLEFORK 262 INTERNATIONAL FALLS 263 BIG FALLS 264 PINE LAKE 265 LONDA</p> | <p>REGION 3 BRAINERD</p> <p>AREA 31 BRAINERD STATION 311 BRAINERD 312 LITTLE FALLS 313 PALMER 314 JAMES 315 LONG PRAIRIE</p> <p>AREA 32 BACKUS STATION 321 BACKUS 322 WABERUN LAKE 323 REDOY LAKE 324 HENNOG</p> <p>AREA 33 HEL CITY STATION 331 HEL CITY 332 JACOBSON 333 SANDY LAKE 334 UTTER 335 NEGAYNA</p> <p>AREA 34 MOOSE LAKE STATION 341 MOOSE LAKE 342 HENNINGSON 343 FARGO 344 WADSWORTH 345 HORN</p> <p>AREA 35 CAMBRIDGE STATION 351 CAMBRIDGE 352 JAMESVILLE 353 ST. CLOUD 354 OYAMA</p> <p>NURSERY 38 GENERAL ANDREWS NURSERY 39 BADOURA</p> <p>REGION 5 ROCHESTER</p> <p>AREA 53 LEWISTON STATION 531 LEWISTON 532 CALSON 533 PRESTON 534 RED RAIN 535 LAKE CITY</p> <p>AREA 54 ROCHESTER STATION 541 ROCHESTER 542 HENRATY 543 NEW ULU 544 WELLS 545 FARMVALLEY</p> <p>AREA 55 CARLOS AVERY STATION 551 CARLOS AVERY 552 HASTINGS 553 WADONA</p> |
|--|---|

| | |
|--|--|
| <p>HEADQUARTERS SYMBOLS</p> <p>○ REGION</p> <p>⊕ AREA</p> <p>● FIELD STATION</p> <p>🌲 NURSERY</p> | <p>BOUNDARY LINES</p> <p>— REGION BOUNDARY</p> <p>— AREA BOUNDARY</p> <p>--- DISTRICT BOUNDARY</p> <p>- - - COUNTY BOUNDARY</p> |
|--|--|

Each geographic administrative unit of the division of forestry identified by the commissioner as an appropriate unit for forest resource planning shall have a unit forest resource plan which is consistent with the forest resource management policy and plan, including state reforestation and road policies. The scope and content of the plan shall be determined by the commissioner. A unit plan shall not be implemented until approved by the commissioner.

A unit plan shall set forth the specific goals and objectives for the management, protection, development, and production of forest resources in the administrative unit. A unit plan shall be integrated with other uses not managed under the multiple use, sustained yield principles policy when those uses have been authorized and approved according to law, including compliance with environmental review procedures. Unit plans shall be revised as necessary to remain consistent with the forest resource management plan.

In addition, section 7 of the act requires that the completed plans be presented to the standing committee of each house of the legislature with jurisdiction over natural resources or appropriation matters.

The commissioner also has general forest resource planning authority under Minnesota Statutes 89.01, Subd. 4, which states that the commissioner "...shall cooperate with the several departments of the state and federal governments and with counties, towns, corporations, or individuals in the preparation of plans for forest protection, management, protection of trees, wood lots, and timber tracts, using his influence as time will permit toward the establishment of scientific forestry principles in the management, protection, and promotion of the forest resources of the state."

RELATIONSHIP TO THE MINNESOTA FOREST RESOURCES PLAN (MFRP)

The Forest Resource Management Act of 1982 also requires the Department of Natural Resources to maintain a comprehensive statewide forest resource management plan designed to implement multiple use, sustained yield policies for management of forest lands under the authority of the commissioner. The Minnesota Forest Resources Plan (MFRP) provides the statewide policy and budget framework within which Area Forest Resource Management Plans are developed.

Area plans reflect the general policy and program direction for forest resource management established in the MFRP. Since the program portion of the MFRP will be updated every four years, area plans must be flexible enough to allow for possible adjustments in management priorities and program directions.

INTERDISCIPLINARY PLANNING TEAM

The provisions of the Forest Resource Management Act and the complexity of forest ecosystems necessitate the use of an interdisciplinary approach in developing forest resource management plans. The Moose Lake Area Forest Resource Management Plan was developed by an interdisciplinary planning team directed by the Planning Team Leader and the Area Forest Supervisor. The interdisciplinary team consisted of a variety of DNR natural resource specialists including foresters, wildlife managers, fisheries managers, recreation specialists, hydrologists, minerals specialists, enforcement officers, and others.

PUBLIC INVOLVEMENT

The objective of public involvement efforts in the Moose Lake Area has been to obtain the most useful input and review possible. Open house meetings were held at the area and district forestry offices, as were meetings with key interest groups such as timber industry representatives, environmental groups, and others. Both large formal meetings and small informal sessions were conducted.

Comments received at informational meetings were used to develop aspects of the plan. Following DNR review, copies of the draft area plan were made available for public review at the area and district forestry offices. Persons on the mailing list also received summaries of both the draft and final plans.

IMPLEMENTATION AND MONITORING

Public involvement and review procedures used in developing the Moose Lake Plan were designed to foster agreement on the proposed course of action. They were also intended to provide a clearer understanding of how recommended actions will be carried out by the Division of Forestry.

The Division is primarily responsible for implementing approved area plans for those lands and programs administered by the Division of Forestry. The Division Director and St. Paul staff set annual targets and objectives for each program consistent with the MFRP and other agency plans. Other DNR units will implement those actions where they have program responsibilities.

The Regional Forest Supervisors and their staffs cooperate with the Division Director and Area personnel in setting annual program objectives. Specific program targets and funding levels are negotiated with the Area Forest Supervisor. The result of negotiations is the annual area work plan.

The annual work plan reflects area priorities established during the planning process. Moose Lake area and district personnel are responsible for implementing the area work plan and for meeting targets and completing projects according to program priorities.

FORMAT AND CONTENT

The Moose Lake Area Forest Resource Management Plan contains five major chapters. The Introduction provides an overview of the planning process; legal requirements and important planning relationships.

The Resource Assessment presents an analysis of the present situation and the outlook for outdoor recreation, fish and wildlife, timber, and water. It includes detailed information on the social, economic and natural resource character of the Moose Lake Area, as well as a description of the lands and programs administered by the Division of Forestry.

The Land Management Plan divides the Moose Lake Area into management compartments. Compartments are contiguous or nearly contiguous blocks of Division of Forestry administered land with similar management needs. For each compartment, the resource highlights (e.g., access, timber, minerals, fish and wildlife, land use and surrounding ownership) are described and resource management guidelines were developed. Special considerations were also noted and a recommendation was made for land disposition.

The Program Guidelines contain specific forestry program guidelines and project descriptions. Staffing, budgeting, program targets and project priorities are identified and documented for a 10 year period.

Implementation and Monitoring outlines a procedure for periodic review and update of the Moose Lake Area Plan. Responsibilities for program monitoring and accomplishment reporting are assigned.

The Appendices includes A) Wildlife Species List for the Moose Lake Area, B) Description of Principle Game and Non-Game Wildlife Species, C) Evaluation of Unique Biological Features, D) Moose Lake Area Forest Resource Management Compartments, E) Timber Regulation Model, F) Moose Lake Area Fire Management Plan, G) Moose Lake Area Forest Recreation Sub-Area Plan, and H) Soil Resource Interpretations and Forest Management Guidelines for Geomorphic Regions in the Moose Lake Area, I) Wild and Scenic River Rules, and J) Protected Waters Map and Inventory.

MOOSE LAKE AREA FOREST RESOURCE MANAGEMENT PLAN

2. RESOURCE ASSESSMENT

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MOOSE LAKE AREA RESOURCE OVERVIEW

SOCIAL PROFILE

History

The abundance of natural resources in the Moose Lake Area has contributed significantly to its development. Virgin white and red pine, interspersed with spruce and hardwoods, once covered the area. Many rivers and lakes dissected the expansive forest cover. Today, however, some of these natural resources have been substantially depleted, and lands have been converted to other uses.

Prior to the 16th century, the Dakota (or Sioux) Indians were the primary inhabitants of this region. Later, the Chippewa settled in the area after being forced westward in search of a new food supply and hunting grounds. Both the Dakota and Chippewa fished, hunted and trapped along the multitude of rivers and lakes. The Indians were eventually pushed westward again as white explorers came to claim this land.

Prior to settlement, fur traders moved through the area in search of the valuable pelts that were in high demand in Europe. The Indians eagerly traded furs for articles such as knives, hatchets, needles, trinkets, cloth, guns, and liquor. In 1804, Thomas Connor of the British Northwest Company established the first semi-permanent wintering post in the state. This post was located on the banks of the Snake River by Cross and Pokegama lakes near Pine City. The post has been reconstructed and today is maintained by the Minnesota Historical Society.

By 1850 the demand for furs had slackened and the supply dwindled. Lumber replaced the fur industry as the region's most important activity. Western settlers and lumbermen pressured the powers in Washington to negotiate concessions of Indian land and to open the land for settlement and exploration. Lack of title to the land, however, did not hinder the growth of lumbering. Scores of pine stands were cut, houses and sawmills were built on unowned lands, and lumbermen began marketing the valuable white pine forest that belonged to the government. The government provided for

acquisition of the land under provisions of the Pre-Emption Act of 1841. Also, the Homestead Act of 1862 enabled purchase of 160 acres for homesteading for a nominal filing fee. After the Civil War, increasing numbers of immigrants settled in the area.

In the early 1800's, the area's lumber industry grew slowly because it lacked adequate markets. Timber was needed to build houses for early settlers but the population of Minnesota was less than 5,000. However, successful rafting of logs and lumber down the St. Croix and the Mississippi to points in Iowa and on down to St. Louis greatly increased the market for lumber, and lumbering quickly became the leading industry in the state.

The late 1800's proved to be the peak of lumbering activity in Carlton, Kanabec and Pine counties. Numerous towns began as sawmilling centers or supply depots for the multitude of logging operations in existence. Many small communities such as Rock Creek and Rutledge had as many as five sawmills. Log drives were an annual spring occurrence on nearly every river and stream in the area.

The first and largest commercial sawmill in Minnesota was built in 1838 at Marine-on-St. Croix to saw pine lumber. It operated for nearly a century. Four additional sawmills opened at Stillwater after 1843. These sawmills opened the area to extensive logging.

The St. Croix Valley remained a vital factor in building the west while there was timber to be cut. From 1840-1903, the estimated yield of St. Croix logs was over 11 billion board feet. In the peak year, 1890, approximately 3.5 million logs totalling over 452 million board feet were guided through the Stillwater Boom.

As the forests were cut, settlers moved in to clear and till the land. Removing the stumps and boulders was a slow, laborious task. When the prairies opened settlers moved there where they could plow in the spring and have a crop in the fall; the land did not have to be laboriously cleared of stumps. As a consequence, vast areas of cutover forest lands

were abandoned and became tax-delinquent. Very little of the land was ever used for farming. An influx of settlers from the east brought a renewed heavy demand for lumber from the Moose Lake Area.

~~Until the mid 1800's, logging and lumbering, not forestry, typified the~~ timber industry. In the early days loggers took the large white pine, red pine, jack pine and then the hardwoods. The cleared land was sold to settlers. Every lumber company had a land department for disposing of cutover lands. No attempt to reforest the land was made.

The logging was followed by fire. Sometimes the cutover lands were burned to protect the remaining stands of timber; frequently the fires were accidental. On September 1, 1894 brush and stumps in the cutover areas and swamps of western Pine County that had been smoldering all summer burst into flame, resulting in the ravaging Hinckley Fire. Sparks and burning embers set the mill yard at Hinckley and the dry swamp to the west of the village afire. In a matter of hours, the towns of Hinckley, Brook Park, Mission Creek, Friesland, Gronigen, Finlayson and Sandstone were destroyed and 418 people were dead. Later, these towns were completely rebuilt. Another tragic fire on October 12, 1918 destroyed the towns of Moose Lake and Cloquet. Fires lashed by gusts of wind up to 72 miles per hour raged over an area of more than 1,500 square miles. Property loss was estimated at \$28 million and lives lost numbered 438. The villages and farms destroyed by this fire were also later rebuilt.

By 1950, nearly all of the area's pine forests had been cut or destroyed by fire. The great stands of pine disappeared and the lumber industry had reached its peak. Today, second growth hardwood forests have largely replaced the pine forests. Farming, mainly cattle, now plays a large role in the area's economy.

History of State Forest Lands

Efforts to protect state forest lands were meager until the late 1800's. The Tree Bounty Law of 1871 authorized payment of a bounty for trees planted on the prairies and the Minnesota State Forestry Association was organized in 1876 to promote forest and water conservation in the state.

In 1895, after the devastating Hinckley fire, General C.C. Andrews appealed to the state legislature to create a forest commission to provide for better fire protection and for restoration of the forests. Instead, the State Auditor was made forest commissioner. He was authorized to appoint a deputy with the title of Chief Fire Warden at a salary of \$1,200 per year to enforce the fire laws the legislature passed that year. The Chief Fire Warden also was required to investigate the extent and characteristics of the forests in the state, the causes of fire, and the methods used to promote regrowth of timber.

General Andrews became the state's first Chief Fire Warden. He took charge of a force of 1,282 fire wardens the first year, including town supervisors, mayors of cities and the presidents of the village councils. No funds were provided for permanent employees other than the Chief Fire Warden so no fire prevention work was possible. Over the next 50 years many major fires occurred, for example:

- The Chisholm Forest Fire of 1908 burned over 20,000 acres and destroyed two million dollars worth of standing timber;
- The Baudette-Spooner Forest Fire of 1910 destroyed the towns of Baudette and Spooner, burning over one million acres of forest land and killing 42 people;
- The Cloquet-Moose Lake Forest Fire of 1918 destroyed the towns of Cloquet and Moose Lake and 25 surrounding villages and settlements, causing \$28,000,000 of property damage and taking 438 human lives; and
- In 1931 over 943,000 acres of land were burned over in northern Minnesota, the worst fire burning from Red Lake to the Canadian border.

The Legislature of 1905 changed General Andrews' title to Forestry Commissioner and expanded his duties beyond those of fighting fires. In 1909 General Andrews received funds to hire 24 rangers to fight fires, the state's first major financial commitment to keep fires in the state in check. In 1910 the Lake States Forest Fire Conference was held in St. Paul to discuss forest fire prevention and suppression. As a result of this meeting, new laws providing for the preservation and reforestation of forests and for the prevention and suppression of forest fires were enacted

to replace and strengthen practically all previous legislation. All responsibility for the preservation of the forest and prevention of fires was transferred from the State Auditor to the State Forestry Board. The management of state timber remained under the jurisdiction of the State Auditor.

Not until 1931 were all these activities joined together in the Division of Forestry of the newly created Department of Conservation. The Director of Forestry was then responsible for the administration of all state forests and other land set aside for forestry purposes, and the sale of all state timber. The Division's duties were no longer confined to fire protection and fire suppression, but grew to include the management of state-owned timber and forests, operation of forest nurseries, development of state forests and recreational areas, tree planting, private forest management assistance, forest research, utilization and marketing studies, land exchange, insect and disease control, and other state and federal cooperative projects.

Today about 18 percent of the forested land in the Moose Lake Area is protected and managed for forest purposes as part of the state forest system. A brief history and description of each of the eight state forests in the area can be found beginning on page 2-68.

Historical and Archaeological Sites

A review of the Minnesota Historical Society's records show no historical sites and only one archaeological site on Division of Forestry administered land in the Moose Lake Area. It should be noted, however, that potential archaeological sites do exist in the area, some of which are in close proximity to division lands. A thorough examination of division lands for archaeological sites has not been completed.

Demographics

Population

The 1980 population of the Moose Lake Area was 39,301, an increase of 5,982 since 1970. This increase of 18 percent compares to a 7 percent increase statewide for the same period. Net increases between 1970 and 1980 for each county were: 8.1 percent for the southern half of Carlton County; 24.4 percent for Kanabec County; and 18.1 percent for Pine County. This increase in population included a rapid immigration of 15.3 percent in Kanabec County and 11.5 percent in Pine County.

Most of this population was considered to be living in rural areas*, except the 2,890 living in Mora. The greatest percentage increases occurred in the cities of Askov, Pine City, Sturgeon Lake and Barnum. Percentage decreases in population occurred in Brook Park, Denham, Kerrick, Grasston, Sandstone and Willow River.

Carlton, Kanabec and Pine counties are projected to continue this rapid growth trend through the end of the century. Projected population growth through the year 2010 by county is 14.2 percent for Carlton County, 60.4 percent for Kanabec County, and 41.3 percent for Pine County.

Increased population growth in this area will add to existing pressures for conversion of forested land for year-round and seasonal residences and will place an added burden on the forests for recreation, particularly day use activities such as hunting and snowmobiling. Increased settlement may also increase the potential for wildfires, resulting in significant impacts on the division's fire management program.

*Towns or cities with populations under 2,500.

Employment

Unemployment rates in the Moose Lake Area have been running higher than the state average. The 1982 annual average unemployment rate was 7.8 percent for the state, 8.7 percent for Carlton County, 11.8 percent for Kanabec and Pine counties. The October 1983 figures do not show much improvement relative to the overall state rates: 6.4 percent for the state, 9.6 percent for Carlton County, 8.7 percent for Kanabec County and 8.9 percent for Pine County. Area employment is high in manufacturing and construction, and consequently, the area experiences higher seasonal unemployment than the state as a whole. This is illustrated by high unemployment rates during the 1982-83 winter months: 16.8 percent for Carlton County, 17.8 percent for Kanabec County and 18.1 percent for Pine County.

Income

The median family income in 1981 was \$14,821 in Pine County, \$15,220 in Kanabec County and \$20,901 in Carlton County. The comparable median family income statewide in 1981 was \$23,230.* All three counties had median family income increases of less than 12 percent for 1979-1981, among the smallest increases in the state. Statewide the increase in median family income for 1979-1981 averaged 16.4 percent.

In 1979, 15.3 percent of persons in Pine County, 14.8 percent of persons in Kanabec County and 8.8 percent of persons in Carlton County were estimated to be at or below the poverty level. This compares to 9.5 percent statewide. The high unemployment in the Moose Lake Area creates a substantial pool of available labor. During times of high unemployment, the Division of Forestry has participated in various state and federally-funded job programs.

*Federal adjusted gross income reported by the Minnesota Department of Revenue.

Transportation Systems

Highways

The Moose Lake Area is reasonably well served by existing transportation facilities. Interstate 35 runs the entire length of the area through Pine and Carlton counties. State highway 65 runs the entire length of Kanabec County and state highway 23 cuts diagonally across the area from southeastern Kanabec County to east-central Carlton County. Other state highways and county and township roads feed into these major arteries providing good access to the entire region.

Access to the area is also provided by 64.3 miles of year-round state forest roads. State forest road maps, inventory information, and proposed maintenance and improvement projects are described in the State Forest Road Plan (MN DNR, Division of Forestry, 1982). The State Forest Road Program is described in detail on page 2-102.

No major construction projects are planned on state highways in the area through 1989. Minor projects include those listed in Table 2.1.

Table 2.1. State Trunk Highway Construction Projects Planned for the Moose Lake Area, 1984-1989.

| County | Highway | Type of Project | Year |
|---------|---------------------------------|-----------------------------------|---------|
| Kanabec | #70 near Grasston | New alignment | 1984 |
| Kanabec | Junction of #65 and #23 in Mora | Improvement | 1984 |
| Pine | #48 near Danbury | Bridge replacement, new alignment | 1984-85 |
| Pine | #70 | Bridge replacement, new alignment | 1988-89 |
| Carlton | #73 in Moose Lake | Bridge replacement | 1986 |

Source: Minnesota Department of Transportation, 1984.

Highway access in the Moose Lake Area, overall, is adequate for the movement of wood products and to provide access to recreational facilities. However, improvements may be needed to correct isolated transportation deficiencies that are needed to achieve desirable objectives. Certain state highways could be upgraded to carry nine-ton per axle loads. This action would provide for safer movement of wood and less damage to the existing road system from heavy loads of logs and wood chips.

Airports

Additional access to this area is provided by local airports. Intermediate airports (i.e., paved, lighted, runways less than 5,000 feet long) are located at Sandstone and Cloquet. Landing strips (i.e., unpaved, not lighted, and generally 2,500 to 3,500 feet long) are maintained at Mora, Pine City and Moose Lake. The landing strip at Mora is presently being upgraded to an intermediate airport with lights and a paved runway. The airports at Moose Lake and Sandstone, and a private landing strip at Hinckley, are used for fire protection purposes.

Railroads

Two rail companies service the Moose Lake Area. The Soo Line Railroad operates a line from St. Paul through Danbury, Wisconsin to Superior, Wisconsin and one from Brooten to Superior, Wisconsin through Moose Lake. Burlington Northern Railroad operates a line from the Twin Cities to Duluth paralleling Interstate 35 to Hinckley where it joins with a line which follows State Highway 23 from Brook Park to Superior, Wisconsin. An additional Burlington Northern line goes from Minneapolis to Brook Park through Grasston and Henriette. The Milwaukee Road, Canadian Pacific, Union Pacific, and the Chicago North Western have trackage rights to travel over the Burlington Northern line but do not service the area.

As profitability declines on individual rail lines they are identified by the rail companies for possible abandonment. Recent abandonments in the Moose Lake Area include the Soo Line from Carlton to Moose Lake and the Burlington Northern line from St. Cloud to Brook Park. The 1981-82 Minnesota State Rail Plan (Minn. Department of Transportation, 1982) identifies the Soo Line from Danbury to Superior as a proposed abandonment. The plan also identifies the recently abandoned line from Carlton to Moose Lake as a potential rail banking project. The purpose of a rail bank program is to preserve abandoned rail line rights-of-way for future public and commercial transportation use. The Moose Lake to Brooten line is scheduled for rehabilitation between 1985 and 1990. Abandoned railroad corridors could be used for state forest roads or trails.

ECONOMIC PROFILE

Economic Overview

The decentralized nature of economic activity within the Moose Lake Area is demonstrated by the lack of a single identifiable economic center. Several towns within the area, each with significant economic development characteristics, are referred to as Primary Economic Activity Centers (East Central Regional Development Commission, 1983). Hinckley, Mora, Moose Lake, Pine City and Sandstone share a mix of employment, commercial, recreational, medical, cultural, governmental and educational activities. Each is located within a relatively large land area and each has a significant economic effect on surrounding communities.

With the steady loss of employment opportunities in the agriculture industry and recent increases in manufacturing, construction, retail trade and services, the labor force has begun to concentrate in and near the larger population centers. The spread of manufacturing employment has provided an opportunity for farm families to supplement their incomes with non-agricultural employment, thus stabilizing year-round earnings, increasing the number of wage earners per family, and reducing the pressure to consolidate small and medium-sized farms.

Non-farm employment trends suggest that most of the economic growth in the area is taking place in the south, where growth rates are at or near the statewide average. Carlton County, on the other hand, suffers from its proximity to the depressed conditions of Duluth and the Iron Range.

While total growth, as measured by non-farm employment, appears to be keeping pace with the state as a whole, growth in basic (export) industries has lagged far behind the state as a whole. Taken in combination with the overall growth in employment, this trend suggests that much of the economic growth in the area is concentrated in the local service and trade sectors.

Forest sector employment trends present an interesting picture of a growth industry in Kanabec and Pine counties and a receding industry in Carlton County. Statewide the trend in this sector has been toward growth through mechanization and productivity with a concurrent but minor loss in employment.

The ratio of total employment to basic industry employment (or Basic Employment Multiplier) for 1970 and 1980 confirms the diversification of the economy in the Moose Lake Area and its individual counties (Table 2.2). This was somewhat counter to the trend at the statewide level where the emphasis was on increases in the export (base) sectors.

The location quotient, a measure of industrial specialization, shows that the economy in the Moose Lake Area is more forest sector oriented than the state as a whole. Although, over time the trend in both the area and the state have been diversifying, with this trend being more pronounced at the area level, mainly due to changes in Carlton County's economy.

Shift-Share analysis of the forest sector of the Moose Lake Area economy indicates that both industrial mix (i.e., diversification) and inter-regional competition are the major forces of change. Competition between this sector in the Moose Lake Area and the same sector in other areas being the most significant source of change. This is counter to the statewide trend where diversification is, by far, the major force for change in the forestry sector.

Table 2.2. Economic Descriptors for the Moose Lake Area.

| | Basic Employment (Multiplier) Ratio | | | Forest Sector Location Quotient | | | Shift/Share Coefficient | | |
|-----------------|--|------|----------|------------------------------------|------|----------|-------------------------|-----------------|-------------------------|
| | 1970 | 1980 | % Change | 1970 | 1980 | % Change | Nat'l. Growth | Industry Mix | Regional Competition |
| Carlton County | 2.32 | 2.86 | + 0.54 | 10.13 | 5.57 | - 4.56 | + .49 | - .60 | - .89 |
| Kanabec County | 2.45 | 2.65 | + 0.20 | .36 | .93 | + 0.57 | + .19 | - .23 | - 1.04 |
| Pine County | 2.59 | 2.70 | + 0.11 | 1.06 | 2.13 | + 1.07 | + .30 | - .38 | - 1.07 |
| Moose Lake Area | 2.42 | 2.76 | + 0.34 | 5.49 | 3.54 | - 1.95 | + .61 | - .75 | - .87 |
| State of MN | 3.33 | 3.27 | - 0.06 | 1.06 | .97 | - 0.09 | + 4.13 | - 3.87 | - 1.25 |

Data Source: U.S. Bureau of the Census.

Manufacturing

Manufacturing employment in the Moose Lake Area, as listed in the 1981 County Business Patterns (CBP), was 3,717 persons or 33.5 percent of total employment. According to the CBP there was more employment in this sector than in any other, followed by 26.5 percent employed in retail trade and 21 percent in services.

The total payroll for manufacturing in 1981 was \$69,569,000 or one percent of the total state payroll. This was the largest contributor to the total payroll for the three counties. The largest manufacturing category (as measured by employment) was paper and allied products. Other large categories are stone, clay and glass products, and coal products. These three sectors are represented only in Carlton County. Paper and allied products employment is principally in Cloquet, and petroleum and coal product employment is located near Wrenshall; both cities are located in northern Carlton County.

Other manufacturing in the area includes machinery, transportation equipment, food and kindred products, instruments and related products, apparel and other textile products, lumber and wood products, and rubber and miscellaneous plastics.

Gross manufacturing sales in Carlton County for 1982 were \$102,752,509, or 34 percent of the total sales by businesses reporting sales tax in that county. Gross sales for the year in Kanabec County were \$22,604,258, or 27 percent of the total county sales, and in Pine County were \$3,643,037, or 4 percent of total county sales. The most significant classification within the manufacturing sector in terms of gross sales is machinery.

Wood and Wood Products

There are presently 39 active wood products mills in the three county area (Table 2.3). They consume approximately 77,600 cords per year.

Table 2.3. Number of Primary Wood Processing Mills by Production Class.

| <u>Active Sawmills (Volume in MBF/year)</u> | | | |
|---|---------------------|-------------------|------------------------|
| <u>Production Class</u> | <u>No. of Mills</u> | <u>Production</u> | <u>% of Production</u> |
| 10000+ | 1 | 24,800 | 71 |
| 1001-5000 | 3 | 6,400 | 18 |
| 251- 500 | 3 | 1,770 | 5 |
| 101- 250 | 8 | 1,140 | 3 |
| 51- 100 | 7 | 610 | 2 |
| 0- 50 | 15 | 308 | 1 |
| TOTAL | 37 | 35,028 | 100 |

| <u>Active Mills Excluding Sawmills (Volume in cords/year)</u> | | | |
|---|---------------------|-------------------|------------------------|
| <u>Production Class</u> | <u>No. of Mills</u> | <u>Production</u> | <u>% of Production</u> |
| 1001-5000 | 2 | 7,540 | 100 |

NOTE: North half of Carlton County included.

Source: MN DNR, Division of Forestry, 1983.

The majority of the sawlog resource harvested in the Moose Lake Area is presently processed into rough lumber at local mills. However, significant amounts of pulpwood are exported to other areas of the state and to Wisconsin mills.

Secondary wood processing firms, those that convert rough lumber to a finished or partially finished product, are presently lacking in Pine and Kanabec counties. Those existing in Carlton County are mostly confined to the northern portion of the county.

Travel and Recreation

Total travel expenditures for the three county Moose Lake Area for 1979 were \$30,940,000, or 0.8 percent of the state total. Travel is defined as those activities associated with overnight trips away from home and day trips to places 100 miles or more away from the traveler's origin.

Economic impact is represented by measures of spending, employment, payroll, business receipts and tax revenue in each Minnesota county generated by traveler spending (Table 2.4).

Table 2.4. Economic Impact Generated by Travel Expenditures.

| | State | Carlton* | Kanabec | Pine |
|---|-----------|----------|---------|--------|
| Total Travel Expenditure (\$1000) | 4,001,724 | 11,900 | 1,962 | 17,078 |
| Total Travel Generated Payroll (\$1000) | 876,469 | 2,269 | 337 | 3,064 |
| Jobs in Travel | 108,422 | 328 | 43 | 371 |
| State Tax Receipts (\$1000) | 185,901 | 543 | 72 | 513 |
| Local Tax Receipts (\$1000) | 32,704 | 68 | 10 | 92 |

*Figures are for all of Carlton County.

Source: Impact of Travel on State Economies, 1980. Study prepared for Minnesota Office of Tourism by U.S. Travel Data Center, December 1983.

The number of full-time jobs attributable to travel expenditures in 1979 was 742, or 0.7 percent of the state total. The total travel generated payroll in the three county area is \$5,670,000, or 0.6 percent of the state total. This figure includes the payroll or wage and salary income attributable to travel expenditures. Payroll is reported before deductions for social security, income tax, insurance, union dues, etc.

The state tax revenue attributable to travel in this area in 1979 was \$1,128,000 or 0.6 percent of the state total. Local tax revenue attributable to travel expenditures is \$170,000 or 0.5 percent of the state total. Travel expenditures, as a percent of total sales by businesses, were 4 percent for Carlton County, 2 percent for Kanabec County, and 19 percent for Pine County.

A portion of the travel expenditures in the Moose Lake Area are derived from tourists who use the area for outdoor recreation activities. Residents (i.e., those traveling less than 100 miles) also contribute to outdoor recreation expenditures in the area.

Recreation-related expenditures, although difficult to accurately measure, contribute significantly to the economy of the Moose Lake Area. Estimates prepared by the Minnesota DNR, Division of Forestry using 1981 camper attendance data show camping-related expenditures totaling \$41,813 for five forestry-administered campgrounds in the area.* This primary expenditure is projected to have a local economic impact of \$71,082 and a statewide impact of \$153,873.

In addition to camping, the area receives heavy recreational use for a variety of other activities. For example, in 1982 21,210 resident hunting licenses, 814 trapping licenses, 169 non-resident hunting licenses* and 1,591 state waterfowl stamps were sold in Pine, Kanabec and Carlton counties. Revenues from these sales totaled \$327,512. An additional \$22,000 in issuing fee revenues was also returned directly to the area economy. Additional local expenditures related to these activities are thought to be considerable.

The tourist-travel industry is not considered a major industry in east-central Minnesota but does have good potential for expansion, particularly in Pine and Kanabec counties. The area has excellent rivers and streams, and contains sizable state parks and forests that are within a one to two hour drive of the Twin Cities metropolitan area and Duluth.

*Estimated economic impact of DNR campers based on 1980 Wisconsin Camper Survey conducted by the Recreational Research Center, University of Wisconsin Extension and Minnesota DNR, Division of Forestry. No data available for D.A.R. Campground.

Agriculture

The proportion of Minnesota's total land area in farms, by county, averaged 56.5 percent in 1978. Land in farms for that year was 157,074 acres (28.5 percent of land area) in Carlton County; 185,494 acres (55.3 percent of land area) in Kanabec County; and 305,730 acres (33.8 percent of land area) in Pine County. The land area in farms increased from 1974 figures of 22.2 percent of Carlton County, 51.7 percent of Kanabec County and 31.1 percent of Pine County. Farm land use by county is shown in Table 2.5.

Table 2.5. Farm Land Use by County, Moose Lake Area (in acres).

| | Carlton* | Kanabec | Pine |
|---------------------------------|---------------|---------------|---------------|
| Harvested | 48,281 | 66,040 | 105,880 |
| Pasture | 19,639 | 19,311 | 33,696 |
| Cover crops | 1,251 | 2,105 | 3,434 |
| Crop failure | 2,017 | 1,170 | 2,029 |
| Cultivated summer fallow | 495 | 537 | 631 |
| Idle | 3,677 | 3,683 | 5,697 |
| Woodland-pastured | 22,103 | 27,693 | 45,108 |
| Woodland-not pastured | 37,476 | 24,614 | 50,852 |
| Other pastureland and rangeland | 9,604 | 24,233 | 27,503 |
| House lots, ponds, roads, etc. | <u>12,531</u> | <u>16,108</u> | <u>30,900</u> |
| TOTAL | 157,074 | 185,494 | 305,730 |

*Includes north half of Carlton County.

Source: 1978 Census of Agriculture.

The number of farms in the three-county Moose Lake Area with sales over \$2,500 increased between 1974 and 1978 from 355 to 473 farms in Carlton County; from 538 to 638 farms in Kanabec County; and from 858 to 983 farms in Pine County. The value of agricultural products sold from these counties in 1978 was less than \$20 million in Carlton and Kanabec counties, and between \$20-49 million in Pine County. The state total for that year was \$4,542,566,000. The relatively poor soils for crop production have increased the importance of livestock production in the area. In all three counties, the sale of livestock and poultry products contributed to the majority of the agricultural value. In 1974, between 80 and 92 percent of all agricultural products sold in all three counties were in the livestock-poultry category.

ENVIRONMENT AND NATURAL RESOURCES

Climate

Temperature

The temperate, continental climate of the Moose Lake Area is characterized by moderate annual precipitation and seasonal extremes in temperature. The temperatures of the northern portion of the region can drop as low as -50° Fahrenheit. The highest temperature which can be expected is around 100° F. Mean daily maximum temperatures for July range from 67.5° F at Moose Lake to 70.6° F in Mora. Summer temperatures in Moose Lake are tempered by its proximity to Lake Superior, and to a lesser extent by smaller inland lakes and vegetative cover. Winter temperatures range from an average 7.7° F January reading in Moose Lake to 9.4° F at the Mora station. The mean annual temperature for both stations is about 40° F.

Precipitation

Precipitation varies slightly within the area. Average annual precipitation increases from west to east. Across the area the average is about 28 inches per year. The soil water profile is highly variable, but soil water levels are generally highest between April and June when precipitation levels and snowmelt are at a maximum.

Annual snowfall totals can range from less than 50 to more than 70 inches. The area experiences an average of 120-125 snowcover days per year (one inch or more) beginning on November 20 and extending through approximately April 10. However, the onset, depth and duration of snowcover varies widely from year to year. Spring snowcover can help to greatly reduce forest fire danger and delay the onset of dangerous fire conditions.

Growing Season

The average growing season within the area is the most variable climatic characteristic. In the southern portion of the area the growing season averages 135 to 140 days, whereas in the northern sections the growing

season can be as short as 95 days. This variation in the length of growing season is due primarily to the influence of Lake Superior on climatic conditions in the northeastern portion of the Moose Lake Area.

Geology and Soils

Bedrock Geology

There are six major bedrock formations underlying the Moose Lake Area (Figure 2.2). They are: 1) an undivided (Chengwatana) volcanic rock unit, 2) the Hinckley and Fond du lac formations, 3) the Thomson formation, 4) the McGrath Granite Gneiss formation, 5) an unnamed intrusive rock unit (dominantly quartz diorite, granodiorite and quartz monzonite), and 6) Cambrian rocks (dominantly quartzose and glauconitic sandstone). There are also two smaller areas of bedrock associated with the Mille Lacs group in the western portion of the area.

The volcanic rock unit on the eastern side of Pine County is associated with the Keweenaw period (1.1 billion years old). Included are basalts, andesites and minor felsic rocks. Some interbeds of conglomerate and sandstone are also present. Exposed areas of this formation can best be viewed at the St. Croix Dalles area around Taylors Falls, Minnesota.

The Hinckley and Fond du Lac formations are present in a line from southeastern Carlton County through central Pine and eastern Kanabec counties. The Hinckley formation overlies the Fond du Lac. It is a cemented quartz sandstone, medium to very thickly bedded, fine to coarse grained, and generally buff colored with local red and yellow straining. The Fond du Lac formation is a feldspathic sandstone, with interbedded mudstone. Exposures of the Hinckley formation may be seen along the Kettle River from south of Rutledge down to Sandstone. Outcroppings of the Fond du Lac can be seen along the St. Louis River, west of Duluth. It is also exposed north of Mora in Kanabec County along the Snake River.

The Thomson Formation is found in the southwestern part of Carlton County and the northwestern corner of Pine County. It consists dominantly of graywacke (an impure gray sandstone), siltstone and shale. Locally there

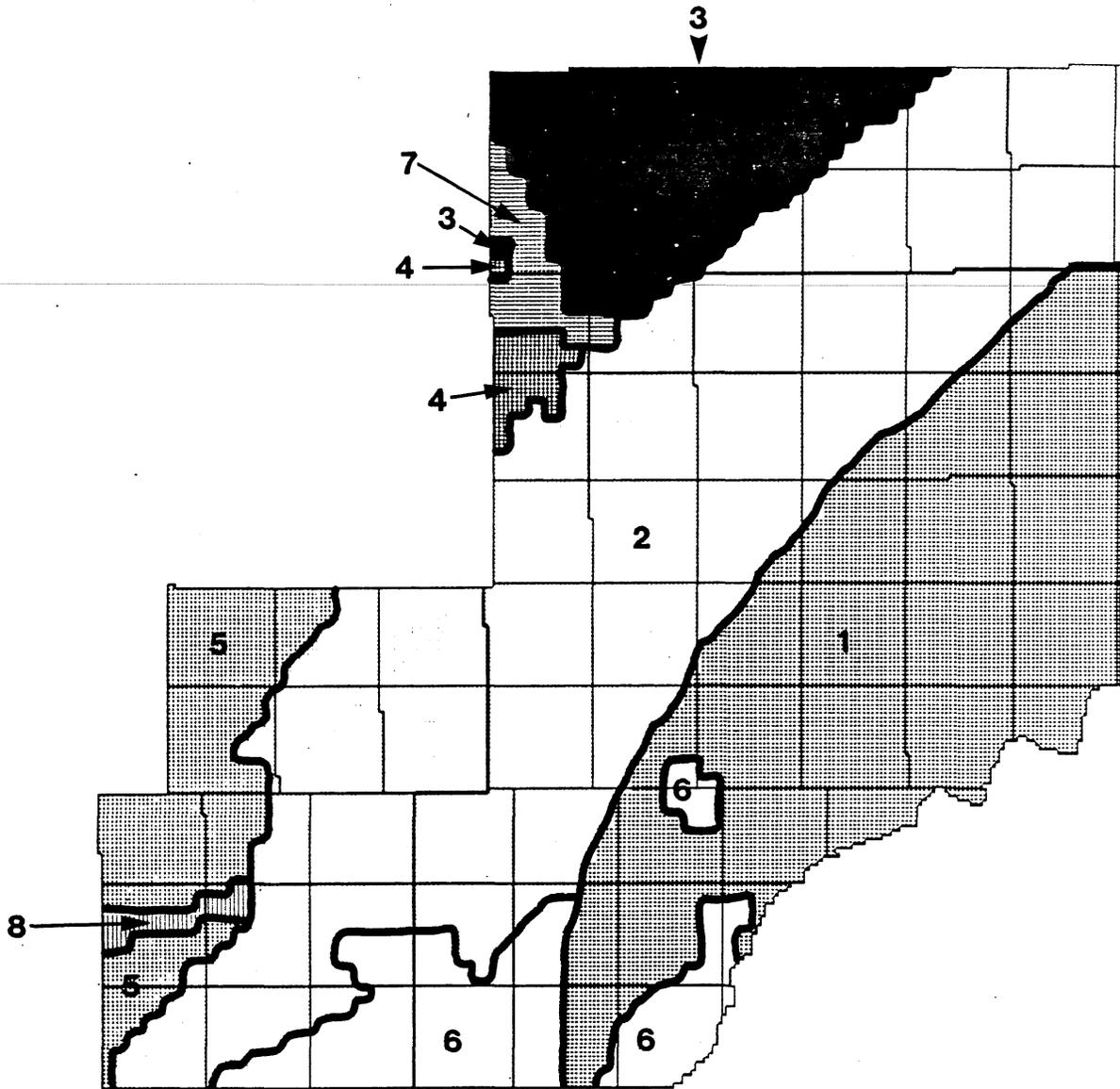


Figure 2.2. Bedrock Geology of the Moose Lake Area.

- 1 Chengwatana volcanic group, basalt and associated rocks.
- 2 Red to buff shale and feldspathic to quartzose sandstone, includes Fond du Lac formation and Hinckley sandstone.
- 3 Slate, metagraywacke, and associated metavolcanic rocks, includes Virginia, Thomson and Rabbit Lake formations of the Animikie group, and associated unnamed iron formations.
- 4 Gneiss and amphibolite, locally migmatitic, includes some granitoid rocks of late Archean and Proterozoic X ages.
- 5 Granitoid rocks of 1,850 M.Y. age group, includes Stearns granitic complex of central Minnesota.
- 6 Cambrian rocks, undivided, dominantly quartzose and glauconitic sandstone and siltstone with lesser amounts of carbonates.
- 7 Quartzose sedimentary rocks of the Mille Lacs and Animikie groups, quartzite, quartz wacke, grit includes minor carbonate rocks, iron formation and volcanic rocks.
- 8 Randall and Olen Township formations of the Mille Lacs group, metamorphosed mafic and intermediate volcanic rocks, includes Minot iron formation, carbonaceous slate, and quartzite.

Source: Minnesota Land Management Information Center, 1984.

are some volcanic rocks. All of the formation is metamorphosed to some extent.

The McGrath Granite Gneiss Formation is a metamorphic rock formation occupying a very small area in the northwestern corner of Pine County. Known outcrops of this formation are relatively sparse and small. The rock is a coarse grained, pinkish grey biotite gneiss. The McGrath Gneiss is at least 2.7 billion years old, much older than the Thomson Formation.

Another major underlying hard rock formation in the Moose Lake Area is the Warman quartz monzonite or granite located in the western half of Kanabec County.

Mineral Potential

Most of the Moose Lake Area falls into the "B", "C", and "D" classes of mineral potential (MN DNR, Office of Planning, 1983). Class B represents geologic formations where metallic mineral bearing units are known to occur in the geologic formation, and areas where the geology is very similar to that in areas elsewhere in the world containing major metallic mineralization. Class C represents areas in which the geology is generally not well known, although it is similar to geologic environments in other areas of the world that are known to contain a variety of economic mineral deposits. Class D represents areas in which the possibility of metallic mineral deposits is present, but less likely than Class B or C formations.

There is potential for a variety of minerals to occur in this area, depending on the underlying bedrock. Several quarries have produced dimension stone from the Keweenaw sandstones and from the Warman quartz monzonite. Traces of native copper are common in outcrops of the volcanic rock group. Several old copper mine workings exist in Pine County near Pine City and Hinckley. The volcanic rocks in Minnesota are the southwest continuation of the lava sequence in the Keweenaw Peninsula of Michigan, which has produced copper for more than a century. Future discovery of mineable copper is possible. Other metals or elements that could occur include gold, silver, zinc, lead, phosphorite, manganese, uranium, nickel and graphite.

In the 1985 Copper-Nickel lease sale, private exploration companies bid on five sections of land in the Moose Lake Area. Exploration for minerals on these parcels could lead to mining. Also, oil and gas interest has developed in Pine, Carlton, and Chisago counties in Minnesota and in adjoining Douglas County, Wisconsin. There are now thousands of acres of oil exploration leases on private lands in the Minnesota counties and the several hundred thousand acres of leases in Douglas County. This interest is due to the fact that the mid-continent rift extends north to south through the area.

Sand and gravel deposits are scattered throughout the three-county area. Extensive deposits are located along the St. Croix River in Pine County, the Snake River from Pine City to Mora, the Moose Horn River in Carlton and Pine counties, and in the Hinckley outwash in Pine County. Commercial gravel mining operations are established in the outwash along the Moose Horn River in Carlton County and the Willow River and Hinckley outwash deposits in Pine County. Lake Nemadji lacustrine clay is mined at Wrenshall in Carlton County for manufacturing brick and tile products.

A large area of sandstone and quartzite close to the surface is found in western Pine County along either side of Interstate 35 from Beroun to Rutledge. This 10-mile wide area is the most significant deposit in the state outside of southeastern Minnesota.

The Moose Lake Area, particularly Pine and Carlton counties, was recently (1978-1982) intensively explored for uranium. All drilling conducted was on private lands, and a few walk-on permits were granted on state lands. No economic deposits were discovered, and there is no exploration being conducted at this time.

Surficial Geology

A geomorphic region is defined as a broad physiographic feature such as a lake plain, glacial outwash plain, or moraine. These regions were determined primarily by the contour or relief of a given landscape,

together with the parent soil material. Within the Moose Lake Area, nine geomorphic regions have been defined (Figure 2.3) (Univ. of Minn., Agricultural Experiment Station, 1977 and 1980).

McGrath Till Plain - This geomorphic region covers approximately 946,680 acres throughout the northeastern and central portions of the Moose Lake Area. It is a gently rolling till plain containing many peat bogs. Peat occurs in about 20 percent of the region. Another 16 percent is somewhat poorly to poorly drained. In the northeast part of the region the ratio of peat to well-drained soils is higher than elsewhere. Several prominent eskers formed in glacial tunnel valleys occur in the vicinity of Finlayson in northern Pine County and are a good source of gravel. The depth to water table on well-drained areas is normally over 6 feet. In the peat bogs and lower areas the depth to water table is zero to 6 feet.

The glacial drift ranges from neutral to slightly acid and reddish-brown. Most of the till is fine sandy loam. A small area of clayey till in the Finlayson area is an exception. The eskers are composed of sand and gravel with some cobble. In a few places the eskers contain a thin veneer of till. The water-holding capacity of the till soils is high and of the coarse-textured soils, low. This till plain contains many peat bogs, some fairly large, and other poorly drained areas.

The original vegetation was largely red and white pine, but included areas of northern hardwoods, especially in Kanabec County. The present forest is predominantly aspen with mixed hardwoods, white spruce, balsam fir and red pine. Tamarack and black spruce still occupy most peat areas. Cropland and pastures make up 5 to 15 percent of the region.

Hinckley Outwash Plain - This region consists of a sand plain that covers approximately 131,240 acres between Hinckley and the St. Croix River in Pine County.

The sand plain is nearly level to gently undulating and includes a few peat bogs. In most of the region the water table is normally over six feet deep, in the peat bogs it is surface to three feet deep. Total water area is about 950 acres not including the St. Croix River.

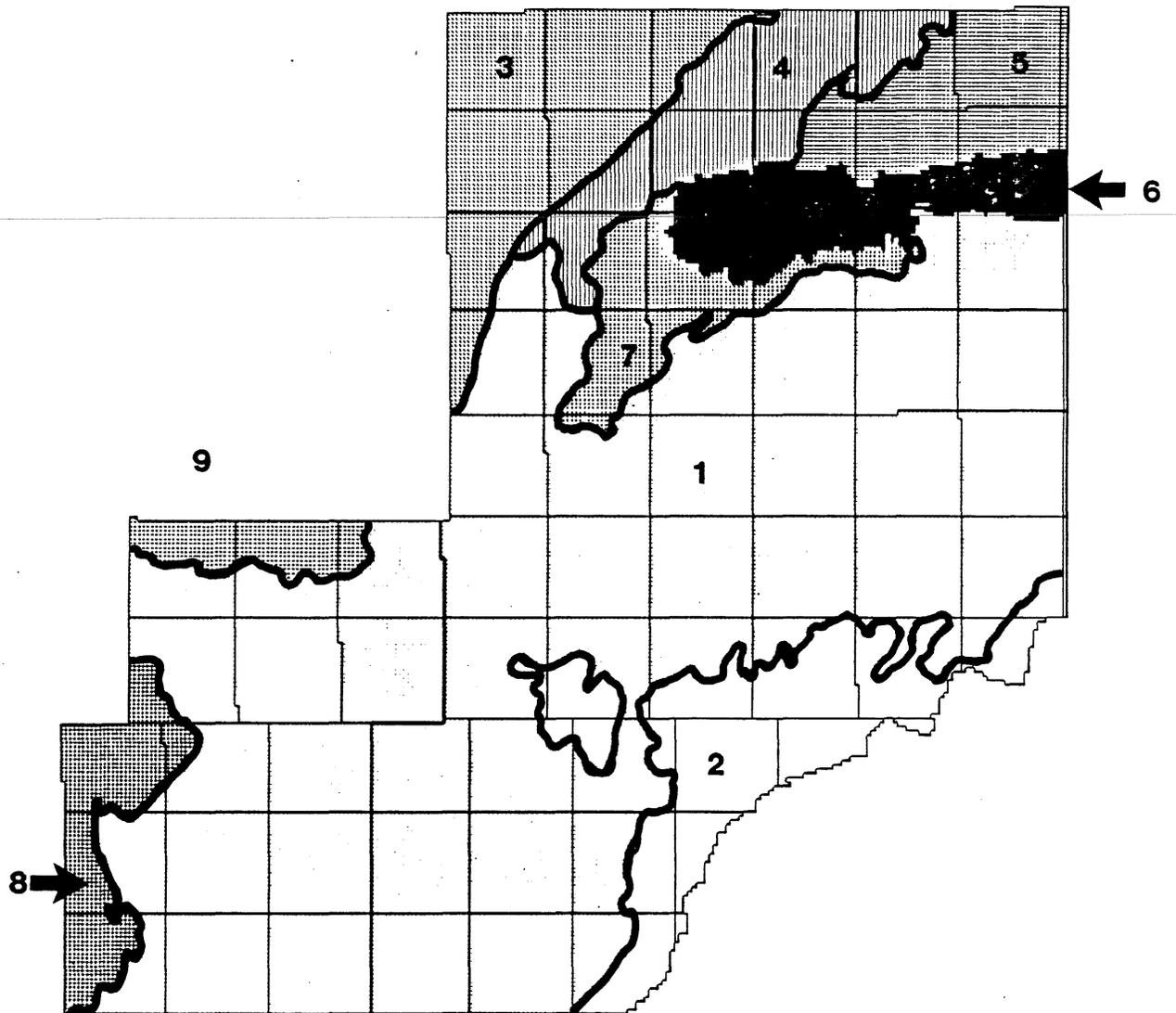


Figure 2.3. Geomorphic Regions of the Moose Lake Area.

- 1 McGrath Till Plain, loamy, gently rolling
- 2 Hinckley Outwash Plain, sandy
- 3 Automba Drumlin Area, loamy
- 4 Thomson-Cloquet Moraine Complex, rolling
- 5 Nemadji-Duluth Lacustrine Plain, clayey
- 6 Nickerson Moraine, loamy to clayey
- 7 Willow River Outwash Plain, sandy
- 8 Brainerd-Pierz Drumlin Area, loamy
- 9 Mille Lacs Moraine Complex, rolling

Source: Minnesota Soil Atlas, University of Minnesota, Duluth and Stillwater Sheets (1977 and 1980).

The drift is composed of reddish-brown, acid sand and gravel. Soils in most of the region are sandy loam to loam in the upper 18 to 30 inches. Sandy loam till is within 4 feet of the surface in a few places. The water-holding capacity ranges from moderate to low.

Original vegetation was largely northern hardwoods. Present land use is 45 to 65 percent forest, 25 to 35 percent cultivated land, and 5 to 15 percent pasture. Aspen and other hardwoods dominate the forests.

Automba Drumlin Area - This area covers approximately 111,560 acres in northwestern Pine and southwestern Carlton counties. It contains drumlins which are generally oriented west. In the northern part of the region the drumlins are oriented northwest. Toward the middle and southern portion they are oriented west and southwest. The individual drumlin averages $\frac{1}{2}$ to 1 mile long, $\frac{1}{8}$ mile wide and only 25 feet high. Poorly drained mineral and peat soils separate the drumlins.

Included in this region is the small Split Rock Drumlin Field, located near Finlayson in northern Pine County. This field contains about 59 drumlins, each averaging about 2,000 feet long, 500 feet wide, and 20 feet high with westward orientation.

The till is nonlimy, reddish-brown fine sandy loam. The soils have Hardpan characteristics between about 16 and 60 inches. Peat makes up about 23 percent of the region. The water-holding capacity in most of the soils is high.

The original vegetation was principally red and white pine. Tamarack and black spruce occupied most of the peat bogs. At present, 75 to 85 percent is forested. Aspen, mixed hardwoods, spruce and fir are the main species.

Thomson-Cloquet Moraine - This geomorphic region covers 84,680 acres in south central Carlton and northwestern Pine counties.

The Cloquet Moraine was formed during the Split Rock phase and the Thomson during the Nickerson phase. The topography is rolling in most of the

region but includes hilly land. Small wet depressions and peat bogs are common. In most of the region the depth to water table is over 10 feet. The water-holding capacity ranges from high to low.

The original vegetation was mainly red and white pine. Present forest cover is principally aspen with minor amounts of other hardwoods, spruce and fir. Only scattered areas are in cultivation and pasture.

Nemadji-Duluth Lacustrine Plain - The Nemadji-Duluth plain covers approximately 71,960 acres in eastern Carlton County. The region is dominantly a flat plain deeply dissected by the St. Louis and Nemadji rivers and their tributaries. The plain is about 400 feet above the present level of Lake Superior.

Clays occupy about 53 percent of the region and sands another 34 percent. The sandy soils are nonlimy and the water holding capacity ranges from high to low. Lime is leached to depths of 16 to 32 inches in clay soils. Depth to bedrock is variable, but generally more than 6 to 20 feet.

The original vegetation was northern hardwoods, white spruce and balsam fir. An estimated 5-15 percent is cropland and pasture. Aspen, mixed hardwoods, spruce and fir are the dominant forest types.

Nickerson Moraine - This geomorphic region covers approximately 67,560 acres in extreme northern Pine and southern Carlton counties. This moraine is characterized by extremely broken and irregular topography. Small wet depressions and peat bogs are fairly common. On upland areas the depth to water table is normally over 10 feet. In peat bogs the depth to water table is 0 to 3 feet deep. Textures of the till range from loam to clay. The drift includes areas of water sorted sand and gravel. The drift is reddish-brown and neutral to mildly alkaline. The water holding capacity ranges from high to low in most of the region.

Originally, the vegetation consisted of red and white pine with some upland spruce and fir in the eastern part of the region. Present forest cover is aspen, hardwoods, white spruce and fir. Only scattered areas are cultivated and pastured.

Willow River Outwash Plain - This geomorphic region covers approximately 53,040 acres in north central Pine and south central Carlton counties.

The region is characterized by a nearly level to gently rolling plain. Near Sturgeon Lake it is a well-developed pitted outwash. The water table is normally over 6 feet deep. In the peat bogs the depth to water table is surface to 3 feet. Part of Sturgeon Lake and two other major lakes are located in the region. The Willow and Kettle rivers flow through the plain.

The outwash drift is reddish-brown acid sands. The soils are excessively drained and have a low water-holding capacity. Peat bogs make up about 10 percent of the plain.

The original vegetation was jack pine. Present land use consists of 75 to 85 percent jack pine and aspen forest. The remaining 15 to 25 percent is cultivated land and pasture.

Brainerd-Pierz Drumlin Area - This geomorphic region covers 48,320 acres in western Kanabec County. It is characterized by relatively low drumlins separated by poorly drained mineral and peat soils. The drumlins are oriented in a general east-west direction. They range from about 1 to 2 miles long and $\frac{1}{4}$ to $\frac{1}{2}$ mile wide. The depth to water table is normally more than 6 feet deep on the drumlins and surface to 3 feet deep in the low areas.

The till is brown, sandy loam, usually stony and often dense. The eastern part of the till is reddish-brown and in places capped with 1 to 3 feet of silt. There is medium water-holding capacity of the soils in most of the region.

Originally, the vegetation in the eastern part of the region was predominantly red and white pines. Tamarack and black spruce occupied most of the peat bogs. An estimated 45 to 55 percent of the region is forested. Aspen dominates but the forest has other hardwoods and pines on drumlins. Tamarack and black spruce occur on most bogs.

Mille Lacs Moraine Complex - This geomorphic region covers approximately 24,400 acres in Kanabec County. The region is rolling to hilly, with knob and kettle topography. Many small wet depressions and peat bogs occur. Normally the depth to water table is over 10 feet on the knobs and zero to 6 feet deep on lower positions and peat bogs.

The drift consists mostly of acid, reddish-brown till, but sandy and gravelly pockets are common. Most of the soils contain hardpans. The water-holding capacity ranges from high to low.

The original vegetation was a mixture of red and white pine, and white spruce with balsam fir in poorly drained areas. Some hardwoods were found in the area. Tamarack and black spruce occur on most bogs. Aspen, maple, basswood and oak are the main forest species.

Soils

A soil landscape unit is a group of soils generalized into a single identifiable unit based on soil texture, drainage and color. A complete description of each soil landscape unit is contained in the Minnesota Soil Atlas, Duluth and Stillwater Sheets, published by the University of Minnesota, Agricultural Extension Service (1980 and 1977). Table 2.6 describes the dominant soil landscape units within each geomorphic region according to the classification system identified above.

There is a significant acreage of peat (partially decayed organic material) in the Moose Lake Area. While there is growing interest in mining peat resources for energy, the suitability of peat deposits for this use is dependent on several factors. These include the depth and areal extent of the deposits, the humification and botanical origin of the peat, as well as its accessibility, and economic feasibility.

Table 2.6 Soil Characteristics by Geomorphic Region in the Moose Lake Area

| GEOMORPHIC REGION | DOMINANT SOILS* | ROOT RESTRICTIONS | SOIL FERTILITY |
|-------------------------------------|------------------------------|--|---|
| Brainerd-Pierz Drumlin Area | LLWL NP | Dense till layers, water movement restrictions | LLWL-med. to high NP-low |
| Mille Lacs Moraine Complex | LLWL LLPL NP | Dense till layers, water movement restrictions | LLWL-med. to high LLPL-low to med. NP-low |
| Nemadji-Duluth Lacustrine Plain | CCWL SSWL CCPL SSPL | None | CCWL, CPPL-mod. to high SSPL, SSWL- low to mod. |
| Willow River Outwash Plain | SSWL AP | None | SSWL-low to mod. AP-low |
| Automba Drumlin Area | LLWL LLPL AP | Dense till layers, water movement restrictions | LLWL-med. to high LLPL-low to mod. AP-low |
| Thompson-Cloquet Moraine Complex | LLWL SSWL NP | Dense till layers (LLWL) | LLWL-med. to high SSWL-low to med. NP-low |
| Nickerson Moraine | LLWL SSWL XLWL CCWL | None | SSWL-low to med. LLWL, CCWL-mod. to high |
| McGrath Till Plain | LLWL LLPL LP AP | Dense till layers, water movement restriction | LLWL-med. to high LLPL-low to mod. |
| Hinckley Outwash Plain | SLWL SSWL LSWL LP | None | SLWL, SSWL, LSWL- low to moderate LP-low |

*Soils are grouped into "soil landscape units" and characterized by a four-letter code based on the following factors:

1. Texture of the soil material below 5 feet into sandy (S); loamy or silty (L); and bedrock (R).
2. Texture of the material above 5 feet, or a significant part of it, into sandy (S); loamy or silty (L); and clayey (C).
3. Drainage with moderately well, well, and excessively drained designated (W); and somewhat poorly, poorly, and very poorly drained designated (P). Units with (W) designation will normally have water tables below the rooting zone and units with (P), water tables commonly within the rooting zone.
4. Color of surface soil with dark color designated (D); and light color designated (L).

Some soils do not have a four letter symbol of a soil landscape unit. These are soil types such as P for peat or muck; M for marsh; R for rocky land; A for floodplains; SSR for steep, stony, rocky land; UC for unclassified city land; and M-D for mines and dumps.

Source: Minnesota Soil Atlas, Duluth and Stillwater Sheets, University of Minnesota, Agricultural Extension Service, 1977 and 1980.

Water

Lakes

The many lakes, streams and rivers of east central Minnesota give this region its particular character. There are 207 lakes (18,466 surface acres of water) within the area over 10 acres in size (Table 2.7). Eighty-four of these lakes are managed for fisheries. Concentrations of lakes are related to particular land forms. The location of lakes reflects the distribution of the major glacial moraines which were deposited throughout central Minnesota. Most of the lakes are concentrated in a band running from southwestern Kanabec County to just northeast of Barnum in Carlton County.

Table 2.7. Moose Lake Area Lake Inventory.

| | <u>No. of Lakes*</u> | <u>Lake Area (acres)</u> |
|-----------------------------------|----------------------|--------------------------|
| Pine County | 142 | 11,596 |
| Kanabec County | 41 | 4,837 |
| Carlton County (S $\frac{1}{2}$) | <u>24</u> | <u>2,033</u> |
| Moose Lake Area | 207 | 18,466 |

*Includes all lake basins 10 acres or larger.

Source: An Inventory of Minnesota Lakes. (MN Dept. of Conservation, 1968).

Watersheds

The area known as the St. Croix Delta forms a roughly triangular area between the Mississippi and St. Croix River drainages and contains five of Minnesota's 23 major watersheds (Waters, 1977). These include the Nemadji Basin, St. Croix, Snake, and Kettle River drainages, and the Pine County Creeks.

Nemadji Basin - The part of the Nemadji Basin that lies in Minnesota, is a comparatively small, unspoiled river basin covering only 270 square miles. The Upper Nemadji is a western extension of the glacier carved trough that flows northward from Maheu Lake in northern Pine County to Lake Superior, a distance of some 65 miles.

Formed beneath glacial waters, the surface of the Nemadji plain is generally flat with little slope. However, the narrow, steep-sided gorges and slumping red clay banks that characterize the Nemadji River account for its warm, red, turbid waters. The Nemadji drops 608 feet in elevation from Lake Maheu to Lake Superior. Periodic stormflows produce flash floods and severe erosion.

Major tributaries include the Net and Little Net rivers, North Fork and South Fork rivers, and the Blackhoof River, the largest and longest Minnesota tributary of the Nemadji. A number of smaller streams that, because of their size or other ecological characteristics, play an important role in the watershed include Hunters Creek, Skunk Creek, Deer Creek, Mud Creek and State Line Creek.

St. Croix Basin - Formed during the glacial epoch when glacial Lake Duluth poured meltwater down its outlet, the St. Croix river basin covers 7,650 square miles, about one-half of which is in Minnesota. It includes major drainages of the Snake, Kettle and Lower Tamarack rivers. The uppermost section of the St. Croix Basin forms the eastern edge of the Moose Lake Area, as well as the border between Minnesota and Wisconsin.

Major tributaries of the St. Croix River include the Lower Tamarack River, Snake and Kettle rivers and the Sunrise River near Taylors Falls. The St. Croix drops a total of 325 feet over its 150 mile route, making for some of the most spectacular river scenery in the midwest.

Snake and Kettle River Basins - The high divides of east central Minnesota which separate the Mississippi River drainage from Lake Superior's drainages contain the headwaters of the Snake and Kettle rivers, two of

Minnesota's most beautiful and impressive waterways. Both rivers and their watersheds contain extremely diverse and outstanding geology, topography, stream bank vegetation and overall recreation opportunities.

In all, the Snake River drains 1,020 square miles. It drops a total of 500 feet in elevation from its origin in the Solana State Forest to its mouth some 100 miles east on the St. Croix. The Snake has many tributaries including Hay and Spring creeks, and Bergman, Chesley, Cowan and Snowshoe brooks. Just north of Mora, the Knife River joins the Snake, and later both are joined by the Ann River, Pokegama and Cross lakes. Below Pine City there are no major tributaries.

Peak flows on the Snake River are usually caused by spring snow melt and accompanying spring rains. Flooding in the watershed is not serious because most stream banks in the lower watershed are high and because numerous lakes and wetlands collect and store runoff, releasing it slowly to the streams.

The Kettle River and its tributaries drain 1,060 square miles. The Kettle flows some 80 miles to the St. Croix dropping a total of 500 feet in elevation. The watershed includes approximately 80 lakes with a total area of 10,000 acres. The watershed also includes all or part of six state forests. Major tributaries of the Kettle include the Split Rock and Moose Rivers, Birch Creek and the Willow, Pine and Grindstone Rivers.

Streamflow is normally highest at spring breakup and lowest in late fall or winter. Flooding is uncommon because of the deeply incised channel throughout much of the lower reaches of the Kettle River.

Pine County Creeks - The St. Croix River, after first touching Minnesota, flows in a westerly curve before turning south. From north of this curve, a number of small streams drain a portion of Pine County, flowing south to the St. Croix. These small streams--more than 40 in all--comprise a drainage distinct from the Kettle River watershed to the northwest and the Nemadji to the northeast. The four primary streams in the area are the Lower Tamarack River and Crooked, Sand and Bear Creeks.

Protected Waters

Minnesota's waters and wetlands have been grouped into two categories for purposes of regulating and encouraging the wise use and development of major waterbasins and watercourses. The waters involved are identified either as "protected" or "unprotected" depending on their size, physical characteristics and ownership of surrounding lands. Protected waters, basins and wetlands are those waterbasins in unincorporated areas greater than 10 acres in size. Wetlands must be type 3, 4 or 5 as defined in U.S. Fish and Wildlife Service Circular Number 39. Protected watercourses are those natural or altered natural watercourses that have a total drainage area in excess of two square miles, except that officially designated trout streams are protected waters regardless of size. Any person or agency proposing to alter the course, current or cross-section of the state's protected waters or wetlands must first obtain a permit from the Department of Natural Resources. An inventory of the protected waters, wetlands and streams within the Moose Lake Area is provided in Table 2.8.

Table 2.8. Protected Waters, Wetlands and Streams within the Moose Lake Administrative Area.

| <u>County</u> | <u>Number of Protected Water/Wetland Basins Greater Than 10 Ac.</u> | <u>Total Acreage of Protected Water/Wetland Basins</u> | <u>Length of Streams Designated as Protected Waters</u> |
|-----------------|---|--|---|
| Carlton County* | 47 | 2,282 ac. | 254 mi. |
| Kanabec County | 107 | 6,257 ac. | 236 mi. |
| Pine County | <u>202</u> | <u>13,173 ac.</u> | <u>588 mi.</u> |
| TOTALS | 356 | 21,712 ac. | 1,078 mi. |

*Includes only those basins and streams within townships 46 north and 47 north.

Source: MN DNR, Division of Waters 1984.

Additionally, most of the basins over 25 acres in size are subject to DNR minimum standards related to shoreland development. These standards are administered by county zoning officials, subject to DNR monitoring. Shoreland districts include all lands within 1,000 feet of the water basins and within 300 feet of streams. Shoreland management regulations can

affect the choice and application of various forest management practices including clear-cutting, herbicide use and other forms of vegetation control.

The Kettle and the St. Croix rivers have been designated as part of the State and National Wild and Scenic Rivers Systems, respectively. Regulations pertaining to these waterways are generally more stringent than state shoreland regulations with regard to management and development activities.

Land Use

Total acreage within the Moose Lake Area is 1,471,258 acres, including water. Of the total area, 734,000 acres are considered commercial forest land, with an additional 15,000 acres classified as unproductive forest land and 2,000 acres classified as productive-reserved forest.

Forested lands comprise 51 percent of the total Moose Lake Area (Table 8). Forested areas also make up 51 percent of the total land area in Pine County, 40 percent in Kanabec County and 63 percent in Carlton County. Of the forested land in Pine County, 97 percent is classified commercial forest land (capable of producing more than 20 cubic feet per acre of industrial wood under natural conditions); for Kanabec County 100 percent is classified commercial forest land; for Carlton County 98 percent is classified commercial forest land; and for the entire Moose lake Area 98 percent is classified commercial forest land. Unproductive forest land accounts for 89 percent of the noncommercial forest lands in Pine County, 100 percent in Carlton County and 91 percent in the entire Moose Lake Area. Agriculture related land used (i.e., cropland, pasture, idle farmland, windbreaks) comprise about 32 percent of the Moose Lake Area. Marsh lands cover 12 percent of the area.

Table 2.9. Land Use in the Moose Lake Area.

| Land Use (acres) | Total | Carlton | Kanabec | Pine |
|---------------------------|-----------|---------|---------|---------|
| Commercial forest | 734,187 | 171,612 | 134,428 | 428,147 |
| Cropland with trees | 2,820 | 0 | 2,820 | 0 |
| Cropland-no trees | 401,450 | 51,356 | 128,248 | 221,846 |
| Farm-idle | 4,411 | 0 | 0 | 4,411 |
| Farm-idle with trees | 1,550 | 0 | 0 | 1,550 |
| Farm-other | 12,522 | 5,552 | 4,182 | 2,788 |
| Improved pasture | 27,035 | 8,230 | 14,375 | 4,430 |
| Marsh | 180,257 | 18,080 | 33,564 | 128,613 |
| Productive reserve forest | 1,606 | 0 | 0 | 1,606 |
| Unproductive forest | 15,346 | 2,794 | 0 | 12,552 |
| Urban and other | 46,534 | 9,990 | 6,941 | 29,603 |
| Water-census | 19,460 | 2,384 | 4,269 | 12,807 |
| Water-noncensus | 5,194 | 1,378 | 1,272 | 2,544 |
| Windbreaks | 7,179 | 1,415 | 0 | 5,764 |
| Wooded pasture | 11,707 | 3,034 | 2,971 | 5,702 |
| TOTAL | 1,471,258 | 275,825 | 333,070 | 862,363 |

*Includes T46N and T47N, Ranges 15W through 21W.

Source: Jakes, 1980.

Land Use Trends

Because of expected population increases the general land use pattern in the area will change over time, with the most drastic changes occurring in the southern part of the area.

Increased urban and residential land demands will likely be experienced in future years throughout the Moose Lake Area. Permanent single-family home development pressures will be greatest near existing population centers, along major transportation routes, and in close proximity to environmentally aesthetic areas (e.g., forest and park lands, rivers, and lakes). Seasonal home development is expected to occur throughout the area near lakes, along rivers and in forested areas.

Development pressures on productive agricultural and forest lands will increase as the population increases resulting in conversion of agricultural land, clearing of forested lands and drainage of some area wetlands for residential development. The southern part of the Moose Lake Area is likely to experience the greatest change: marginal farms going out

of production may revert back to forest or be converted to residential or commercial use; some smaller, existing farms may be consolidated into larger units; and the development of "new" agricultural areas from forest lands and wetlands may occur.

Timber Resources

Forest Cover

Approximately 51 percent of the area's 1.5 million acres is forested, or nearly 751,000 acres. More than one-half (54%) of the forest land is in the aspen type of which 180,000 acres are a minimum of 40 years of age. On some of the better sites these overmature and high risk aspen stands are being replaced by northern hardwoods, which currently comprise 15 percent of the total forest.

In some parts of the area, most notably southern Carlton and northeastern Pine counties, the succession of hardwood stands is skewed toward the spruce-fir complex. Approximately 10 percent of the Moose Lake Area is covered by softwood stands of black spruce, balsam fir, tamarack and jack pine. Of the commercial softwood types, 11 percent are plantations. Other major hardwood cover types, lowland hardwoods, paper birch, oak, and balsam poplar comprise 7 percent, 6 percent, 5 percent, and 2 percent, respectively of the area's forest land (Figure 2.4).

Commercial Forest Land Ownership

Public owners hold 28 percent (207,000 acres) of the Moose Lake Area's commercial forest land (CFL). The State of Minnesota is the largest public commercial forest landowner with 18 percent. County and municipal governments own 10 percent of the CFL, and miscellaneous federal owners own less than 1 percent.

The remaining 72 percent (527,000 acres) of CFL is held by private owners. Farmers are the largest group of private landowners in the southern half of Carlton, Kanabec and Pine counties, accounting for roughly 40 percent of

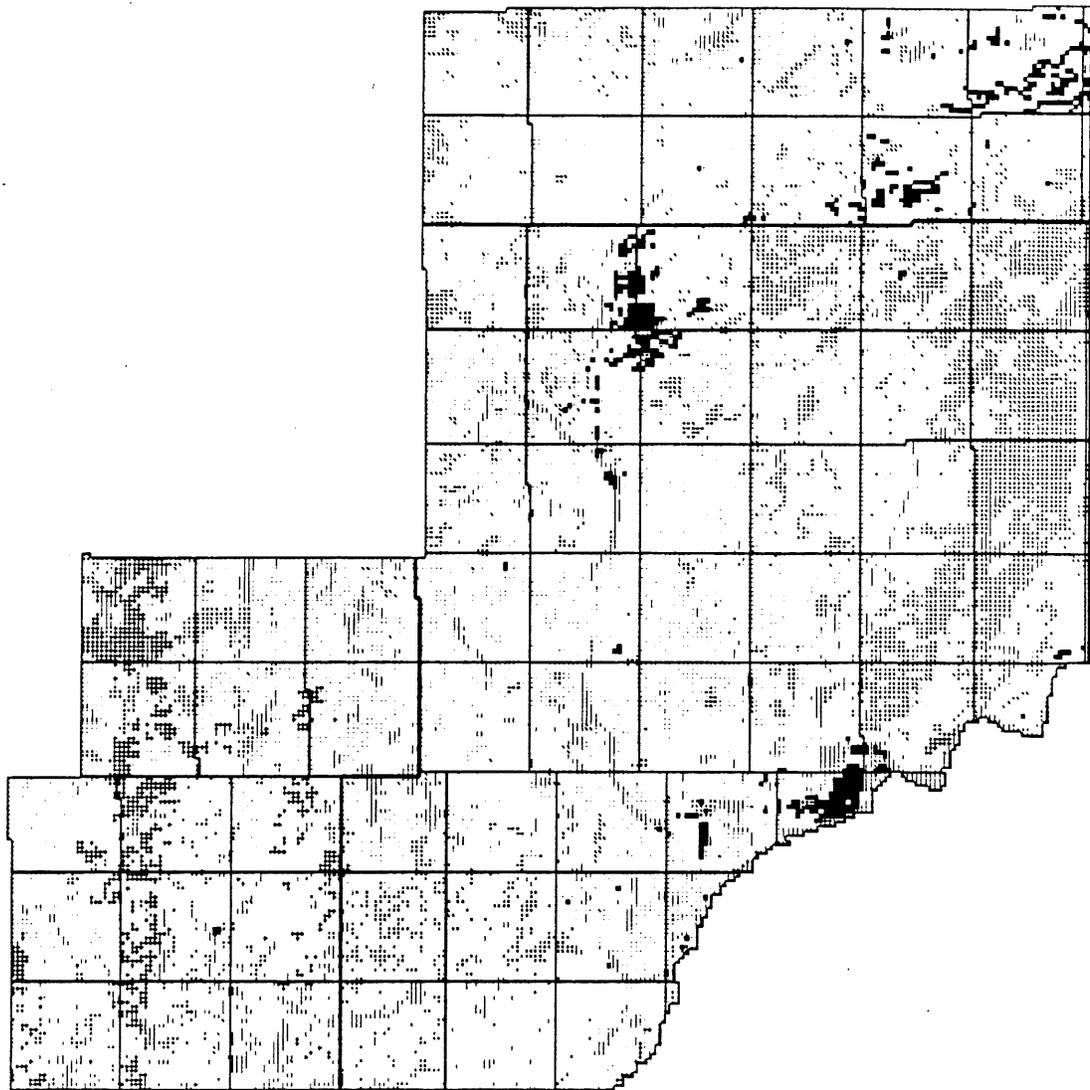


Figure 2.4. Major Forest Cover Types in the Moose Lake Area.

- Pine
- ∴ Spruce-Fir
- ⊞ Oak
- ∥ Elm-Ash-Cottonwood
- ∴ Maple-Basswood
- ∴ Aspen-Birch
- = Unproductive Forest Land
- Non-Forest Land

Source: North Central Forest Experiment Station,
Forest Service, USDA, 1977.

the CFL. Miscellaneous private individuals own approximately 27 percent, private corporations hold about 4 percent and forest industries hold approximately 2 percent (Figure 2.5).

Commercial Forest Types

Softwood forest types cover 9.4 percent of the commercial forest land in the Moose Lake Area. Acreages for the softwood types are shown in Table 2.10.

Table 2.10. Area of Commercial Forest Land by Softwood Forest Type.

| <u>Forest Type</u> | <u>Area (acres)</u> |
|------------------------|---------------------|
| Black Spruce | 27,000 |
| Balsam Fir | 15,000 |
| Tamarack | 12,000 |
| Jack Pine | 8,000 |
| White Pine | 3,000 |
| Red Pine | 3,000 |
| White Spruce | 1,000 |
| TOTAL SOFTWOODS | 69,000 |

Source: Jakes, 1980b.

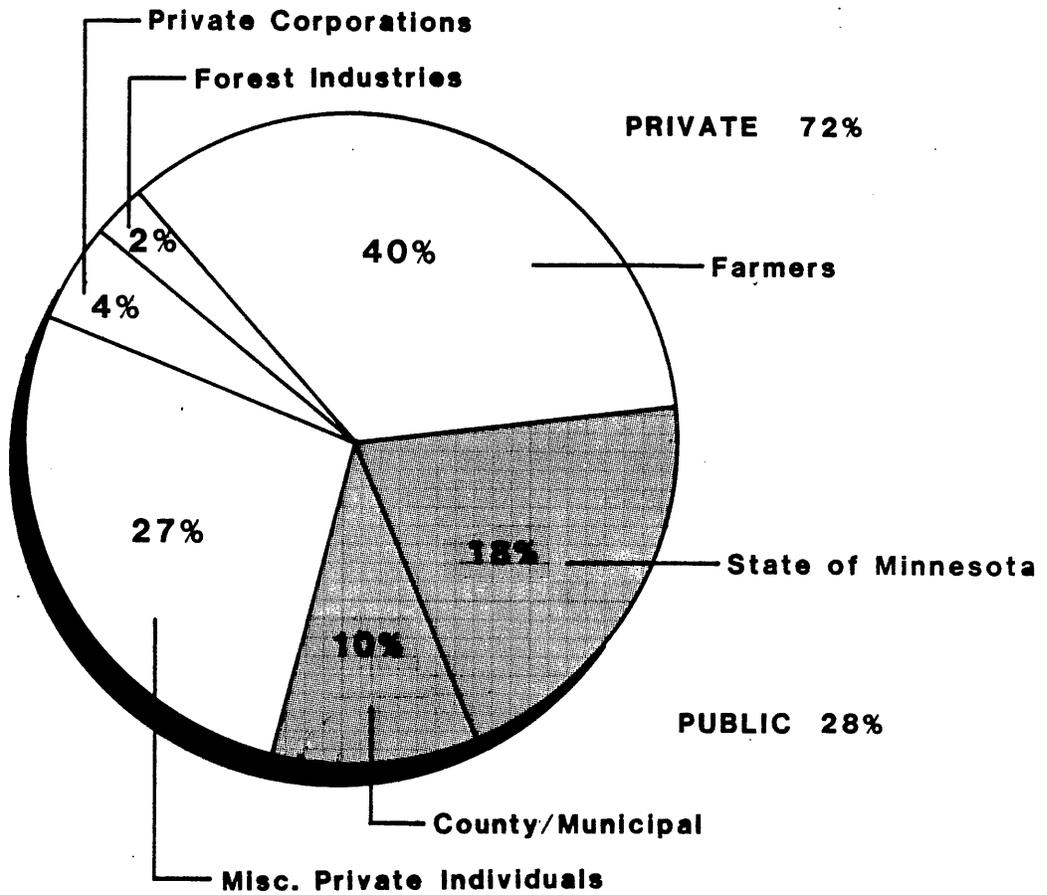
Hardwood forest types cover 89.6 percent of the commercial forest land in the Moose Lake Area. Acreages for the hardwood types are shown in Table 2.11.

Table 2.11. Area of Commercial Forest Land by Hardwood Forest Type.

| <u>Forest Type</u> | <u>Area (acres)</u> |
|------------------------|---------------------|
| Aspen | 393,000 |
| Northern Hardwoods | 112,000 |
| Lowland Hardwoods | 53,000 |
| Paper Birch | 44,000 |
| Oak | 39,000 |
| Balsam Poplar | 17,000 |
| TOTAL HARDWOODS | 658,000 |
| Nonstocked | 7,000 |
| GRAND TOTAL | 734,000 |

Source: Jakes, 1980b.

Fig.2.5 Commercial Forest Land Ownership



Source: 1978 Census of Agriculture.

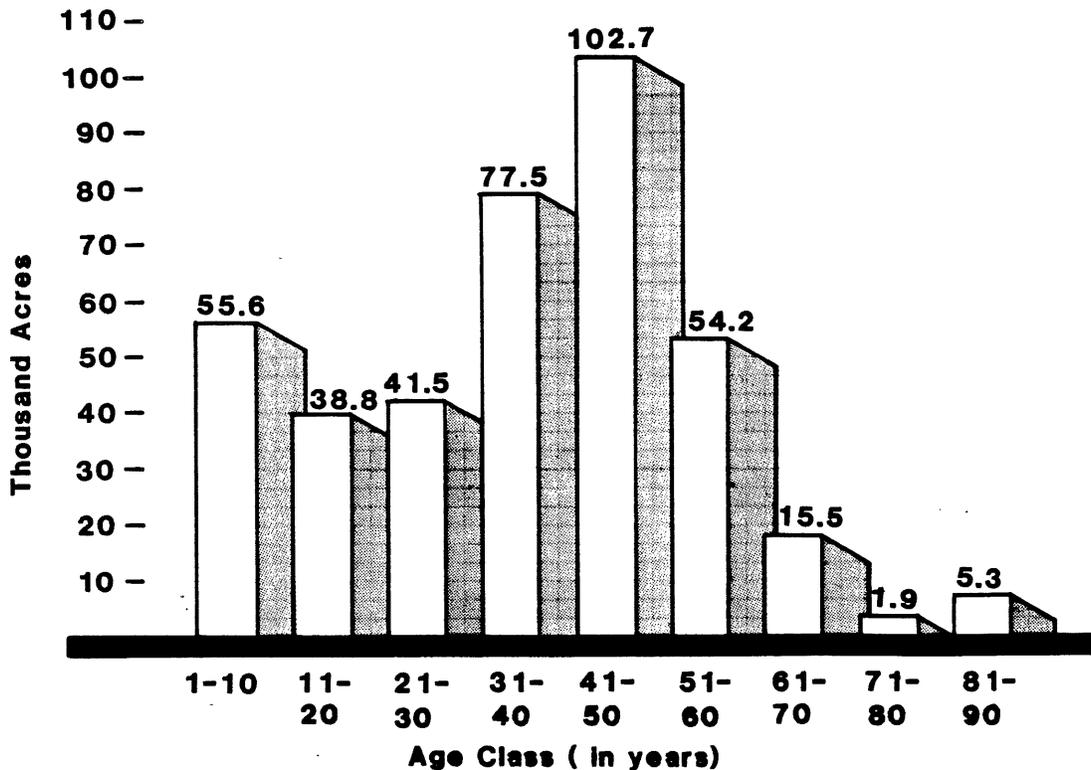
CFL Land Ownership



Age Class Distribution of Forest Types

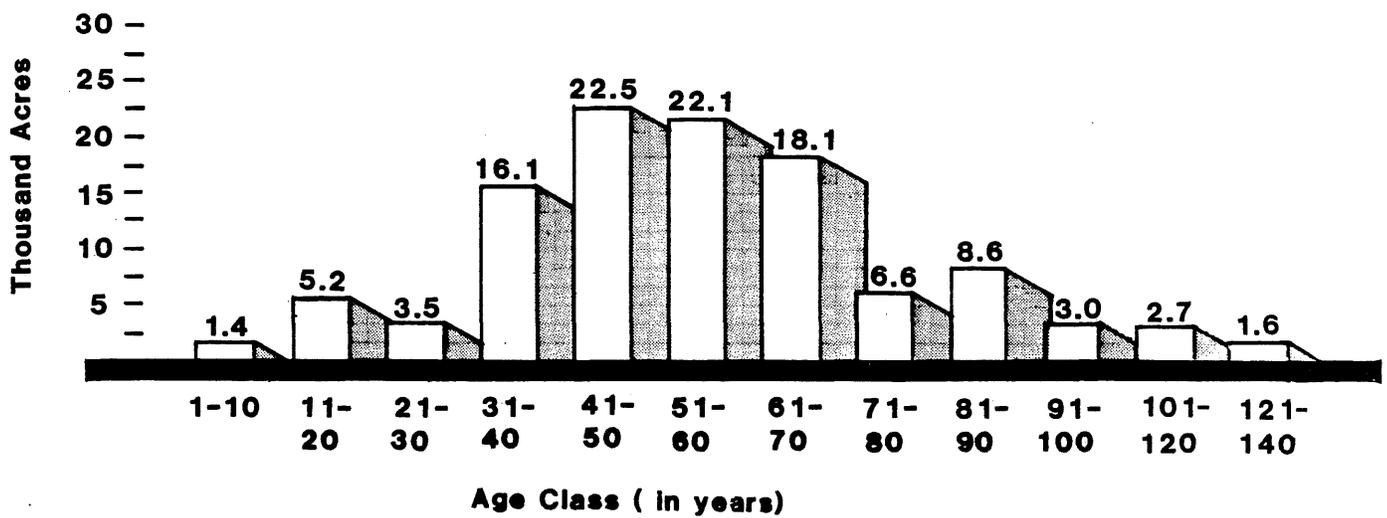
Age class distributions reveal the acreages of a given type within each 10 year age class. A balanced age class distribution, one in which each age class has the same number of acres, is ideal from a timber production standpoint for types managed on an even-aged basis. As forest stands reach maturity and are harvested, an equivalent acreage should be reforested to provide for a sustained yield of timber products. The age class distribution of each forest type in the Moose Lake Area is listed on Table 2.12. The age class distributions of the aspen and northern hardwood types are shown in Figures 2.6 and 2.7.

Fig.2.6 Area of Commercial Forest Land by Aspen Forest Type and Stand -Age Class



Source: Jakes, 1980b.

Fig.2.7 Area of Commercial Forest Land by Northern Hardwood Forest Type and Stand-Age Class



Source: Jakes, 1980b

Table 2.12. Commercial Cover Type Acreage by Age Class (in 1,000 acres)

| Commercial Cover Type | Age Class (in years) | | | | | | | | | | | | | TOTAL |
|--------------------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------|---------|------|-------|
| | 1-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 | 101-120 | 121-140 | 141+ | |
| Aspen | 55.6 | 38.8 | 41.5 | 77.5 | 102.7 | 54.2 | 15.5 | 1.9 | 5.3 | 0.0 | 0.0 | 0.0 | 0.0 | 393.0 |
| Balsam Fir | 0.0 | 2.0 | 0.0 | 0.0 | 10.2 | 1.3 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.7 |
| Balsam Poplar | 2.9 | 1.5 | 1.4 | 1.3 | 4.4 | 2.7 | 0.0 | 1.4 | 0.0 | 1.4 | 0.0 | 0.0 | 0.0 | 17.0 |
| Black Spruce | 0.0 | 1.7 | 8.9 | 2.2 | 6.5 | 4.4 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 26.7 |
| Jack Pine | 0.0 | 0.0 | 0.7 | 3.8 | 2.0 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.9 |
| Lowland Hdws. | 2.5 | 4.9 | 3.0 | 1.4 | 10.1 | 9.8 | 9.4 | 0.0 | 1.4 | 6.2 | 3.0 | 1.4 | 0.0 | 53.1 |
| Nonstocked | 8.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.5 |
| Northern Hdws. | 1.4 | 5.2 | 3.5 | 16.1 | 22.5 | 22.1 | 18.1 | 6.6 | 8.6 | 3.0 | 2.7 | 1.6 | 0.0 | 111.4 |
| Oak | 1.3 | 3.2 | 0.0 | 6.8 | 11.6 | 4.3 | 7.5 | 3.0 | 0.0 | 0.0 | 1.6 | 0.0 | 0.0 | 39.3 |
| Paper Birch | 0.0 | 4.1 | 0.0 | 6.9 | 9.9 | 10.7 | 4.4 | 5.4 | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | 44.2 |
| Red Pine | 0.0 | 0.0 | 1.3 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.7 |
| Tamarack | 0.0 | 4.3 | 0.8 | 0.8 | 3.5 | 0.0 | 1.4 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.2 |
| White Pine | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 |
| White Spruce | 0.0 | 0.0 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 |
| TOTAL | 72.2 | 65.7 | 62.5 | 118.2 | 183.4 | 112.3 | 61.9 | 19.7 | 18.1 | 10.6 | 7.3 | 3.0 | 0.0 | 734.9 |

Source: Jakes, 1980b.

Stand-Size Class

Forest lands are separated into four stand-size classes: sawtimber, poletimber, seedling and sapling (restocking) stands, and nonstocked areas. This classification is useful in determining a stand's stage of development, the forest products it can produce, and whether or not deforested areas are being restocked.

Of the total 734,000 acres of commercial forest land in the Moose Lake Area, 16 percent of the area is sawtimber, 59.4 percent poletimber and 23.4 percent seedling and sapling stands. Less than 1 percent of the commercial forest land is nonstocked.

Hardwood forest types account for 90 percent of the sawtimber stand acreage, 93 percent of the poletimber stands and 85 percent of the seedling and sapling stands. Softwood forest types comprise the remainder of each stand-size class.

Of the total 658,000 acres covered by hardwood forest types, 16 percent is classified as sawtimber, 62 percent poletimber and the remaining 22 percent seedling and sapling stands. In a similar comparison, 16 percent of the total 69,000 acres covered by softwood forest types is sawtimber stands, 45 percent poletimber and 39 percent seedling and sapling stands (Table 2.13).

Table 2.13. Total Volume and Area by Commercial Cover Type and Size Class.
(Area in 1,000 acres and Volume in 1,000 cords)

| Commercial Cover Type | Sapling/Seedling | | Pole Timber | | Sawtimber | | 1,000 ac. | TOTAL* |
|--------------------------|------------------|------------|-------------|--------------|------------|--------------|------------|--------------|
| | Area | Volume | Area | Volume | Area | Volume | | 1,000 ac. |
| Aspen | 109 | 487 | 237 | 2,661 | 47 | 636 | 393 | 3,784 |
| Balsam Fir | 2 | 3 | 9 | 101 | 4 | 21 | 15 | 125 |
| Balsam Poplar | 6 | 25 | 7 | 82 | 4 | 63 | 17 | 170 |
| Black Spruce | 17 | 44 | 9 | 64 | 0 | 0 | 27 | 108 |
| Jack Pine | 0 | 0 | 5 | 65 | 3 | 38 | 8 | 103 |
| Lowland Hardwoods | 10 | 32 | 41 | 335 | 1 | 22 | 53 | 389 |
| Nonstocked | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 |
| Northern Hardwoods | 12 | 43 | 64 | 738 | 36 | 527 | 112 | 1,308 |
| Oak | 4 | 21 | 24 | 365 | 11 | 153 | 39 | 539 |
| Paper Birch | 4 | 8 | 32 | 428 | 8 | 111 | 44 | 547 |
| Red Pine | 0 | 0 | 1 | 9 | 1 | 34 | 3 | 43 |
| Tamarack | 6 | 18 | 6 | 52 | 0 | 0 | 12 | 70 |
| White Pine | 0 | 0 | 0 | 0 | 3 | 67 | 3 | 67 |
| White Spruce | 1 | 9 | 0 | 0 | 0 | 0 | 1 | 9 |
| TOTAL | 172 | 690 | 436 | 4,901 | 118 | 1,673 | 734 | 7,264 |

*Rounding error accounts for the difference in totals.

Source: Jakes, 1980b.

Timber Volume

In 1977 (the most recent survey) total net volume of merchantable timber on commercial forest land in the Moose Lake Area was 7,264,000 cords including approximately 1,673,000 cords in sawtimber.

Hardwood species make up 93 percent (6,737,000 cords) of the total net volume. Volumes for the major hardwood species are:

| <u>Species Group</u> | <u>Net Volume (cords)</u> |
|----------------------|---------------------------|
| Aspen | 3,784,000 |
| Northern Hardwoods | 1,307,000 |
| Paper Birch | 547,000 |
| Oak | 540,000 |
| Lowland Hardwoods | 389,000 |
| Balsam Poplar | 170,000 |
| TOTAL | 6,737,000 |

Softwood species make up 7 percent (526,000 cords) of the total net volume on commercial forest land. Volumes for the major softwood species are:

| <u>Species Group</u> | <u>Net Volume (cords)</u> |
|----------------------|---------------------------|
| Balsam Fir | 124,000 |
| Black Spruce | 109,000 |
| Jack Pine | 104,000 |
| Tamarack | 70,000 |
| White Pine | 67,000 |
| Red Pine | 43,000 |
| White Spruce | 9,000 |
| TOTAL | 526,000 |

Timber Demand and Harvest

The pulp and paper industry generates the major demand for forest products harvested in the Moose Lake Area. Recent harvest levels for the Moose Lake Area illustrate a substantial decline in the amount of timber cut. Table 2.14 illustrates recent allowable cut levels for state land in the Moose Lake Area, and Table 2.15 illustrates percentage of the allowable cut actually harvested. Approximately 54 percent of the 1980 allowable cut

from state land was actually harvested. This figure dropped to 27 percent in 1983. Similar figures apply to both county and private lands. The decline was due to the slump in economic activity during this period.

Table 2.14. Allowable Cuts for State Land in Acres in the Moose Lake Area (in acres).

| | 1980 | 1981 | 1982 | 1983 |
|---|-------------|-------------|-------------|-------------|
| Aspen-Birch | 1887 | 1412 | 1434 | 1520 |
| Balsam Poplar | 0 | 0 | 0 | 0 |
| Bottomland Hardwoods/ Northern Hardwoods | 596 | 434 | 391 | 402 |
| Oak | 0 | 0 | 0 | 2 |
| White Spruce-Balsam Fir | 77 | 48 | 50 | 73 |
| Jack Pine | 44 | 48 | 55 | 56 |
| Red Pine | 1 | 1 | 1 | 15 |
| Black Spruce | 15 | 83 | 80 | 89 |
| Tamarack | 36 | 6 | 6 | 19 |
| White Cedar | 9 | 3 | 3 | 3 |
| TOTAL | 2265 | 2035 | 2020 | 2179 |

Source: Moose Lake Area Staff.

Table 2.15. Percent of Annual Allowable Cut Sold.

| | 1980 | 1981 | 1982 | 1983 |
|--------------------|------|------|------|------|
| All Species | 54 | 47 | 34 | 27 |
| Aspen Only | 50 | 48 | 34 | 27 |
| Northern Hardwoods | 61 | 60 | 59 | 28 |

Source: Moose Lake Area Staff, 1984.

Although less than 50 percent of the Moose Lake Area's allowable cut is currently being harvested, this amount is expected to increase substantially as other areas in the state experience greater harvest pressure. As the demand for timber increases in traditional wood procurement areas, demands are expected to gradually shift to the under-utilized Moose Lake Area resource. The newly established and expanding waferboard industry and projected expansions in the paper and related industries will be the areas of most pronounced increase.

Opportunities For Meeting Future Timber Needs

Silvicultural Opportunities - Stand establishment, stand conversion, improved planting stock, and thinning were all identified in the MFRP as silvicultural opportunities having potential for increasing the state's timber supplies. However, in the Moose Lake Area increased levels of timber harvest would likely have a greater impact. Until significant increases in demand occur in other parts of the state, however, increases in harvest are not likely to occur. A potential method of extending the timber resource for future harvest is by recycling (non-commercial harvest) older age classes of aspen. Recycling without harvest would restore the older aspen to younger age classes which would be available for harvest and would reduce the mortality risk. All possible measures should be taken to encourage commercial timber sales before recycling projects are initiated.

Fire Protection Opportunities - Uncontrolled wildfires can destroy significant amounts of timber and other forest resources as well as human lives and property. Population migration into previously uninhabited areas, rural subdivisions, and expanded recreational activities have increased the chance of wildfire in the Moose Lake Area. There are opportunities to increase fire prevention by providing more prevention information to area residents and recreationists, especially in state forest campgrounds, day use areas, and other high hazard areas.

Efforts to make fire suppression activities flow more smoothly have been stepped up. Pre-fire contracts for equipment and personnel have been increased, thereby insuring better coordination and saving valuable time in emergency situations.

Insect and Disease Control Opportunities - Disease and insect infestation tend to be less dramatic than fires, but they decrease timber supply and quality to a much greater degree. Protecting forested stands from insect and disease outbreaks also helps maintain the existing timber supply. Because of the advancing age of the forest types in the Moose Lake Area, the timber resources are increasingly susceptible to insect and disease

outbreaks. Accelerated harvesting of overmature aspen stands, salvage harvests and direct control of insect and disease outbreaks, especially the gypsy moth, are among the main control opportunities in the area.

~~Soil Nutrient and Water Opportunities - Although the material that remains~~ after a harvest can impair the establishment and growth of new stands and increase the risk of wildfire, it has value in the nutrients it contains. Residual biomass can also protect soils from extreme temperatures and erosion by wind and water. Nutrient losses vary with harvest intensity. However, maintenance of soil fertility is essential if forest productivity is to be maintained. This is particularly important in the Nemadji State Forest area, because of the steep topography and the highly erodible soils.

Improved Access Opportunities - The current road system permits access to a good portion of the harvestable timber. However, much of the Moose Lake Area is not accessible because of physical boundaries such as rivers and streams, as well as rough and fragile or wet soils. The problem is particularly evident in the Nemadji State Forest area.

There are opportunities for accessing additional timber through road construction and upgrading. Any new road construction in the Moose Lake Area will take environmental considerations into account in accordance with the State Forest Road Plan (MN DNR-Forestry, 1982).

Opportunities for Improved Utilization - Opportunities for increased utilization of low-quality hardwoods and greater value-added processing exist within the area. The most favorable opportunities include combustion of wood for energy, the production of composition boards, printing papers, and secondary manufacturing processes capable of utilizing relatively small pieces of wood. Secondary manufacturing opportunities are numerous and consist of products such as hardwood paneling, flooring, and miscellaneous specialty products.

Plants and Plant Communities of Special Concern

Plant Communities

The Moose Lake Area has not received a complete plant community survey, in part because the majority of the vegetation types here are not considered endangered. Five occurrences of special natural community types are registered in the Natural Heritage Program's database. In a number of cases too little information is available on the sites to determine if they are of high enough natural quality to be considered ecologically sensitive. Each occurrence is discussed in more detail in Appendix C.

Rare Plants

Historically the Moose Lake Area has received only casual attention by botanists. Until recently very little floristic data has been available. Since 1980 there have been three intensive, but limited floristic surveys. This recent research, coupled with the meager historical data available, documents the occurrence of three plants officially listed as special concern species in Minnesota: Decodon verticillatus (Water-willow), Polygonum arifolium (Halberd-leaved tearthumb) and Tsuga canadensis (Eastern Hemlock). Each occurrence is discussed in Appendix C.

Fish and Wildlife Resources

Fish

The Moose Lake Area has a lower concentration of fish lakes than most of central Minnesota, but the concentration of streams and rivers is much higher. The locations of lakes and streams generally correlates with the forested portions of the area.

The Department of Natural Resources has classified lakes and streams by ecological type and by management classification for fish and game management. These classes are characterized by different fish communities, which exist because of variations in the species and numbers of other aquatic organisms, water chemistry, the shape and depth of lake basins or

stream bottoms, temperature, and characteristics of the surrounding shore and vegetation. Most of the area's lakes are managed for centrarchids (pan fish), but there is one deep, cold water lake managed for stream trout and one managed primarily for walleyes (Table 2.16).

Table 2.16. Lake Management Classifications,
Moose Lake Area

| | |
|-----------------------|----|
| Stream Trout | 1 |
| Centrarchid (lm) | 53 |
| Centrarchid (sm) | 1 |
| Walleye - Centrarchid | 11 |
| Walleye | 1 |
| Warm Water Game Fish | 8 |
| Regular Winter Kill | 4 |
| Unclassified | 4 |

Source: MN DNR, Division of Waters.

Forty-one streams in the area are designated trout streams, primarily tributaries of the Nemadji and St. Croix rivers. Twenty are located in eastern Carlton County and 21 in eastern Pine County. All of the rivers in the area except for the Nemadji (a designated trout stream) are warm water rivers.

Fisheries management activities on designated trout streams have consisted of primarily survey work. Other management activities have been hampered by the inability to obtain easements. The Willow River has been recommended for removal from the designated list due to inability to support trout and overall warm water status. The Sand River and the main branch of Crooked Creek are the only trout streams stocked at this time.

The quality of water bodies depends to a great extent on the quality of the terrestrial environment in which they are located. Lakes and streams in forested areas tend to have higher water quality and larger, more diverse fish populations than lakes and streams in agricultural areas. Regardless of the primary vegetative cover type, maintenance of forest or other vegetative buffer strips along streams and around lakes is highly beneficial to fish. These buffer strips help shade the water, control erosion and maintain water quality.

Minnesota waters contain 151 species of fish. Table 2.17 lists 24 species of game fish found in the area.

Table 2.17. Game Fish Found in the Moose Lake Area.

| | |
|-----------------|---------------------|
| Northern pike | Brown bullhead |
| Walleye | Black bullhead |
| White bass | Yellow bullhead |
| Muskellunge | Lake sturgeon |
| Largemouth bass | Shovelnose sturgeon |
| Smallmouth bass | Smelt |
| White crappie | Rainbow trout |
| Black crappie | Brown trout |
| Green sunfish | Brook trout |
| Pumpkinseed | Yellow perch |
| Bluegill | Flathead catfish |
| Rock bass | Channel catfish |

Source: MN DNR, Fish and Wildlife 1982.

Of the game fish listed in Table 2.17, several species may be affected by forest management. The northern pike is particularly dependent on temporary spawning marshes for its existence. Major alterations of spawning marshes could eliminate northern pike in a given area. Rainbow, brown, and brook trout are all dependent on cold, clear water. Shade from overstory vegetation and consistently high quality water supplies from forest watersheds are of particular importance. All three species of trout are sensitive to siltation, temperature variations and excessive runoff, especially during spawning.

Wildlife

Wildlife Habitat - The presettlement vegetation of the Moose Lake Area was a mosaic of five major vegetation types--Aspen-Birch Forest, White and Red Pine Forest, Northern Hardwood-Conifer Forest, Bog, and Swamp. Floodplain Forest and Jack Pine Forest were minor components. The White and Red Pine and the Northern Hardwood-Conifer Forest have undergone the greatest alteration and old growth stands of these communities are now rare in the region.

The major causes of alteration to these forest communities were logging and subsequent intense fires. Many of the presettlement vegetation types were maintained by occasional fires, but these fires in most cases were not as intense as those which followed logging. Much of the land formerly covered by pine forest today supports stands of aspen-birch and jack pine.

The most extensive forest cover in the area occurs in southeastern Carlton and eastern Pine counties where there are sizeable holdings of state and county land. This extensive forest cover is best illustrated by the remote eastern portion of the Nemadji State Forest which still supports small populations of moose and timber wolves. Such large tracts of public ownership provide wildlife management opportunities not available on private land.

Recent studies suggest that many wildlife species require contiguous and extensive forest systems. Many songbird species adapted to living in forest interiors need large tracts of forest during the nesting season. When a forest area is fragmented due to residential development, roads and highways, pipelines, transmission lines, surface mining and agriculture, many of these species disappear. The implications of such findings are significant if we want to maintain the native wildlife species associated with the forest community.

Twelve percent of the area is marsh (non-wooded wetland), including 15 percent of Pine County, 10 percent of Kanabec County, and 7 percent of Carlton County. In the Moose Lake Area there are 21,712 acres of protected waters and wetlands. Many values of wetlands have been documented but wildlife values are perhaps the most visible, particularly for waterfowl and furbearers. These species are normally associated with the type 3, 4, and 5 wetlands.* Many of the wetlands in the Moose Lake Area are type 2, which are particularly important for sharp-tailed grouse and sandhill cranes. As these wetlands convert from type 2 to type 6 (shrub swamp), largely due to fire control, habitat for these species is reduced.

*Wetland types are defined in Circular 39, Wetlands of the United States, 1971 Edition, U.S. Department of the Interior.

Wildlife Habitat Trends - Major land conversions and habitat changes have altered the distribution of wildlife species in the Moose Lake Area. Moose formerly ranged throughout Pine and Kanabec counties. The peripheral range of caribou used to extend southward through northern Pine and Kanabec counties, and elk ranged from the prairie to the hardwoods in the southern part of the Moose Lake Area. Prior to 1860, white-tailed deer were rare.

Logging, subsequent fires and settler activity changed the habitat to types that favor transitional zone, prairie, and farmland species of wildlife (e.g., sharp-tailed grouse, white-tailed deer, and ring-necked pheasant). These habitat conditions persisted until the mid 1960's when maturing forests, improved fire control, and farm abandonment in the forested parts of the Moose Lake Area again began to favor presettlement wildlife species. These habitat changes are still occurring. Due to past and current market conditions, timber harvesting has not offset the trend.

Better soils, primarily in the southern part of the area, have favored continuance of agricultural operations. Although some drainage occurred in the period 1900-1925 which affected wetlands in the area, some legal ditches were filled or became blocked over the years, partially reclaiming wetland habitat. Ditch cleaning operations, however, have increased within the last 10 years and new private ditches have been dug.

Agricultural operations have been modified greatly from the first "stump" farms. Within the past 10 years row crop production has increased greatly, in some cases providing supplemental food for wildlife. Row crop production has not pre-empted excessive amounts of nesting cover as agricultural practices are diversified to include both dairy and crop operations. Nevertheless, woody cover and forest land in the agricultural areas are continually subject to pressures from clearing, resulting in a loss of wildlife cover.

Fire control affects habitat in the agricultural areas as well as in forested areas. For example, Type 1 and 2 wetlands are gradually converting to Type 6 (shrub swamps). As a result, open wetlands that provide habitat for sharp-tailed grouse, sandhill crane, and other species are deteriorating due to natural succession.

Trends in Use of Wildlife Resources - Wildlife provides diverse opportunities for hunting, trapping and nature observation in the Moose Lake Area. In 1982 21,210 resident hunting licenses, 814 trapping licenses, 169 nonresident hunting licenses and 1,591 state waterfowl stamps were sold in Pine, Kanabec and Carlton counties. Revenues from these sales totaled \$327,512. In conjunction with these sales figures, the issuing fee revenue has an immediate impact on the local economy. In 1982 this represented a \$22,000 direct return to the economy in these three counties. In addition to the sales in Pine and Kanabec counties, many of the Carlton County sales and a good number of license sales in the Twin Cities area can be attributed to hunters who use the Moose Lake Area.

Because of its proximity to the Twin Cities the Moose Lake Area receives a considerable number of hunters from the metropolitan area. According to data collected from deer registration stations from 1972 through 1977, hunters from Anoka, Chisago, Dakota, Hennepin, Isanti, Ramsey and Washington counties accounted for a harvest ranging from 43 percent to 48 percent of the total deer taken and registered in Pine and Kanabec counties. During this same period the deer taken by county residents ranged from 38 percent to 45 percent of the total.

Firearm deer hunter car counts indicate an apparent increase in the number of deer hunters from 1977 through 1981 in east-central and southern Pine County with numbers of cars decreasing in 1982. These car counts provide an index of use on public land. In the Chengwatana State Forest on the first day of the firearms deer season, the average number of cars on a four mile segment of road has been 99 with a range from 65 in 1977 to 145 in 1982.

Generally the numbers of big game licenses sold in the Moose Lake Area have been on an upward trend with firearm deer licenses increasing from 9,141 in 1977 to 12,657 in 1982 due to a higher deer population. Hunting deer with bow and arrow has become increasingly popular with license sales climbing from 511 in 1977 to 1,351 in 1982. Some bear hunting is done with archery equipment but the majority of bear are hunted with firearms, with license sales increasing from 216 in 1977 to 750 in 1981. Beginning in 1982, bear licenses were allocated under a permit system.

In contrast small game license and trapping license sales peaked in 1980. In 1977 small game license sales totaled 6,963. In 1980 they totaled 9,077. By 1982 they had dropped to 6,837, with the largest decrease in 1982. In 1981 the largest drop in sales occurred in Carlton County, probably as a result of the cyclical low in the ruffed grouse populations. The same grouse cycle occurred in Pine and Kanabec counties but hunters probably tended to shift to pheasants.

Trapping license sales increased from 408 in 1977 to 917 in 1980, then decreased to 673 in 1982. During this time period a separate beaver trapping license was required, with sales rising from 281 to 574 in 1977 and 1980, respectively and decreasing to 465 in 1981. The peak license sales in 1980 coincided with a drop in the price of furs.

Waterfowl stamp sales totaled 2,169 in 1978 and peaked at 2,235 in 1979. In 1980 they decreased to 2,087. There were further decreases in 1981 and 1982 to 1,595 and 1,591, respectively.

Data documenting the nonconsumptive use of wildlife in the Moose Lake Area are extremely limited. The St. Croix River Valley with its wide array of parks, forests and rivers attracts numerous year-round visitors, many of whom spend considerable time enjoying wildlife, particularly birdwatching. Birdwatching, a fast growing wildlife recreation activity, is estimated to account for expenditures in excess of \$30 billion dollars annually in North America.

Wildlife in the Moose Lake Area - There are 210 species of birds, 49 species of mammals and 27 species of reptiles and amphibians reported in the Moose Lake Area. An additional 20 species of birds can be considered as casual migrants or nesters, irregular migrants or accidental.

Because of the large number of wildlife species, it is impractical to consider each species individually. Complete species lists for the area are presented in Appendix A. The following discussion is limited to major game species and certain species that receive special consideration, such as those on Minnesota's official endangered species list.

Table 2.18 lists 25 of the principal game species found in the Moose Lake Area.

Table 2.18. Principal Game Species Found in the Moose Lake Area.

| | |
|-------------------|----------------------|
| White-tailed deer | Muskrat |
| Black bear | Gray squirrel |
| Moose | Fox squirrel |
| Beaver | Cottontail rabbit |
| Porcupine | Ruffed grouse |
| Showshow hare | Sharp-tailed grouse |
| Bobcat | Ring-necked pheasant |
| Coyote | American woodcock |
| Raccoon | Canada goose |
| Red fox | Mallard |
| Gray fox | Blue-winged teal |
| Otter | Wood duck |
| Mink | |

Source: MN DNR, Section of Wildlife, 1984.

All of these species are affected to varying degrees by forest management practices. Primary management for most of these species involves either maintenance of a variety of timber age classes and permanent openings, protection of den or nest trees, mast trees, and wetlands, or a combination of these practices. Specific information on these species is provided in Appendix B.

Nongame Wildlife Species

Table 2.19 lists 19 species of known or probable occurrence in the Moose Lake Area that are officially designated as endangered, threatened, or of special concern in Minnesota.

Table 2.19. Wildlife Species that are Endangered, Threatened, or of Special Concern in Minnesota that Occur or Probably Occur in the Moose Lake Area.

| | |
|---------------------|-------------|
| E = Endangered | F = Federal |
| T = Threatened | S = State |
| S = Special Concern | |

| | |
|-------------------------------|------------------------------|
| Peregrine falcon (E, F and S) | Osprey (S, S) |
| Bald eagle (T, F and S) | Sandhill crane (S, S) |
| Gray wolf (T, F and S) | Upland sandpiper (S, S) |
| Loggerhead shrike (T, S) | Wilson's phalarope (S, S) |
| Wood turtle (T, S) | Short-eared owl (S, S) |
| Blanding's turtle (T, S) | Louisiana waterthrush (S, S) |
| Keen's myotis (S, S) | Snapping turtle (S, S) |
| American bittern (S, S) | Fox snake (S, S) |
| Red-shouldered hawk (S, S) | Eastern hognose snake (S, S) |
| | Western hognose snake (S, S) |

Source: MN DNR, Section of Wildlife, 1984.

The majority of these species are affected by forest management practices. Management needs vary depending on the species, and in some cases are not well documented. Specific information on these species is included in Appendix B, as is information on colonial waterbird nesting sites and bat caves.

Fish and Wildlife Management Opportunities. - There are three major ways to meet prospective demands for fish and wildlife conservation, fishing, hunting, and wildlife observation in the Moose Lake Area: 1) habitat retention, 2) habitat management, and 3) research, surveys and harvest regulations.

Maintaining high water quality is especially important in retaining fisheries and also benefits wildlife that live in the water or feed on fish. Maintaining forest or other vegetative buffer strips along streams and around lakes is highly beneficial to fish as well as to aquatic and riparian wildlife. These buffer strips help shade the water, control erosion, maintain water quality, and provide habitat.

Several kinds of habitat in the Moose Lake Area are in short supply or are disappearing from the scene. These habitats are critical if we are to maintain the rich diversity of wildlife that now exists. Special

consideration should be given to the protection and management of these critical habitats.

Oak stands are of special importance to wildlife. The acorn crops produced by oak trees provide an important and highly preferred food supply for wildlife. Black bears will travel for miles to feed on acorns in the fall. Acorns are also relished by deer, squirrels, raccoons, wood ducks, mallards and grouse. Oak trees are used for dens and oak leaves supply nest material. Natural regeneration of oaks is poor in some areas due to competition from other tree species and wildlife browsing. Remaining oak stands should continue to be carefully delineated, especially where they are mixed with northern hardwoods. Oak stands need to be carefully managed to prevent the loss of the oak type, to increase mast production and to expand oak stands where possible.

There are only a few scattered stands of white cedar in the Moose Lake Area. This forest type is heavily used by deer for winter cover and food. The white cedar type is in jeopardy because a universally successful method of regenerating cedar stands has not been discovered. Acid soil conditions and browsing by deer prevent the growth of seedlings. Where cedar trees occur, the stands should be maintained for as long as possible. More research and experimental management needs to be done with cedar to find a method for establishing new stands.

Transition habitat is midway between the prairie and forest environment. It is an open habitat consisting of a mixture of grass, brush, trees and marsh. This type provides critical habitat for a variety of wildlife species. Transition habitat is being squeezed out by certain land use practices. Most of this habitat type has been drained and farmed or has reverted to trees and brush. Portions of selected open areas on state lands such as old fields, forest openings, upland brush and other poorly stocked sites should be preserved to save a remnant of the transition habitat type. A management program of prescribed burning and shearing of selected lowland areas that have reverted to brush is also needed.

Wildlife and fisheries managers and foresters should become more involved in influencing local planning decisions and increasing the awareness of developers, farmers, and local planning commissions about the effects of forest land conversion on fish and wildlife. Nonindustrial private forest landowners should be encouraged to maintain the forest cover on their land through improved property tax incentive programs, increased technical assistance from the Division of Fish and Wildlife and Division of Forestry, and increased financial assistance using cost-share programs.

Coordination of timber, wildlife, and fisheries management activities in the Moose Lake Area is extremely important in maintaining and improving fish and wildlife habitat. Northern pike spawning marshes and trout streams are especially vulnerable and should be protected during forest management activities. The DNR's Forestry/Wildlife Guidelines to Habitat Management should be followed to as great an extent as possible in forest and wildlife management.

Maintaining a diverse and varied forest in terms of stand type, stand size and age class is critical to wildlife management. Over 200 kinds of animals use the Moose Lake Area forest for breeding habitat. Each species has its own unique habitat requirements, many of which are unknown to man. A varied forest environment is essential to provide for these many habitat needs. A diverse forest is also more ecologically stable because it provides natural protection against insects, disease and fire. In order to avoid decreasing forest diversity, forestry practices should be done in accordance with the Forestry/Wildlife Guidelines to Habitat Management.

Attention should also be given to measuring the economic value of the non-timber crops of wildlife, berries and recreation produced by the forest each year. These crops are dependent upon forest diversity and their value may rival the value of timber produced. The fruit producing plants, including blueberries, strawberries, raspberries, juneberries and choke cherries, provide food for a myriad of wildlife as well as humans. These fruit producing plants require open, sunny sites and periodic fire to remain abundant and productive. The production of berry crops in the forest has been given very low priority. More attention needs to be given to the promotion of berry production in the forest.

The remote eastern portion of the Nemadji State Forest has been mentioned previously in the context of habitat for moose, timber wolves and other forest interior species. It is important to maintain this habitat for those species less tolerant of human activity as well as for those people who enjoy solitude in the outdoor experience. The Moose Lake Area is heavily used during the hunting season, with most of the forested land accessible through road and trail systems. In this remote area access should be limited and any trails or development work carefully planned.

More intensive fisheries survey work is needed in the Moose Lake Area. Fisheries management activities could then be guided by more complete survey findings. Additional inventory work is needed on virtually all of the plant and animal species that are endangered, threatened, or of special concern. Surveys of remnant old growth stands of White and Red Pine Forest and Northern Hardwood-Conifer Forest are also needed. Forest and wildlife managers need to be informed about the location of unique natural features in order to protect them during management activities.

The effects of wildfire control on forest and wetland habitats in the Moose Lake Area should receive more research emphasis. A greater effort should be made to use and evaluate the effects of prescribed burning on selected habitats in the Moose Lake Area.

Recreation Resources

The Moose Lake Area lies between the two largest population centers in Minnesota, the Twin Cities metropolitan area and Duluth. Major access to the area is provided by Interstate Highway 35, with driving times ranging from one to two hours, depending on destination, from both population centers. The area itself is sparsely populated and its forested lands and water resources provide an excellent base for outdoor recreation.

The area's large public land base provides opportunities for dispersed recreation activity such as hunting and nature observation, as well as providing the land area necessary for trail networks.

The major recreational amenities in the area include the St. Croix, Kettle, and Snake rivers. The St. Croix is a National Wild and Scenic River, the Kettle is a State Wild and Scenic River, and all three rivers are state canoe and boating routes. Lakes in the area also provide recreation opportunities. Major recreational amenities in counties surrounding the Moose Lake Area include the St. Louis and Rum rivers, Lake Superior and Lake Mille Lacs.

Area Recreation Facilities

The Moose Lake Area contains a number of well developed recreational facilities (Table 2.20). Most major public facilities are administered by the Minnesota Department of Natural Resources. The DNR, Division of Parks and Recreation administers the 31,482 acre St. Croix State Park, the 4,351 acre Banning State Park, and the 951 acre Moose Lake State Recreation Area. The DNR's Trails and Waterways Unit administers most area public water accesses, canoe and boating route rivers and canoe campsites, the entire Minnesota-Wisconsin Boundary Trail, and many miles of grants-in-aid trail. The DNR, Division of Forestry administers 6 campgrounds and one day use area. Forestry also has operational responsibility for 225.8 miles of trail which includes 78 miles of the Minnesota-Wisconsin Boundary Trail.

Detailed descriptions of Division of Forestry administered recreation facilities are included in the Recreational Sub-Area Plan (Appendix G).

Other major public recreation providers include the National Park Service, which administers the St. Croix National Wild and Scenic River; the Minnesota Department of Transportation, which provides highway rest areas; and local units of government, which provide county and municipal parks. The National Park Service is also the lead agency for the North Country National Scenic Trail which is proposed to pass through the Moose Lake Area.

Private sector recreation facilities include 18 campgrounds and 3 group camps with 825 and 467 sites, respectively. Private resorts are few.

Table 2.20. Summary of Moose Lake Area Recreation Facilities.

| Type of Facility | Carlton County* | Kanabec County | Pine County | Total |
|------------------------------|-----------------|----------------|-------------------|------------------|
| State Forests | 2 - 9,712 ac. | 2 - 11,176 ac. | 5 - 128,766 ac. | 8 - 149,654 ac. |
| Wildlife Management Areas | 1 - 160 ac. | 9 - 9,077 ac. | 9 - 1,389 ac. | 19 - 10,626 ac. |
| Wildlife Refuges (Nat.) | --- | --- | 1 - Sandstone NWR | 1 |
| Trails | | | | |
| X-C Skiing | 1 - 4.0 mi. | --- | 3 - 34.0 mi. | 4 - 38.0 mi. |
| Interpretive | --- | --- | 3 - 12.0 mi. | 3 - 12.0 mi. |
| Hunting | --- | --- | --- | 40 - 963.5 mi. |
| Horseback Riding | --- | --- | 5 - 149.8 mi. | 5 - 149.8 mi. |
| Biking | --- | --- | 1 - 6.0 mi. | 1 - 6.0 mi. |
| Snowmobiling | 6 - 204 mi. | 2 - 22.9 mi. | 10 - 289.0 mi. | 18 - 515.9 mi. |
| Hiking | 1 - 1.0 mi. | 1 - 1.0 mi. | 7 - 239.8 mi. | 9 - 241.8 mi. |
| State Parks | 1 - 951 ac. | --- | 2 - 35,833 ac. | 3 - 36,784 ac. |
| Rest Areas | 1 | 2 | 9 | 12 |
| County Parks | 1 | 1 | --- | 2 |
| Municipal Parks | 1 | 7 | 9 | 17 |
| Campgrounds | | | | |
| Public | 2 | --- | 9 | 11 |
| Private | 2 | 6 | 10 | 18 |
| Public Group | --- | --- | 3 | 3 |
| Private Group | 2 | --- | 7 | 9 |
| Canoe Campsites | --- | --- | 5 | 5 |
| Campsites | | | | |
| Public | 58 | --- | 309 | 367 |
| Private | 55 | 365 | 405 | 825 |
| Public Group | --- | --- | 467 | 467 |
| Private Group | 247 | --- | 427 | 674 |
| Beaches | | | | |
| Public | 3 | --- | 1 | 4 |
| Private | 5 | --- | 16 | 21 |
| Picnic Grounds | | | | |
| Public | 4 | --- | 13 | 17 |
| Private | 3 | --- | 6 | 9 |
| Picnic Sites | | | | |
| Public | 74 | --- | 114 | 188 |
| Private | 8 | --- | 99 | 107 |
| Monuments | 1 | --- | 4 | 5 |
| Wild and Scenic Rivers | --- | --- | 2 | 2 - Snake-Kettle |
| Canoe and Boating Routes | --- | --- | 3 | 3 |
| Scientific and Natural Areas | --- | --- | 1 - 593 ac. | 1 - Kettle River |
| Public Accesses | 3 | 11 | 28 | 42 |

*T46N and T47N, Range 15W-21W.

Source: MN DNR, Office of Planning. State Comprehensive Outdoor Recreation Plan (SCORP) 1979.

Major recreation facilities in counties surrounding the Moose Lake Area include Jay Cooke, Wild River, Father Hennepin and Mille Lacs Kathio state parks and the Spirit Mountain Recreation Area which is administered by the city of Duluth.

Projections of Future Recreational Demand

The State Comprehensive Outdoor Recreation Plan (MN DNR, Office of Planning, 1979) projects the occurrence levels for outdoor recreation activities in Minnesota and for 13 economic development regions within the state. These projections must be considered along with the existing supply of and demand for recreational facilities and amenities in the area in order to accurately determine development needs and priorities. Some of the projected recreational activity levels for the economic development region that includes most of the Moose Lake Area are listed in Table 2.21.

Table 2.21. Projections of Summer and Winter Recreation Occasions Occurring in Region 7E*

| Activity | 1978 | 1980 | % Change 78-80 | 1985 | % Change 80-85 | 1990 | % Change 85-90 | 1995 | % Change 90-95 |
|--------------------------------|-----------|-----------|-------------------|-----------|-------------------|-----------|-------------------|-----------|-------------------|
| Backpacking | 15,763 | 16,000 | 1.5 | 16,389 | 2.4 | 16,596 | 1.3 | 16,432 | -1.0 |
| Recreation Bicycling | 1,319,822 | 1,316,521 | -0.3 | 1,381,994 | 5.0 | 1,549,162 | 12.1 | 1,711,415 | 10.5 |
| Camping | 372,990 | 379,783 | 1.8 | 398,585 | 5.0 | 421,857 | 5.8 | 441,220 | 4.6 |
| Stream Canoeing | 63,851 | 66,133 | 3.6 | 69,566 | 5.2 | 72,283 | 3.9 | 74,700 | 3.3 |
| Hiking | 195,059 | 200,532 | 2.8 | 212,371 | 5.9 | 229,971 | 8.3 | 247,155 | 7.5 |
| Horseback Riding (trail) | 67,117 | 68,196 | 1.6 | 73,799 | 8.2 | 87,190 | 18.1 | 98,050 | 12.5 |
| Picnicking | 331,162 | 339,004 | 2.4 | 365,198 | 7.7 | 397,433 | 8.8 | 416,265 | 4.7 |
| Swimming | 917,577 | 917,071 | -0.1 | 928,493 | 1.2 | 998,241 | 7.5 | 1,081,171 | 8.3 |
| Trail Biking | 25,154 | 24,234 | -3.7 | 25,972 | 7.2 | 30,259 | 16.5 | 33,662 | 11.2 |
| Cross Country Skiing | 73,853 | 77,190 | 4.5 | 83,087 | 7.6 | 92,987 | 11.9 | 95,542 | 2.7 |
| Snowmobiling | 656,448 | 566,719 | 0.2 | 618,897 | 9.2 | 692,591 | 11.9 | 742,894 | 7.3 |

*Region 7E includes Pine, Kanabec, Mille Lacs, Isanti and Chisago counties.

Source: MN DNR, Office of Planning, 1979. State Comprehensive Outdoor Recreation Plan (SCORP).

Based on these projections the SCORP report recommends substantial increases in snowmobile and hiking trail mileage, hunting availability, swimming and bicycling opportunities, and in the development of camping and picnic facilities. Also recommended are efforts to increase the number and awareness of public water accesses for canoe and boating use.

Proposals to develop additional recreation facilities and expand recreational opportunities in the Moose Lake Area must consider current and potential use of existing facilities, natural features in the area, emerging social and economic trends, and changing public preferences for outdoor recreation. The opportunity also exists to increase public awareness of existing recreational facilities through advertising, signing, mapping and better information distribution.

Recreation Potentials

The recreation resources of Economic Development Region 7E differ greatly from those found in other parts of the state. Given current trends concerning desired recreational outings, energy availability and pricing, and this region's relatively close proximity to the metropolitan area, the resources of this region may be given a second look by recreators, both regional citizens and tourists.

The region's woodlands offer a wide range of recreation potentials. A good portion of this area is presently in state forests and wildlife management areas. The Snake River State Forest in Kanabec County and the St. Croix State Forest in Pine County have recreation potential in terms of additional trail development, both summer hiking and winter cross-country skiing. Northern Kanabec County contains extensive mixed forested areas of rolling topography, with outstanding potential for cross-country ski trail development. An annual ski race drawing international competitors is held in this area.

The state forests in the area could provide additional overnight camping areas. The numerous smaller lakes and streams of these forests have potential for semi-primitive campgrounds. This type of camping experience

with emphasis on nature observation and limited dependency on motorized recreation is increasing in popularity.

Another major water related resource of the region is its many miles of rivers. Their recreation potential lies in their development as canoeing routes for nature observation and fishing. The Kettle, Snake and St. Croix rivers are part of the State Canoe and Boating Route System. Each river offers opportunities for canoeing with minimum skill levels.

The Kettle River with Hell's Gate Rapids at Banning State Park, and the Snake River with Upper and Lower Snake Falls are two of the finest whitewater rivers in the state. Developed campsites along these rivers are not properly spaced or abundant enough to provide for canoeist needs. The opportunity exists on forestry administered land to provide some campsites for canoeists. Another opportunity exists to better promote these rivers through the Canoe and Boating Route Program administered by the DNR Trails and Waterways Unit.

Pine and Kanabec counties contain many smaller lakes with potential as fishing lakes. Many of these lakes are too small for active recreation associated with larger lakes, such as water skiing and pleasure boating. Public access development on many of the region's smaller lakes would provide expanded facilities for local and non-local fishermen.

Camping, hunting, fishing, birdwatching, and other recreational activities in the area could be increased through better information dispersal, signing, and mapping. Specific recreational development opportunities for Division of Forestry administered land are described in the Moose Lake Area Forest Recreation Sub-area Plan (Appendix G).

LAND ADMINISTRATION

Of the 1,471,258 acres in the Moose Lake Area, 320,350 acres are publicly owned including 223,748 acres of DNR administered land, 92,221 acres of county land and 4,381 acres of federal ownership. Private lands comprise 1,150,908 acres or 78 percent of the total area. The Division of Forestry presently administers 172,403 acres and the Divisions of Parks and Recreation and Fish and Wildlife administer 36,784 acres and 11,700 acres, respectively. The remaining DNR land is administered by other units. Within the state forest boundaries, 82 percent of the land is state administered, the rest is administered by the county and private interests.

Department of Natural Resources

The DNR administers 223,748 acres of land in the Moose Lake Area. This includes 19,127 acres in southern Carlton County, 23,547 acres in Kanabec County, and 181,074 acres in Pine County. Approximately 90 percent of the DNR administered lands are included in management units such as state forests, state parks, and wildlife management areas. Table 2.22 lists the DNR management units located in the Moose Lake Area. The 10 percent of the DNR administered lands outside of management units consists of tracts ranging in size from a few hundredths of an acre to several hundred acres. The lands outside of management units are administered by the Division of Forestry. The lands administered by the various DNR divisions are described in greater detail below.

Division of Forestry - The Division of Forestry administers all or part of eight state forests located in the Moose Lake Area. There are also 19 acres of administrative and scattered state forest land in the area. These parcels are typically office and fire tower sites. The division administers 149,713 acres, or 82 percent of the land within the statutory boundaries of the state forests. The remaining land within state forests is primarily private land. The current boundaries of all state forests are described in Minnesota Statutes Section 89.021.

Table 2.22. DNR Management Units in the Moose Lake Area

| Management Unit Type and Name | County | Boundary Acreage(10) | DNR Acreage(1) | Management Unit Type and Name | County | Boundary Acreage(10) | DNR Acreage(1) |
|-----------------------------------|------------------------------|-------------------------|-------------------|---|------------------------------|-------------------------|-------------------|
| STATE FORESTS | | | | Fish Lake Improvement | Kanabec | (?) | 1 |
| Chengwatana[2] | Pine | 23,360 | 16,377 | Grindstone River Improvement | Pine | (?) | 54 |
| D.A.R. | Pine | 640 | 360 | Hinckley Bass Rearing Pond | Pine | (?) | 33 |
| Fond du Lac[2] | Carlton | 40 | 40 | Knife Lake Improvement and Spawning Area | Kanabec | (?) | 17 |
| General C.C. Andrews | Pine | 7,760[11] | 5,213 | Quamba Lake Spawning Area | Kanabec | (?) | 16 |
| Nemadji | Carlton/ Pine | 97,040 | 90,480[3] | SCIENTIFIC & NATURAL AREAS | | | |
| Rum River | Kanabec | 4,000 | 3,357 | Kettle River | Pine | 761 | 593 |
| St. Croix | Pine | 42,105[13] | 26,048 | STATE TRAILS | | | |
| Snake River[2] | Kanabec | 8,320 | 7,819 | Minn-Wisc Boundary Trail[2] | Pine/ Carlton | NA[8] | 605[6] |
| Administrative and Scattered | Carlton/ Kanabec/ Pine | 0[5] | 19[4] | WILD AND SCENIC RIVERS | | | |
| STATE PARKS | | | | Kettle River | Pine | (?) | 497 |
| Banning | Pine | 5,899[12] | 4,351 | WATER ACCESS SITES[7] | | | |
| Moose Lake | Carlton | 965 | 951 | Ann Lake (south shore) | Kanabec | NA | 1 |
| St. Croix | Pine | 34,037 | 31,482 | Bass Lake | Pine | NA | 3 |
| WILDLIFE MANAGEMENT AREAS | | | | Fish Lake (south shore) | Kanabec | NA | 2 |
| Ann Lake | Kanabec | 2,006 | 1,614 | Grindstone Lake | Pine | NA | 2 |
| Bean Dam | Kanabec | 1,216(?) | 200 | Island Lake | Pine | NA | 1 |
| Dye | Carlton | 160 | 160 | Lake Eleven | Kanabec | NA | 1 |
| Five Lake | Kanabec | 280 | 280 | Lake Twenty-nine | Carlton | NA | 12 |
| Gravel Pit #3084 | Kanabec | 11 | 11 | Lewis Lake | Kanabec | NA | 4 |
| Hay-Snake | Kanabec | 880 | 240 | Mod Lake | Kanabec | NA | 1 |
| Kettle River | Pine | 22 | 22 | Oak Lake | Pine | NA | 2 |
| Mark | Pine | 80 | 80 | Pokegama Lake | Pine | NA | 3 |
| McGowan | Pine | 124 | 124 | Pomroy Lake | Kanabec | NA | 1 |
| Nille Lacs[2] | Kanabec | 6,295 | 5,655 | Sand Lake | Pine | NA | 1 |
| Moose | Pine | 46 | 46 | Snake River | Kanabec | NA | 3 |
| Pine V&S 1 | Pine | 76 | 76 | Snake River | Pine | NA | 2 |
| Pine V&S 2 | Pine | 80 | 80 | Sturgeon Lake | Pine | NA | 1 |
| Pine V&S 3 | Pine | 80 | 80 | DEPT. ADMINISTERED LANDS | | | |
| Pine V&S 4 | Pine | 281 | 281 | NA | Pine | NA | 1,091 |
| Rice Creek[2] | Kanabec | 636 | 599 | WATERS OR MINERALS LANDS | | | |
| Rock | Pine | 600 | 600 | NA | Pine | NA | 6 |
| Tosher Creek | Kanabec | 535 | 306 | FORESTRY ADMINISTERED LANDS | | | |
| Whited | Kanabec | 275 | 173 | NOT IN STATE FORESTS | | | |
| FISHERIES MANAGEMENT AREAS | | | | Undedicated lands | Carlton/ Kanabec/ Pine | NA | 22,690[9] |
| Barnes Spring Pond | Pine | (?) | 120 | | | | |
| Big Pine Lake Flowage[2] | Pine | (?) | 51 | | | | |
| Blackhoof River Improvement | Carlton | (?) | 781 | | | | |
| Cross Lake Spawning Area | Pine | (?) | 16 | | | | |

Notes:

- [1] DNR administered acreage as listed in Table 2 of the "DNR Land Ownership/Classification Report" dated 7-1-83. Rounded to nearest acre.
- [2] Moose Lake Area portion only. Parts of this management unit are located outside of the Moose Lake Area.
- [3] Carlton County = 9,712 acres and Pine County = 80,768 acres.
- [4] Carlton County = 9 acres, Kanabec County = 3, and Pine County = 7 acres.
- [5] None of the sites listed as Administrative and Scattered State Forests in the Land Ownership/Classification Report are included in MS 89.021, Subd. 56 which describes the statutory boundaries of Administrative and Scattered State Forests.
- [6] Pine County = 572 acres, Carlton County = 33 acres.
- [7] DNR administered water access sites outside of other DNR management units only.
- [8] NA = Not Applicable.
- [9] Carlton County = 7,429 acres, Kanabec County = 3,246 acres, Pine County = 12,015 acres.
- [10] Boundary Acreage as listed on Minnesota Outdoor Recreation Area Inventory maps unless otherwise noted.
- [11] Acreage based on statutory description assuming 640 acres per section.
- [12] Boundary acreage listed in Banning State Park Management Plan.
- [13] Minnesota SCORP, Table 3-S.06

Source: MN DNR, Bureau of Land, 1984.

The Chengwatana State Forest is located along the Kettle and St. Croix rivers in southeastern Pine and northeastern Chisago counties. Chengwatana means "Town of Pines" and is derived from the old village and trading post organized in 1850 at the Cross Lake outlet of the Snake River. This village served as the county seat from 1860-1872. The Chengwatana State Forest was established by the legislature in 1953 (Minn. Laws 1953, Chapter 292). At that time the forest consisted of portions of Chengwatana and Munch townships. In 1963 the forest was expanded (Minn. Laws 1963, Chapter 332) to include land along the St. Croix River in southeastern Pine and northeastern Chisago counties. The Pine County portion of the forest contains approximately 23,360 acres, of which 16,390 are administered by the Division of Forestry. Over 12,000 acres are tax-forfeited lands managed by the state (50-50 lands). The remaining division administered lands consist of gift, trust fund and purchased land. The 600 acre Rock Wildlife Management Area administered by the Division of Fish and Wildlife is located within the forest boundary.

The Daughters of the American Revolution (D.A.R.) State Forest is located north of Askov on State Trunk Highway 23 in Partridge Township. The D.A.R. was instrumental in the establishment of this forest in 1943 (Minn. Laws 1943, Chapter 171). The division administers 360 of the 640 acres within the statutory boundary. All of the state land in the forest is school trust fund land. A small state forest campground has been constructed there.

There is a 40 acre portion of the Fond du Lac State Forest in the Moose Lake Area. The rest of this forest is located in northern Carlton and southern St. Louis counties. This parcel in Skelton Township was acquired as a Land Utilization Project.

The General C.C. Andrews State Forest is located along Interstate 35 between Willow River and Sturgeon Lake. There is also a non-contiguous section lying about 4 miles east of the main part of the forest. Established in 1943 (Minn. Laws 1943, Chapter 171), the forest was named for Christopher Columbus Andrews, a Civil War veteran and an early proponent of forestry in Minnesota. One of the two state tree nurseries is located in the forest. The division administers 5,213 of the 7,760 acres

within the statutory boundary. The division administered land consists of purchased land (2,253 acres), 50-50 tax-forfeited land (1,653 acres), and school trust fund land (1,307 acres).

The Nemadji State Forest is located along the Minnesota-Wisconsin boundary in southern Carlton and northern Pine counties. The forest was originally established in 1935 (Minn. Laws 1935, Chapter 372). The forest boundary encompasses 97,040 acres of which 90,480 are administered by the Division of Forestry. Almost all of the division's land in the forest is either 50-50 tax-forfeited or trust fund land. At the turn of the century this area was the scene of heavy logging. The Nemadji, Willow, and Tamarack watersheds were used to transport logs to mills downstream. Later, the area between Nickerson and Holyoke was criss-crossed with temporary railroad spurs bringing pine logs to a large mill east of Nickerson on Delongs Lake. The logging activity dwindled to small logging camps cutting railroad ties, cedar shingles, barrel hoops, pulpwood and fuelwood. A few hardy settlers moved in to farm the land and numerous large fires burned the cutover area.

The Rum River State Forest is located in western Kanabec and eastern Mille Lacs counties. The Kanabec County portion of the forest consists of 4,000 acres in Kanabec and Ann Lake townships. There is a non-contiguous section of the forest lying within the boundaries of the Mille Lacs Wildlife Management Area. Established in 1935 (Minn. Laws 1935, Chapter 372) the Division of Forestry administers 3,357 acres in the Kanabec County portion of the forest. This includes 2,387 acres of trust fund land and 970 acres of 50-50 tax-forfeited land. Originally the forest contained only trust fund lands. In the 1950's tax-forfeited lands, the abandoned farms, were turned over to the state by the counties.

The St. Croix State Forest is located along the St. Croix River in east central Pine County, north of State Trunk Highway 48. The St. Croix State Forest was established in 1931 (Minn. Laws 1931, Chapter 124). The forest contains 42,105 acres of which 26,048 are administered by the division. The division administered lands include 4,339 acres of trust fund land, 21,703 acres of 50-50 tax-forfeited, and 6 acres of purchased land. The St. Croix River figured heavily in the movement of pine logs from Pine

County to sawmills in the Twin Cities area. Evidence of numerous logging dams on tributaries to the St. Croix River can still be found scattered throughout the St. Croix Forest. The small dams were constructed to hold back volumes of water so that sufficient flow would be available for floating the logs to the St. Croix. As the virgin pine became depleted, settlers moved into the area and began to further clear the forests for farming. During the late 1800's numerous land clearing activities were ongoing, with the Great Hinckley Fire of 1894 burning over parts of the forest. Continuing into the 20th century, smaller wildfires burned over most of the area until the 1930's. Much of the area held by settlers and large timber companies became tax-forfeited and was turned over to the state to manage as a state forest in 1931.

The Snake River State Forest is located 15 miles north of Mora in northern Kanabec County. Established in 1969 (Minn. Laws 1969, Chapter 257), the Snake River is one of Minnesota's newest state forests. The Division of Forestry administers 7,819 of the 8,320 acres within the forest boundary. There are 7,497 acres of 50-50 tax-forfeited land, 282 acres of trust fund land, and 40 acres of purchased land administered by the division. The 200 acre Bean Dam Wildlife Management Area is also located within the state forest boundary. There is one day-use recreation area, a small recreation trail and 4.3 miles of forest road.

There are 22,690 acres of Division of Forestry administered land outside of state forests in the Moose Lake Area. This includes 7,429 acres in southern Carlton County, 3,246 acres in Kanabec County, and 12,015 acres in Pine County. All of this land is school, swamp, or indemnity school trust fund land.

Division of Fish and Wildlife - The Section of Wildlife manages 19 Wildlife Management Areas (WMA) within the Moose Lake Area. Wildlife Management Area boundaries are established by Commissioner's Order issued pursuant to Minnesota Statutes Sections 97.48, Subdivision 13 and 97.481. The WMA's are managed in accordance with Department Policy #15 entitled Wildlife Management Areas.

The only WMA in southern Carlton County is the 160 acre Dye WMA in Barnum Township. The lands in this WMA were acquired through transfer of administrative control.

There are nine WMA's in Kanabec County with a total of 12,134(?) acres inside their boundaries of which the Division of Fish and Wildlife administers 9,077 acres (see Table 2.22). These lands were acquired by condemnation (5,173 acres), county board resolution (758 acres), purchase (2,718 acres), transfer of administrative control (11 acres), federal deed or patent (40 acres), and condemnation of state land (377 acres).

Pine County has nine WMA's with a gross acreage of 1,389 acres, all of which are administered by the division. These lands were acquired by county board resolution (1,301 acres), purchase (42 acres), and transfer of administrative control (46 acres).

The Division of Fish and Wildlife administers the Kettle River Scientific and Natural Area (SNA) in Pine County. The division administers 593 of the 761 acres within the SNA. All of the land in this SNA was acquired as a gift.

The Division of Fish and Wildlife - Section of Fisheries administers certain lands in the Moose Lake Area as spawning areas, lake or stream improvement projects, and fish rearing ponds. Fisheries administered lands include 781 acres in southern Carlton County, 34 acres in Kanabec County, and 275 acres in Pine County. These lands were acquired by county board resolution (909 acres), gift (20 acres), and purchase (161 acres).

Division of Parks and Recreation - There are three state parks within the Moose Lake Area. The Division of Parks and Recreation administers 36,784 acres within these parks. The boundaries of state parks are established by the legislature. The lands within each park are described in the session laws establishing or changing park boundaries. State parks are managed in accordance with Department Policy #13 entitled Natural State Parks or Department Policy #14 entitled Recreational State Parks and the management plan for each park.

Banning State Park is located along the Kettle River between Sandstone and Rutledge. The park was established in 1963 and expanded in 1965, 1967, and 1969. The DNR administers 4,351 of the 5,899 acres within the statutory boundary. The method of acquisition of the park lands are gift (166 acres), county board resolution (634 acres), purchase (3,384 acres), and federal deed or patent (167 acres). Recommended park management activities are described in A Management Plan for Banning State Park (MN DNR, Office of Planning, 1980).

The Moose Lake State Park is located along Interstate Highway 35 east of the town of Moose Lake. This state park was established in 1971 when custodial control of surplus Moose Lake State Hospital lands was transferred to the DNR. The DNR Office of Planning is currently developing a management plan for the recreation area.

The St. Croix State Park is located along the St. Croix River south of Trunk Highway 48. The St. Croix State Park was established in 1943 when the National Park Service transferred its interest in the St. Croix Recreational Development Project lands to the state. There have been subsequent additions to the park which now has 34,037 acres within its boundary. The land status of division administered lands in the park is gifts (6,350 acres), condemned land (40 acres), county board resolution (4,414 acres), purchase (670 acres), federal deed or patent (18,488 acres), and condemned state land (1,520 acres). Proposed management activities for St. Croix State Park are listed in the Upper St. Croix Resource Management Plan (MN DNR, 1974).

Trails and Waterways - The Trails and Waterways Unit is responsible for administering state trail and water access site lands in the Moose Lake Area. The Minnesota-Wisconsin Boundary Trail West Addition right-of-way in Pine and Carlton counties currently consists of 605 acres. Proposed development of the trail is outlined in the Master Plan for the Minnesota-Wisconsin Boundary Trail and West Addition (MN DNR, Trails and Waterways, 1982). There are 497 acres in Pine County that have been acquired along the Kettle Wild and Scenic River. There are 16 DNR administered water access sites outside of other DNR management units in the Moose Lake Area (see Table 2.22).

Other DNR Administered Lands. - There are 5.81 acres of Division of Waters administered land at the dam on the Willow River in the city of Willow River.

There are 1,091 acres of land in Pine County that are coded as "Department Administered" on the DNR Land Ownership/Classification Report. These parcels are primarily located in the St. Croix State Forest and were acquired as a gift.

County Administered Lands

County governments in the Moose Lake Area manage 92,221 acres of land (Table 2.23). The majority of this land is state-owned, tax-forfeited land administered by the counties. This land, and the resources it offers, provides an important source of revenue to local governments, income and employment for the regional economy, and public recreation opportunities for the entire state.

Table 2.23. County Administered Acreage in the Moose Lake Area (includes Carlton, Kanabec and Pine counties).

| Land Class | Carlton* | Kanabec | Pine | Moose Lake Area Total |
|--------------------------|----------|---------|--------|-----------------------|
| Outside Memorial Forests | 17,913 | 10,540 | 44,850 | 73,303 |
| County Memorial Forests | 18,918 | -- | -- | 18,918 |
| Total County Lands | 36,831 | 10,540 | 44,850 | 92,221 |

*T46N and T47N, Range 15W-21W. The Moose Lake Area includes approximately 51 percent of lands administered by Carlton County.

Source: MN DNR, Bureau of Land 1984.

Carlton County, with a total of approximately 72,500 acres (51 percent of which or 36,831 acres is located within the Moose Lake administrative area), has the most active county forest land management program in the Moose Lake Area. The scope of Land Department activities includes land and timber sales, reforestation, site preparation, and various other resource management and development programs. The Carlton County Land Department also administers 18,918 acres of dedicated memorial forest lands.

The Carlton County Land Department is staffed by a full-time Land Commissioner and professional forester, as well as clerical support. Periodic (part-time) technical assistance is obtained through the County Assistance Program (CAP) administered by the DNR, Division of Forestry.

Kanabec County administers 10,540 acres of tax-forfeited forest land. No formal Land Department organization or land management programs currently exist, nor are any such programs pending or proposed. The Kanabec County Auditor does receive periodic DNR technical advice and assistance from Area forestry staff in the areas of land management and timber sales.

Pine County administers 44,850 acres of tax-forfeited forest lands. Responsibility for the management of an additional 118,000 acres has, over the years, been transferred to DNR under a revenue sharing agreement. Much tax-forfeited land has also been sold to private landowners.

Since 1979, when the Pine County Land Commissioner was appointed, a timber sales program has begun, aerial photographs of Pine County lands have been purchased and the DNR's Phase II Forest Inventory has been successfully completed on all of Pine County's county forest lands. In 1984 a comprehensive forest resource management plan was developed with CAP assistance for Pine County's tax-forfeited forest lands (Pine County, 1984). The plan recommends, among other things, reorganization of Land Department responsibilities and a more active approach to forest resource management and development.

Federal Lands

National Park Service - The National Park Service protects and preserves nationally significant cultural and natural sites for the use and enjoyment of present and future generations. In the Moose Lake Area the National Park Service provides outdoor recreation on the St. Croix National Scenic Riverway. The Park Service also has administrative responsibility for the North Country National Scenic Trail which is proposed to pass through the Moose Lake Area.

Fish and Wildlife Service - The Regional Office of the Fish and Wildlife Service located at Fort Snelling is responsible for managing the Sandstone National Wildlife Refuge located near the Moose Lake Area. The primary management goal for this land is to provide fish and wildlife habitat.

Bureau of Indian Affairs - The Bureau of Indian Affairs (BIA) provides technical assistance to improve the management and utilization of forest resources on non-allotted Indian lands. The agency provides forest land management services such as fire protection and reforestation as well as assistance in developing forest products industries. There are approximately 3,000 acres of commercial forest land managed by the BIA in the Moose Lake Area.

Private Forest Lands

Industrial - There are approximately 17,000 acres of commercial forest land owned by forest products industries in the Moose Lake Area, or about 2 percent of the area's commercial forest land. These lands are managed primarily for timber production to provide a steady supply of wood to regional mills.

Non-industrial - Seventy-two percent of the commercial forest land (527,000 acres) is held by private owners. Farmers own about 40 percent, miscellaneous private individuals own 27 percent, and private corporations own approximately 4 percent of the commercial forest land. Management of these lands varies greatly depending upon individual owners' objectives.

DIVISION OF FORESTRY PROGRAM OVERVIEW

INTRODUCTION

The Division of Forestry is the state agency most involved in the protection and management of forest resources in the Moose Lake Area. However, several other DNR units and other agencies also administer programs that influence the use of forest resources. This section explains the purpose and accomplishments of Division of Forestry programs in the Moose Lake Area.

The Minnesota Forest Resources Plan (MN DNR, Division of Forestry, 1983) describes 19 programs administered by the Division of Forestry. Table 2.24 lists the time spent by Division of Forestry personnel assigned to the Moose Lake Area on various programs in fiscal years 1981 through 1983. This information, however, provides only a rough indication of the relative emphasis placed on each program. Certain programs are sensitive to outside factors such as weather (e.g., fire) or economic conditions (e.g., timber sales). Other programs rely heavily on contracted labor (e.g., reforestation, recreation) that is not reflected in the time summaries.

Table 2.24. Time Spent on Division of Forestry Programs by Moose Lake Area Personnel - Fiscal Years 1981 - 1983.

| Program | Full Time Equivalents (1) | | |
|----------------------------------|---------------------------|--------------|--------------|
| | F.Y. 1981 | F.Y. 1982 | F.Y. 1983 |
| County Assistance Program | 0.47 | 0.43 | 0.60 |
| Environmental Review (2) | X | X | X |
| Fire Management | 3.58 | 4.07 | 2.99 |
| Fish and Wildlife Habitat Mgmt. | 0.18 | 0.22 | 0.27 |
| Forest Pest Management (2) | 0.15 | 0.15 | 0.11 |
| Forest Recreation Management | 1.28 | 1.16 | 0.90 |
| Forest Resource Inventory (2) | 0.63 | 1.08 | 1.64 |
| Forest Resources Planning (2) | X | X | X |
| Forest Soils (2) | X | X | X |
| Land Administration | 0.14 | 0.14 | 0.19 |
| Maintenance and Administration | 1.74 | 2.29 | 1.88 |
| Nursery and Tree Improvement (2) | 0.11 | 0.08 | 0.06 |
| Private Forest Management | 1.60 | 2.12 | 2.17 |
| State Forest Roads | 0.93 | 1.07 | 0.69 |
| Timber Management | 7.00 | 6.79 | 6.46 |
| Urban Forestry | 0.10 | 0.11 | 0.10 |
| Utilization and Marketing (2) | 0.04 | 0.01 | 0.03 |
| TOTAL | 17.95 | 19.72 | 18.09 |

(1) A full time equivalent is equal to 2,920 hours/year (365 x 8), which is the minimum that a full time employee must report on the monthly time summary. This includes both hours worked and time off.

(2) These programs are primarily staffed by personnel outside of the Moose Lake Area.

Source: MN DNR, Division of Forestry Annual Time Summary (unpublished).

FIRE MANAGEMENT PROGRAM

The goals of the fire management program are to provide effective wildfire control and to promote the safe and effective use of fire as a resource management tool. Wildfire control consists of three major components: 1) fire prevention, 2) presuppression, and 3) suppression. Prevention involves efforts to inform the public of the dangers and potential losses that can result from uncontrolled wildfires. Presuppression focuses on the need to adequately prepare and maintain fire suppression forces for the eventuality of fire outbreak. This is done through extensive planning, training, fire detection and inter-agency cooperation. Suppression activities involve controlling and extinguishing forest and grass fires with a minimum of damage to property and natural resources, loss of life and personal injury.

The Moose Lake Area Fire Plan (MN DNR, Division of Forestry 1984) contains a detailed analysis of fire information for the period 1971-1981. It also proposes a balanced fire control program including prevention, presuppression, and suppression activities. The area fire plan contains the operational dispatching plan and will be updated as necessary to reflect changing conditions and the overall direction set in this plan.

The Moose Lake, Hinckley, and Mora districts generally have adequate access for wildfire control purposes. These districts are well served by state, county, and township roads, allowing use of four-wheel drive pickups with slip-on pumps for initial attack on most wildfires. The Nickerson and Eaglehead districts are less accessible, especially the area between State Trunk Highway 23 and the Wisconsin border. When fires occur in off-road areas the Bombardier, crawler tractor and helicopter are frequently used for fire control.

Fires in the hardwood types are usually confined to surface or duff fires. The Nickerson and Eaglehead districts have the largest unbroken tracts of hardwood cover. Conifer types include jack and red pine, white spruce, and balsam fir on upland sites and black spruce and tamarack on lowland sites. There is potential for crown fires in the jack and red pine types. Increased residential development in pine types has increased the chance of

man-caused fires. This trend is evident in the pine areas surrounding the General C.C. Andrews State Forest. Other large areas of pine type include the Nickerson-Holyoke area and parts of the St. Croix State Park. Marsh is a common cover type in the Moose Lake Area. During years of normal moisture, fires in the marsh type burn only surface fuels, mainly grass, cattails, sedges, and lowland brush. During dry periods the fires burn into the peat soils commonly found in marsh areas. Agricultural lands are most prevalent in the Mora, Hinckley and Moose Lake districts. Wildfires in these types often result from land clearing, equipment use, burning of low areas and pastures to get rid of brush, and burning uncut hay fields.

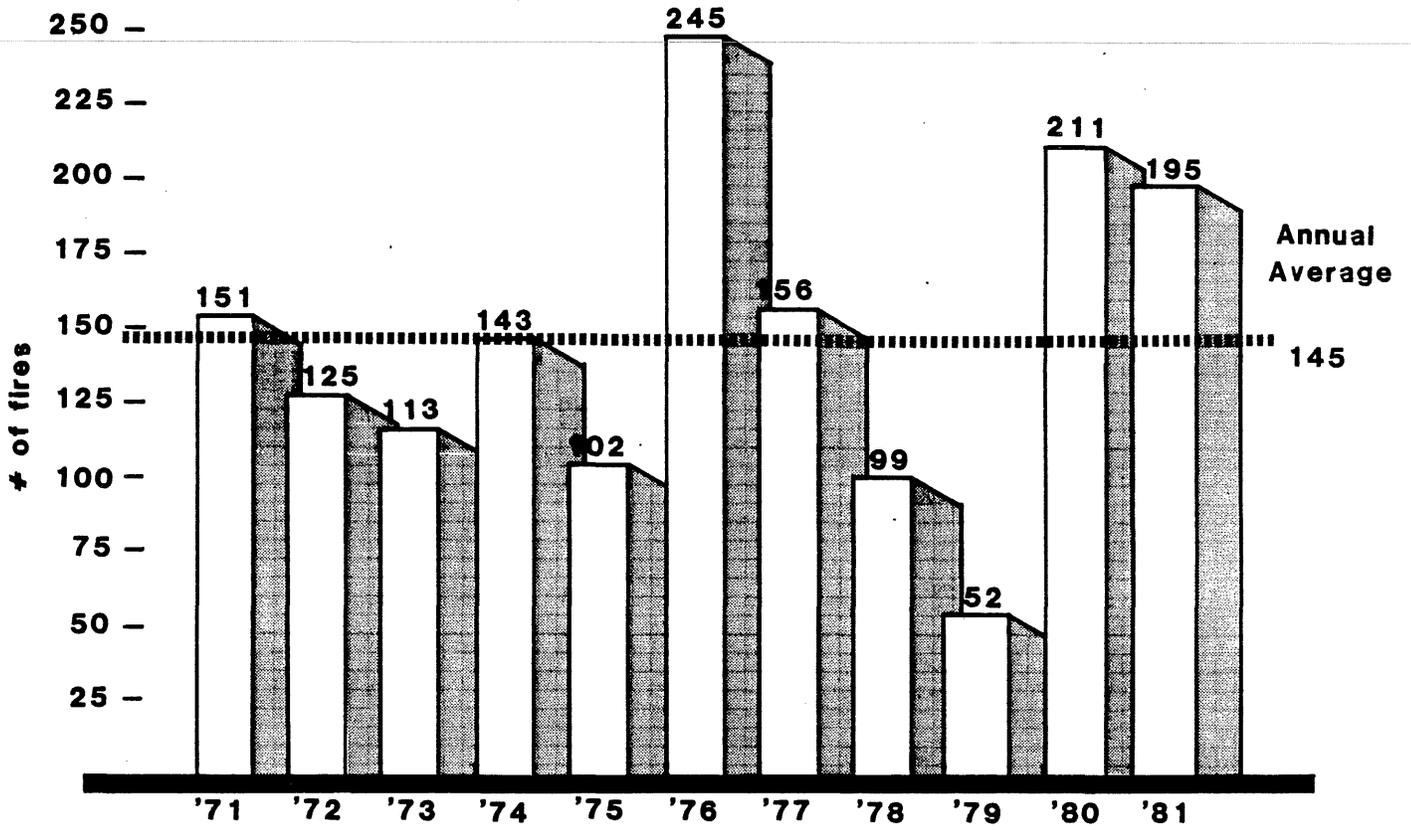
From 1971 through 1981 the Moose Lake Area experienced 1,595 fires, for an average of 145 fires per year. Figure 2.8 shows that the actual number of fires per year ranged from a high of 245 fires in 1976 to a low of 52 fires in 1979.

Grass is the most common fuel type burned in the Moose Lake Area, accounting for 1,297 fires between 1971 and 1981. This amounts to 81 percent of all fires and 83 percent of all acreage burned. The grass fuel type includes marsh areas, where most fires occur, as well as upland grass areas. Shrub and brush areas, which are often associated with grass areas, have the second highest fire occurrence for a total of 71 fires during the 11 year period. The young hardwood fuel type has the third highest fire occurrence with 37.

Spring is the most severe fire season accounting for 70 percent of all fires. Broken down by month, 7 percent of the fires occur in March, 36 percent in April and 27 percent in May.

The summer fire season is the least severe accounting for 12 percent of the fires in the area. Broken down by month, 4 percent of the fires occur in June, 2 percent in July, 3 percent in August and 3 percent in September. The summer fire season runs from greenup around June 1 until the first killing frost in late September. The severity of the summer fire season is directly dependent on the amount of rainfall received during these months.

Fig. 2.8 Number of Fires per Year



Source: Moose Lake Area Fire Plan, 1984.

The fall fire season is the second most severe fire season in the area, accounting for 17 percent of all fires. Broken down by month, 8 percent of all fires occur in October and 9 percent occur in November. The fall fire season begins with the first killing frost in late September and lasts until snow cover comes in November.

Figure 2.9 shows the causes of fires in the area for the period 1971 through 1981. Incendiarism, debris burning, and railroads account for 77 percent of the fires.

Anticipated expenses for an average fire year in the Moose Lake Area are:

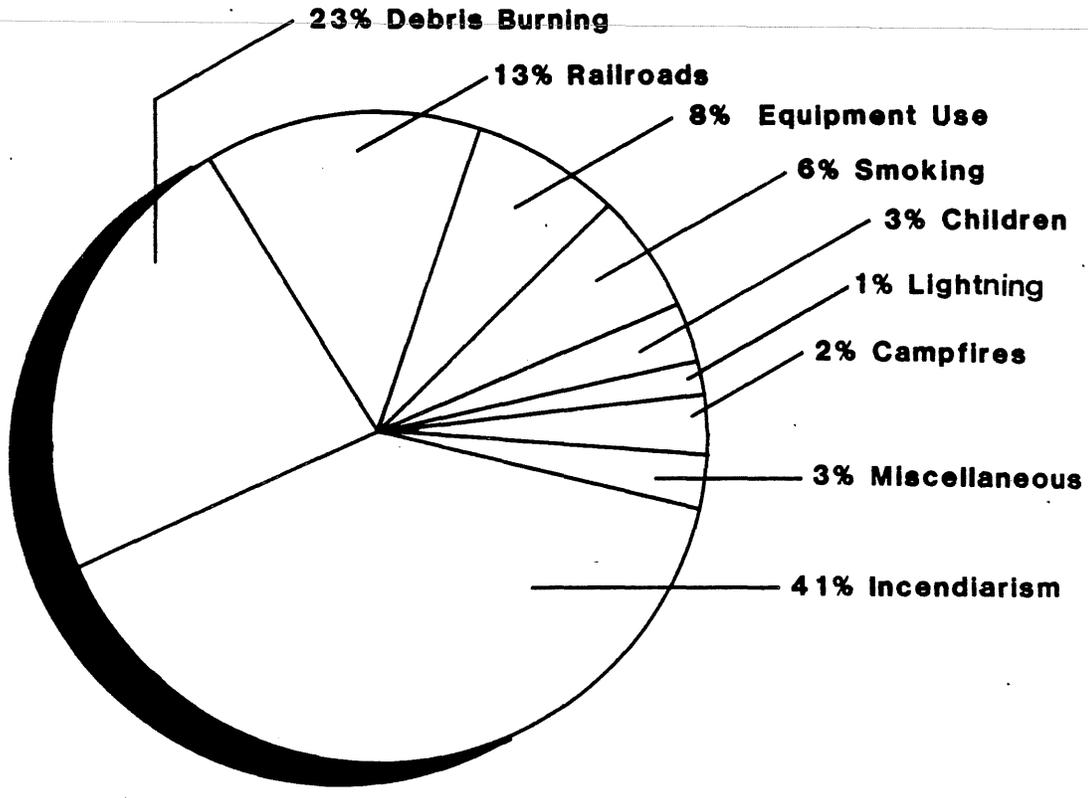
| | |
|-----------------|---------------|
| Prevention | \$ 1,100 |
| Detection | 13,300 |
| Pre-suppression | 74,171 |
| Suppression | <u>31,225</u> |
| TOTAL | \$119,796 |

The DNR maintains cooperative agreements with 20 fire departments in the area and has organized strike teams of fire department and DNR personnel to respond to wildfires. There are 181 commissioned fire wardens in the area who issue burning permits and cooperate in fire control activities. The General Andrews Nursery acts as a statewide receiving and repair depot for excess federal property that the DNR assigns to rural fire departments.

Prescribed burning can be an effective resource management tool. The DNR uses prescribed fire in the Moose Lake Area for several purposes, including for insect control in seed orchards and for site preparation. In recent years, approximately 45 acres per year have been site prepared in this method. In the future, prescribed burning will also be used frequently for keeping permanent openings free of brush. Burning improves wildlife habitat by increasing the production of forbs and grasses after the brush has been killed and more sunlight reaches the forest floor.

In 1983 there were 87 fires that burned 834 acres in the Moose Lake Area. There is an increasing wildfire risk in the area due to rural development

**Fig.2.9 Wildfire Cause , Moose Lake Area , 1971-1981.
(Total number of fires: 1,594)**



Source: Moose Lake Area Fire Plan, 1984.

and conversion of hardwood forests to pine types. Combinations of up to two aircraft and 4 towers are used to detect wildfires.

FOREST PEST MANAGEMENT

The role of the division's forest pest management program is to provide management guidelines, standards, examples, and risk evaluation systems for addressing forest pest management on public and private lands in the state. The forest pest management program seeks to reduce resource losses to acceptable levels by integrating forest pest management techniques into silvicultural practices.

Area and district forestry personnel are responsible for using the integrated pest management guidelines to reduce losses. The Brainerd Region Insect and Disease Specialist serves the Moose Lake Area. Sites requiring special pest management attention in the area include the Willow River Nursery, seed orchards, and recreation areas. In recent years approximately 300 acres per year have been treated with herbicides to control competing vegetation in forest plantations.

Insect and Disease Problems

The canker disease, White Pine Blister Rust Cronartium ribicola, and shoot boring insect, white pine weevil Pissodes strobi Peck; have caused extensive seedling mortality and stem deformation in the Moose Lake Area.

The pine tussock moth Dasychira pinicola (Dyar) and jack pine budworm Choristoneura pinus Freeman have periodically caused extensive defoliation and top kill to pine stands in and around the General Andrews State Forest. This major softwood production area surrounds the state forest nursery and contains numerous overstocked natural jack pine stands on droughty soils that are susceptible to defoliator buildup due to numerous stand openings and an abundance of male cone producing trees. Outbreaks in the 60's and 70's resulted in direct control operations and salvage harvests to avoid additional tree mortality and product loss due to bark beetles.

Existing unmanaged plantations of Scots, Austrian and Ponderosa Pine on private land near the nursery currently contain numerous needlecast and insect problems. An active Christmas tree industry exists in the Moose Lake Area. Growers often import stock from out of state nurseries and these plantings could be a potential source for pest introduction.

The forest tent caterpillar Malacosoma disstria (Hubner) has periodically caused extensive defoliation, growth loss and limited tree mortality in aspen and mixed hardwood stands throughout the Moose Lake Area. The gypsy moth Lymantria dispar (Linnaeus) has been collected in urban areas to the east, south and west of the Moose Lake Area. In the next ten years it could become a serious threat to oak stands in the Mora, Hinckley and Eaglehead districts. High hazard areas for early introduction and spread include parks and scenic areas along river corridors.

ENFORCEMENT*

The Division of Forestry is charged with the enforcement of certain Minnesota Statutes, as well as various DNR administrative rules and regulations. Enforcement activities on forestry-administered lands are conducted in cooperation with DNR Conservation Officers and may also involve state or local law enforcement officials.

Enforcement responsibilities may be grouped into five key areas. These are: 1) forest fire laws, 2) timber sales and timber trespass, 3) Christmas tree laws, 4) forest recreation, and 5) lands, leases and permits. A brief description of each follows.

Forest Fire Laws (Minn. Stat. Chapter 88.03 - 88.22)

The enforcement of fire laws focuses primarily on burning permit regulations, wildland arson and on railroad caused fires. The statutes also outline the authority of Forest Officers to arrest and prosecute fire

*Time spent on enforcement activities by Division of Forestry personnel is included in the Fire, Timber, Recreation and Land Management programs in Table 2.24.

law violators, to close forest roads and trails, to regulate certain public and private dumping areas and to enlist suitable persons and commandeer private property to fight forest fires.

Forest Officers work closely with DNR Conservation Officers and state fire wardens in efforts to reduce the number of wildfires, the loss of property and resources and fire suppression costs.

Timber Sales and Trespass (Minn. Stat. Chapter 90)

Field enforcement of state timber sale regulations and timber trespass laws is the responsibility of the Division of Forestry. DNR Conservation Officers assist the division by conducting in-depth investigations designed to establish basic facts and liability. Minnesota Statutes, Chapter 90 sets forth timber sale permitting procedures, timber appraisal and scaling regulations, and timber trespass provisions.

Christmas Tree Laws (Minn. Stat. Chapter 88.641 - 88.648)

The enforcement of Christmas tree laws pertains to the cutting, removal and transport of decorative trees. Enforcement provisions and permitting procedures are specified.

Recreation Regulations (NR-1)

Certain Forest Officers have been delegated specific authority by the Commissioner of Natural Resources to enforce NR-1 rules in state forest campgrounds and forest day-use areas. These are basically peace-keeping rules which specify appropriate personal conduct, public safety measures, environmental protection guidelines, motor vehicle use regulations and other standards for those areas under the control of or operated by the Commissioner of Natural Resources.

Lands, Leases and Permits (Minn. Stat. Chapters 89, 90.311 and 282)

These laws pertain to the acquisition, use, management and control of state lands, and to some extent, tax-forfeited lands. Forest Officers carry out

inspections, enforce rules and regulations, and oversee provisions of these statutes with the assistance of DNR Conservation Officers or Land Bureau specialists, if needed.

The Division of Enforcement cooperates with the Division of Forestry in the enforcement of certain forestry regulations. The Division of Forestry Law Enforcement Manual outlines coordination procedures for the two divisions. The Division of Enforcement is also responsible for the following major areas:

1. Game and fish laws
2. Watercraft safety
3. Snowmobile enforcement
4. Public access enforcement
5. Water regulations
6. Trail regulations
7. State Park rules
8. Federal statutes (when appropriate)
9. Assist Pollution Control Agency in enforcing environmental protection standards
10. Assist other law enforcement agencies

Additional responsibilities include firearm and snowmobile safety, nuisance animal complaints, removal of animals killed by vehicles, public access maintenance, and public relations.

All of the Conservation Officers are licensed peace officers in accordance with state statutes. Within the Moose Lake Area, Conservation Officers are stationed at Willow River, Hinckley, Pine City, Mora and Moose Lake. The Enforcement Area Supervisor is located in Princeton, Minnesota.

TIMBER MANAGEMENT

It is the Division of Forestry's goal to maintain state forest lands in the appropriate cover types, and with the proper degree of stocking and growth rate to secure maximum benefits according to multiple-use sustained yield principles.

The timber management program includes two major components: timber stand regeneration and the regulation of timber harvest. The basic objective of the timber stand regeneration program is to coordinate timber harvest and regeneration plans to assure state lands are maintained in the appropriate cover types to meet future multiple-use demands. Timber harvest regulation is designed to promote sustained yields of forest products. Both functions are accomplished by coordinating various aspects of timber scaling, sales, timber harvest, stand regeneration, and stand maintenance activities.

Division of Forestry Administered Timber

The Division of Forestry is charged with management of the timber resources on state owned land. Basic to proper management of those timber resources is a good understanding of the extent, condition, species distribution, size class, density and location of timber.

The Phase I Forest Inventory, an inventory of all land ownership classes, does not provide detailed information on a stand by stand basis, but rather a general description of timber resources using statistical sampling techniques. This information is excellent for analysis of all commercial forest land in the area, but it is not accurate or detailed enough for managing individual stands. Phase II is based on a stand by stand inventory. The Phase II Inventory presently collects data on each stand of trees located on state and county owned lands. Management decisions for state owned commercial forest land including timber regulation will be done using Phase II inventory information.

Tables 2.25 through 2.29 described below are summary tables from the Phase II forest inventory for state owned land. They exclude reserved lands, lands with shoreline restrictions and land within state park boundaries.

Table 2.25, area of forest land by cover type, includes all unrestricted timber stands administered by the Division of Forestry (some of the timber stands are on lands administered by other DNR divisions). Of the 175,393 acres identified, 139,000 acres are considered commercial cover type acres. In addition, there are 30,674 acres of non-stocked cover types some of which could be producing timber if planted.

Table 2.26, Area by Commercial Forest Land by Cover Type and Size Class, illustrates the acreage of each cover type by size class. This information is useful because it provides land managers with an understanding of the timber type's stage of development, and the forest products it can produce. As Table 2.26 shows, over 86% of the timber on DNR Forestry administered land is in the upper size classes, pole timber and sawtimber.

Table 2.27, Area of Commercial Forest Land by Cover Type and Site Index, illustrates forest site quality based on the height of a free-growing dominant or co-dominant tree of a representative species in the forest type at age 50.

Table 2.28, Area of Commercial Forest Land by Cover Type and Age Class, provides valuable information needed for determining annual harvest levels for species, managed on an even aged basis. Recommended annual harvest levels are set for the purpose of creating an equal distribution of area among age classes within a forest type to assure a continuous annual yield of forest products. It is based on the present distribution of age classes, the total present volume of timber in the forest, and the condition of this timber. Highest cutting priority should be given to overmature stands. The timber types are rapidly shifting to older age classes due to low levels of harvest.

Table 2.29, Area of Commercial Forest Land by Cover Type with High Risk, is a summary of the timber stands which will not survive or will have a substantial volume loss if not harvested soon.

Table 2.25. Area of Forest Land by Cover Type.

| COMMERCIAL FOREST | | UNPRODUCTIVE | |
|-----------------------|---------------|--------------------|---------------|
| Cover Type | Acres | Cover Type | Acres |
| Ash | 7660 | Stag. Spruce | 5126 |
| Lowland Hardwoods | 1868 | Stag. Tamarack | 386 |
| Aspen | 71162 | Stag. Cedar | 207 |
| Birch | 10309 | TOTAL | 5719 |
| Balsam Poplar | 655 | | |
| Northern Hardwoods | 24147 | NON-STOCKED | |
| Oak | 3886 | Cover Type | Acres |
| White Pine | 74 | Cutover Area | 542 |
| Red Pine | 3724 | Lowland Grass | 8565 |
| Jack Pine | 2890 | Upland Grass | 593 |
| Scotch Pine | 39 | Lowland Brush | 20379 |
| White Spruce | 907 | Upland Brush | 595 |
| Balsam Fir | 3325 | TOTAL | 30674 |
| Black Spruce, Lowland | 5721 | | |
| Tamarack | 2445 | GRAND TOTAL | 175393 |
| White Cedar | 136 | | |
| Black Spruce, Upland | 45 | | |
| Red Cedar | 7 | | |
| TOTAL | 139000 | | |

Source: Phase II Forest Inventory.

Table 2.26. Area of Commercial Forest Land By Cover Type and Size Class.
(Area in Acres)

| Cover Type | Size Class in inches | | | | | |
|-----------------------|----------------------|-------------|-------------|--------------|--------------|------------|
| | 0-1" | 1-3" | 3-5" | 5-9" | 9-15" | 15"+ |
| Ash | 119 | 59 | 27 | 3670 | 3785 | 0 |
| Lowland Hardwoods | 99 | 11 | 0 | 692 | 1066 | 0 |
| Aspen | 6467 | 3822 | 1015 | 20002 | 39856 | 0 |
| Birch | 14 | 0 | 0 | 8983 | 1312 | 0 |
| Balsam Poplar | 0 | 0 | 0 | 468 | 187 | 0 |
| Northern Hardwoods | 338 | 182 | 0 | 7075 | 16527 | 25 |
| Oak | 42 | 9 | 0 | 1105 | 2730 | 0 |
| White Pine | 0 | 5 | 0 | 0 | 33 | 36 |
| Red Pine | 563 | 912 | 942 | 1000 | 209 | 98 |
| Jack Pine | 66 | 387 | 424 | 1531 | 482 | 0 |
| Scotch Pine | 0 | 0 | 0 | 39 | 0 | 0 |
| White Spruce | 729 | 62 | 42 | 45 | 29 | 0 |
| Balsam Fir | 69 | 0 | 11 | 2363 | 882 | 0 |
| Black Spruce, Lowland | 561 | 883 | 636 | 3568 | 73 | 0 |
| Tamarack | 150 | 267 | 121 | 1778 | 129 | 0 |
| White Cedar | 0 | 0 | 0 | 95 | 41 | 0 |
| Black Spruce, Upland | 19 | 0 | 0 | 19 | 7 | 0 |
| Red Cedar | 0 | 7 | 0 | 0 | 0 | 0 |
| TOTAL | 9236 | 6606 | 3218 | 52433 | 67348 | 159 |

Source: MN DNR, Division of Forestry, 1984.

Table 2.27. Area of Commercial Forest Land by Cover Type and Site Index (in acres)

| Cover Type | Site Index Class | | | | | | | | | None |
|-----------------------|------------------|-----------|-------------|-------------|--------------|--------------|--------------|--------------|-------------|-----------|
| | 1-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81+ | |
| Ash | 0 | 0 | 103 | 1071 | 4184 | 2050 | 232 | 20 | 0 | 0 |
| Lowland Hardwoods | 0 | 0 | 6 | 49 | 534 | 797 | 379 | 97 | 6 | 0 |
| Aspen | 0 | 0 | 78 | 181 | 826 | 8616 | 30402 | 24653 | 6364 | 42 |
| Birch | 0 | 0 | 0 | 0 | 245 | 4053 | 4804 | 1177 | 30 | 0 |
| Balsam Poplar | 0 | 0 | 0 | 0 | 45 | 438 | 48 | 124 | 0 | 0 |
| Northern Hardwoods | 0 | 0 | 0 | 33 | 2997 | 8893 | 10065 | 2067 | 92 | 0 |
| Oak | 0 | 0 | 0 | 85 | 387 | 738 | 2284 | 346 | 46 | 0 |
| White Pine | 0 | 0 | 0 | 24 | 9 | 41 | 0 | 0 | 0 | 0 |
| Northern Pine | 0 | 0 | 0 | 0 | 562 | 1458 | 1421 | 231 | 12 | 40 |
| Jack Pine | 0 | 0 | 0 | 15 | 378 | 1302 | 733 | 457 | 0 | 5 |
| Scotch Pine | 0 | 0 | 0 | 0 | 0 | 19 | 16 | 4 | 0 | 0 |
| White Spruce | 0 | 0 | 0 | 0 | 43 | 384 | 434 | 27 | 19 | 0 |
| Balsam Fir | 0 | 0 | 0 | 87 | 524 | 1643 | 840 | 214 | 17 | 0 |
| Black Spruce, Lowland | 0 | 22 | 3238 | 2059 | 347 | 55 | 0 | 0 | 0 | 0 |
| Tamarack | 0 | 0 | 182 | 681 | 1320 | 198 | 64 | 0 | 0 | 0 |
| White Cedar | 0 | 22 | 70 | 41 | 3 | 0 | 0 | 0 | 0 | 0 |
| Black Spruce, Upland | 0 | 19 | 0 | 19 | 0 | 7 | 0 | 0 | 0 | 0 |
| Red Cedar | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 63 | 3684 | 4345 | 12404 | 30692 | 51722 | 29417 | 6586 | 87 |

Source: MN DNR, Division of Forestry 1984.

Table 2.28. Area of Commercial Forest Land by Cover Type and Age Class (in acres).

| Cover Type | Age Class in Years | | | | | | | | | | | | |
|--------------------|--------------------|-------------|-------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|
| | 00-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 01-100 | 101-120 | 121-140 | 141+ |
| Ash | 70 | 42 | 12 | 33 | 150 | 381 | 944 | 1245 | 1074 | 778 | 1574 | 718 | 639 |
| Lowland Hardwoods | 99 | 11 | 0 | 151 | 144 | 64 | 509 | 206 | 84 | 106 | 61 | 278 | 155 |
| Aspen | 8440 | 2437 | 4108 | 19749 | 21895 | 12889 | 1357 | 224 | 63 | 0 | 0 | 0 | 0 |
| Birch | 118 | 0 | 122 | 1417 | 5019 | 3285 | 326 | 22 | 0 | 0 | 0 | 0 | 0 |
| Balsam Poplar | 0 | 0 | 109 | 0 | 369 | 177 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Northern Hardwoods | 316 | 174 | 330 | 1765 | 7299 | 7720 | 3526 | 1173 | 480 | 451 | 364 | 549 | 0 |
| Oak | 51 | 0 | 18 | 263 | 1695 | 1225 | 556 | 0 | 78 | 0 | 0 | 0 | 0 |
| White Pine | 0 | 5 | 0 | 0 | 5 | 4 | 0 | 36 | 0 | 0 | 24 | 0 | 0 |
| Northern Pine | 552 | 1709 | 627 | 594 | 0 | 71 | 81 | 60 | 23 | 0 | 7 | 0 | 0 |
| Jack Pine | 85 | 665 | 440 | 673 | 630 | 169 | 228 | 0 | 0 | 0 | 0 | 0 | 0 |
| Scotch Pine | 0 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| White Spruce | 717 | 76 | 85 | 0 | 0 | 0 | 11 | 8 | 0 | 10 | 0 | 0 | 0 |
| Balsam Fir | 69 | 0 | 11 | 313 | 1362 | 1182 | 327 | 33 | 20 | 8 | 0 | 0 | 0 |
| Black Spruce, Low | 91 | 303 | 143 | 602 | 674 | 857 | 453 | 612 | 588 | 366 | 801 | 78 | 153 |
| Tamarack | 101 | 199 | 58 | 197 | 442 | 893 | 254 | 122 | 47 | 27 | 81 | 9 | 15 |
| White Cedar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 23 | 22 | 34 | 7 | 9 |
| Black Spruce, Up | 0 | 19 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Red Cedar | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 10709 | 5640 | 6109 | 25757 | 39684 | 28943 | 8572 | 3782 | 2480 | 1768 | 2946 | 1639 | 971 |

Source: MN DNR, Division of Forestry 1984.

Table 2.29. Area of Commercial Forest Land by Cover Type with High Risk.

| Cover Type | Total Acres |
|-----------------------|--------------|
| Ash | 149 |
| Lowland Hardwoods | 169 |
| Aspen | 13369 |
| Birch | 386 |
| Balsam Poplar | 43 |
| Northern Hardwoods | 86 |
| Oak | 0 |
| White Pine | 0 |
| Northern Pine | 0 |
| Jack Pine | 28 |
| Scotch Pine | 0 |
| White Spruce | 0 |
| Black Fir | 104 |
| Black Spruce, Lowland | 178 |
| Tamarack | 85 |
| White Cedar | 0 |
| Black Spruce, Upland | 0 |
| Red Cedar | 0 |
| TOTAL | 14597 |

Source: MN DNR, Division of Forestry 1984.

Moose Lake Area timber management accomplishments (FY 1983) included the administration of 64 timber sales with a volume of 10,800 cords and a stumpage value of \$47,500. Site preparation was conducted on 425 acres; reforestation on 727 acres; release on 320 acres; and timber stand improvement activities on 19 acres. Table 2.30 lists silvicultural accomplishments in the area for F.Y. 1980-83.

Table 2.30. Silvicultural Activity in the Moose Lake Area, 1980-1983.

| Activity | 1980 | 1981 | 1982 | 1983 |
|-----------------------------|------|------|------|------|
| Trees planted (000's) | 127 | 516 | 444 | 395 |
| Acres seeded | 100 | 90 | 22 | 32 |
| Site preparation (acres) | 436 | 485 | 260 | 352 |

Source: MN DNR, Division of Forestry, 1984.

NURSERY AND TREE IMPROVEMENT.

The goal of the nursery program is to produce tree planting stock for use on public and private land for afforestation, reforestation, windbreaks, shelterbelts, erosion control, soil and water conservation, wildlife habitat, and environmental education. Primary activities in the nursery program include the production and distribution of bareroot seedlings. When the seedling stock attains a desirable size it is lifted, sorted by grade, packaged, and shipped. The nursery program also contracts with private greenhouses to meet the division's containerized seedling needs.

The tree improvement program seeks to increase the productivity of public and private forest lands in Minnesota through the use of genetically improved planting stock. Genetically superior seeds, or cuttings, are produced or acquired for use in the growing of planting stock or other regeneration activities. The target is the highest level of genetic improvement possible within the restrictions of available resources, current information, and probable economic returns. Major activities include seed source selection, seedling distribution, seed production area development, and seed orchard development, including first generation, seedling, clonal, and advanced generation seed orchards.

The Willow River Nursery, located in the General C.C. Andrews State Forest, is not administered as part of the Moose Lake Area. Area personnel are, however, involved in locating superior trees and in the certification of seed collection sites.

LAND ADMINISTRATION

The goal of the Division of Forestry's land administration program is to maintain a state forest land ownership pattern that provides for efficient multiple-use management and protection of forest resources. The achievement of this goal requires not only an integrated effort among all administrative units of the division, but a close working relationship with the DNR Land Bureau, other DNR divisions, the U.S. Forest Service, other public land agencies, the state legislature, and the private sector.

Land administration involves land acquisition, exchange, sales, and leasing; land classification; and maintaining land records. The State Forest Management and Policy Supervisor is the main liaison with the Land Bureau. Field staff are involved in identifying proposed acquisition, sales, leases, or exchanges, inspecting leases, and maintaining contacts with other agencies and individuals. Once the division has determined its land administration priorities and projects, the Land Bureau assumes follow-up responsibilities for negotiations, appraisals, record keeping, and other services.

In the Moose Lake Area the division currently administers 88 leases (Table 2.31). The majority are hunting cabin leases in the Nemadji, St. Croix and Chengwatana state forests. The number and acreage of land exchanges, sales, and acquisitions from F.Y. 1980-83 are listed on Table 2.32. In addition, 121 acres are currently being acquired as additions to the Dago Lake Day Use Area and the Willow River Campground in the General Andrews State Forest.

Table 2.31. Leases in the Moose Lake Area, July 1984.

| Type of Lease | Number of Leases |
|-----------------------|------------------|
| Hunting cabin sites | 50 |
| Utility rights-of-way | 15 |
| Other rights-of-way | 8 |
| Gravel | 3 |
| Agricultural | 3 |
| Miscellaneous | 9 |
| TOTAL | 88 |

Source: MN DNR Division of Forestry, Moose Lake Area Staff, 1984.

Table 2.32. Number and Acreage of Land Exchanges, Sales and Acquisitions in the Moose Lake Area, 1980-83 (Acres are given in parentheses).

| Activity | 1980 | 1981 | 1982 | 1983 |
|-------------------|--------|--------|--------|--------|
| Land Exchanges | -- | 1 (59) | -- | -- |
| Land Sales | -- | -- | 1 (40) | -- |
| Land Acquisitions | 2 (45) | -- | 1 (28) | 1 (40) |

Source: MN DNR, Division of Forestry and MN DNR Land Bureau, 1984.

FISH AND WILDLIFE HABITAT MANAGEMENT

The goal of Division of Forestry's fish and wildlife habitat management efforts is to ensure that integration of forestry and wildlife management takes place on state administered lands in accordance with the Wildlife/Forestry Coordination Policy. Typical activities include modifying the following forestry practices on lands under Division of Forestry jurisdiction to assure that fish and wildlife habitat is maintained or improved: timber harvest, reforestation, timber stand improvement, construction of openings, roads and trails, wildfire control, and prescribed burning. Regular meetings between the staffs of the Division of Forestry and the Section of Wildlife are an important part of maintaining coordinated management efforts.

FOREST RECREATION MANAGEMENT

The forest recreation program's goal is to fulfill the outdoor recreation potential of Minnesota forest lands by providing developed recreational areas and opportunities for dispersed recreational activities. Recreational developments are generally limited to primitive, minimum impact campgrounds, day-use areas and recreational trails. Division recreation facilities are managed in accordance with DNR Policy No. 8, "Recreational Use of State Forests."

Forest recreation management activities include planning, development, rehabilitation and maintenance of recreation facilities as well as enforcement of rules and regulations. Planning for recreation sites as required by the Outdoor Recreation Act (MS 86A) was done in conjunction with this plan (see Appendix G). Development and rehabilitation involve construction or reconstruction of facilities as outlined in the sub-area plan.

DNR Forestry Administered Recreation Facilities

The Division of Forestry administers 6 campgrounds and a day-use area in the Moose Lake Area. Other facilities include recreational trails, hunter

parking lots, primitive campsites, and trail shelters. The following is a list of dispersed recreational facilities by state forest:

Chengwatana

- Four primitive campsites with table and fire ring, one site has toilets
- Two large parking lots
- Eight turn-out parking lots for 3 to 12 cars

St. Croix

- Eight primitive campsites with tables and fire rings, five have open air pit toilets and one has an enclosed pit toilet
- Six parking lots

Nemadji

- Ten parking lots
- Two trail shelters

General C.C. Andrews

- One parking lot, snowmobile trail head

The Division of Forestry has operational responsibility for 226 miles of trail in the Moose Lake Area. This mileage includes 131 miles of forestry administered unit trails (within state forests), 78 miles of the Minnesota/Wisconsin Boundary Trail, and 17 miles of the Range Line Snowmobile Trail* (Table 2.33). The vast majority of Division administered trails are available for snowmobiling only because of the amount of wet terrain they cross. Only in St. Croix and General C.C. Andrews state forests are there substantial mileages of summer use trails. The summer trails are multiple-use trails on which hiking, horseback riding and ORV use presently occur. This is not the most desirable situation as recreational trail uses often conflict with one another.

*A portion of the trail mileage of the Minnesota/Wisconsin Boundary Trail and all of the Range Line trail mileage lies outside of state forest boundaries.

Table 2.33. Forestry Administered Trails in the Moose Lake Area.

| <u>Pine County</u> | <u>Kanabec County</u> |
|----------------------------------|------------------------------------|
| Chengwatana - 23.2 miles | Kanabec - 15.0 miles |
| 7.0 Hiking | 1.0 Hiking |
| 7.0 X-C Skiing | 15.0 Snowmobiling |
| 16.2 Snowmobiling | |
| St. Croix - 32.3 miles | Chesley Brook - 7.9 miles |
| 32.3 Hiking | 7.9 Snowmobiling |
| 32.3 Horseback Riding Trails | <u>Other Trails</u> |
| 25.2 Snowmobiling | Minnesota/Wisconsin Boundary Trail |
| General C.C. Andrews - 9.4 miles | 78.0 Snowmobiling, X-C Skiing, |
| 9.4 Hiking | Hiking, Horseback Riding |
| 9.4 Horseback Riding | |
| 9.4 Snowmobiling | Range Line - 17.0 miles |
| Nemadji - 43.1 miles | 17.0 Snowmobiling |
| 43.1 Hunting | |
| 43.1 Snowmobiling | |

Source: MN DNR, Trails and Waterways Unit. Registry of Trail Mileage.

Future Recreation Development Opportunities on State Forest Lands

Forestry administered lands in the Moose Lake Area offer a number of potential recreation development opportunities. Some of these opportunities have the ability to fulfill immediate recreation needs. Others are available if future recreation demand indicates. Before any new development of a substantial nature can take place the Minnesota Outdoor Recreation Act (MN Stat. 86A) requires that a Recreational Sub-Area Plan be completed (see Appendix G, Moose Lake Area Recreational Sub-Area Plan).

Canoe and Boating Route Campsites

Division of Forestry lands along the St. Croix and Upper Snake rivers have potential to be developed as canoe campsites. Locations in the Chengwatana and Snake River state forests should be surveyed by the Trails and Waterways Unit for possible development.

Trail Linking Rest Area and Nursery

A short interpretive hiking trail from the Highway 35 rest area through the General C.C. Andrews Nursery would provide an informative and relaxing stop for freeway users.

Campground and Day-Use Areas

At least nine sites have potential for development as campgrounds or day-use areas because of their geographic proximity to open water, topographical characteristics, drainage characteristics and vegetative makeup. Detailed information on these sites are presented in the Moose Lake Area Forest Recreation Sub-area Plan (Appendix G).

Trails

Much of the land which lies in the Moose Lake Area's state forests is found in large, contiguous blocks. Most of these blocks presently have some type of trail development. However, there is potential to substantially increase trail mileage for all types of use if need warrants. The development of individual campsites along these trails is also a possibility. Areas that have no trails presently and show good potential for development are the Snake River State Forest and scattered forestry parcels along the Nemadji River. These parcels are separated largely by county and tax-forfeited lands administered by Carlton County.

The Trails and Waterways Unit was created in 1979 to administer the state trail, grants-in-aid trail, water access, and canoe route programs. Funds for development and maintenance of trails and water access sites within state forests are budgeted through this unit. New trails in state forests must meet the criteria contained in the DNR Trail Policy statements.

FOREST RESOURCE INVENTORY

The forest inventory program is designed to collect and maintain the data needed to develop effective forest management plans and programs. The division's forest inventory unit examines forest lands to determine the

location and condition of various forest resources. On timbered lands species distribution, size class, density, productivity, and operability are recorded.

The division maintains two distinct forest inventories. The "Phase I" inventory is a cooperative effort with the U.S. Forest Service's North Central Forest Experiment Station. The objective of this inventory is to obtain periodic estimates of the extent and condition of forest resources and of the rates of timber growth and removals on all land ownerships. The estimates are based on measurements and remeasurements of a statistical sample of permanent plots. The 1977 inventory was the fourth Minnesota survey. Earlier surveys are dated 1936, 1953, and 1962. The results of the 1977 inventory are contained in numerous reports published by the Department of Natural Resources and the North Central Forest Experiment Station.

The "Phase II" inventory is based on a field examination of each stand on 6.9 million acres of state and county administered land. The primary outputs of the "Phase II" inventory are township maps showing the location of each stand and computerized files of inventory data. An important feature of this inventory is the capability to record changes in the forest cover due to harvest, fire, planting, and other activities.

The Phase II inventory of the Moose Lake Area was recently completed. The inventory information is being used to develop timber management and other plans for the area. Area personnel are responsible for keeping the inventory current.

The Division of Forestry is also working with the Soil Conservation Service and Carlton County on an inventory of private forest lands in the county. This pilot project may be expanded to other counties in the Moose Lake Area and elsewhere in the future.

FOREST SOILS

The goal of the forest soils program is to provide site specific forest soil interpretations to forest managers. These interpretations will enable the Division of Forestry to concentrate intensive timber management on the most productive forest land, to assist in the development of soil surveys in forested areas, to provide technical soils information to forest planners, and to provide soils staff to the regional forest supervisor.

Typical activities include: conducting field examinations of specific sites to identify and interpret the impact that different soils have on forest production and management activities, working with other regional and area staff specialists to integrate soil management principles into silvicultural practices, and working cooperatively with other agencies in the development of soil surveys in forested areas. Soils information and expertise is also made available to area and regional forestry and engineering staffs for road construction and reconstruction projects. Technical soils information is provided to forest and environmental planners so that forest management can be concentrated on productive areas and the forest environment can be protected.

The Soil Conservation Service is involved in surveying and mapping the soils of Minnesota. The Division of Forestry is working with the SCS and other agencies to develop soil survey interpretations that are applicable to forest lands.

STATE FOREST ROADS

The goal of the state forest road program is to develop and maintain Minnesota's state forest road system to facilitate the protection, management, and recreational enjoyment of state forest lands. This 1,800 mile statewide system of roads also provides for public transportation, commerce, and development activities on several million acres of county, federal, and private forest lands.

The Moose Lake Area contains 249.2 miles of state forest roads (Table 2.34). About 64.3 miles of this total are considered permanent, all weather road. The remaining road miles exist primarily for resource access and can be used only during dry periods or in winter.

The permanent (Class 1-4) forest road system in the Moose Lake Area is nearly complete. All additional planned road reconstruction will use existing rights of way. Another 13.5 miles are scheduled for upgrading from Class 4 to Class 3. Maintenance of the forest road system is a continuing concern. In the past adequate funding has not been available for proper road maintenance. Opportunities for developing a more efficient and effective forest road system in the area include closer regulation of the type, timing and intensity of forest road use.

Table 2.34. State Forest Roads in the Moose Lake Area.

| Road No. | Road Name | County | C1* Miles | C2 Miles | C3 Miles | C4 Miles | C5 Miles | Total Miles |
|---------------|--------------------------------|---------|-----------|----------|----------|----------|----------|-------------|
| 005 | Park Trail | Pine | | | | 12.0 | 36.0 | 48.0 |
| 004 | Net Lake | Pine | | | 16.5 | | 33.0 | 49.5 |
| 226 | Harlis-Holyoke | Carlton | | | 3.5 | | 11.3 | 14.8 |
| 257 | Chengwatana | Pine | | | | 4.8 | 37.0 | 41.8 |
| 232 | Tamarack | Pine | | | | 5.1 | 4.7 | 9.8 |
| 247 | St. Croix | Pine | | | | 7.5 | 16.0 | 23.5 |
| 003 | Beldon | Pine | | | | 5.8 | 2.9 | 8.7 |
| 002 | Kanabec | Kanabec | | | | 4.3 | 4.5 | 8.8 |
| 270 | Chesley Brook | Kanabec | | | | 2.5 | 6.8 | 9.3 |
| 339 | Bruno | Pine | | | | | 1.5 | 1.5 |
| 365 | Mud Lake | Carlton | | | | | 0.8 | 0.8 |
| 364 | Firewood Road | Carlton | | | | | 1.7 | 1.7 |
| 338 | Duquette | Pine | | | | 1.5 | 3.0 | 4.5 |
| 337 | Kerrick Road | Pine | | | | | 3.6 | 3.6 |
| 363 | Blackhoof | Carlton | | | | | 1.3 | 1.3 |
| 362 | Holyoke | Carlton | | | | | 1.6 | 1.6 |
| 361 | Split Rock Road | Carlton | | | | | 1.0 | 1.0 |
| 247 | Snake River Campground Road | Pine | | | | 0.8 | | 0.8 |
| 348 | Unnamed | Pine | | | | | 3.0 | 3.0 |
| 342 | Unnamed | Pine | | | | | 2.5 | 2.5 |
| 343 | Wilma Trail | Pine | | | | | 1.0 | 1.0 |
| 344 | Unnamed | Pine | | | | | 1.2 | 1.2 |
| 345 | Unnamed | Pine | | | | | 0.8 | 0.8 |
| 347 | Unnamed | Pine | | | | | 1.5 | 1.5 |
| 349 | Graces Lake Trail | Pine | | | | | 0.5 | 0.5 |
| 346 | Basswood Trail | Pine | | | | | 2.5 | 2.5 |
| 359 | Unnamed | Kanabec | | | | | 0.5 | 0.5 |
| 358 | Unnamed | Kanabec | | | | | 1.5 | 1.5 |
| 357 | Unnamed | Kanabec | | | | | 2.1 | 2.1 |
| 006 | Unnamed | Pine | | | | | 1.1 | 1.1 |
| TOTALS | | | | | 20.0 | 44.3 | 184.9 | 249.2 |

*DNR State Forest Road Classifications:

- Class 1 - Multi-purpose, all weather, two lane, hard surfaced, two foot shoulder (minimum), 26' roadway width.
- Class 2 - Multi-purpose, all weather, two lane, gravel surfaced, no shoulder, 22' roadway width.
- Class 3 - Multi-purpose, all weather, one or two lanes, gravel surface, 18' roadway width.
- Class 4 - Multi-purpose, all weather, one lane, 14-16' roadway width.
- Class 5 - Minimum design for intended use during winter or dry periods only.

Source: State Forest Road Plan, MN DNR, 1982.

PRIVATE FOREST MANAGEMENT (PFM)

The PFM program promotes multiple-use management on non-industrial private forest lands. Typical PFM activities include: 1) promoting forest management through personal contacts with landowners and the use of the media; 2) conducting educational workshops, clinics, and field days; 3) developing multiple-use forest management plans for landowners; 4) providing technical and financial assistance for certain management practices; and 5) providing utilization and marketing assistance associated with timber harvesting.

PFM assistance in the Moose Lake Area is provided by district foresters and the area PFM specialist. There are currently 359 active management plans covering 16,219 acres in the area. Fiscal 1983 PFM accomplishments included 66 management plans for 3,010 acres, reforestation of 216 acres, timber stand improvement on 277 acres, and assistance with 624 acres of timber harvest. There are 145 certified Tree Farms in the area.

Cost-sharing assistance is available to private landowners through the county Agricultural Stabilization and Conservation Service (ASCS) office. It is the responsibility of the PFM Forester to develop and maintain rapport with the ASCS office and to provide technical and planning assistance for the completion of specific forestry practices.

The PFM Forester is responsible for working with and maintaining a rapport with other governmental agencies such as the University of Minnesota, County Extension Offices, Soil Conservation Service, private industry, and the U.S. Forest Service. The PFM program also promotes the educational aspects of forestry to the general public by handling forestry field tours, workshops, and seminars.

COUNTY ASSISTANCE PROGRAM

The goal of the County Assistance Program (CAP) is to provide professional forest management support to counties in their efforts to intensify the multiple-use, sustained-yield management of county administered tax-forfeited lands. This assistance is tailored to meet a variety of

needs, and is intended to complement the management efforts of the counties involved. The CAP program fosters improved cooperative relations between the state and counties in the management of Minnesota's public forest lands. In addition to CAP, region, area and district forestry personnel are available to assist with county land and timber sale appraisals, timber sale reviews and timber trespass.

There are no full-time CAP foresters assigned to the counties in the Moose Lake Area. Pine County currently uses CAP funds to pay a portion of the county forester's salary. In fiscal year 1983 Moose Lake Area personnel administered 37 timber sales valued at \$19,000 for Pine County. Division of Forestry personnel also work with the Kanabec County Auditor to manage that county's 10,500 acres of tax-forfeited land. Carlton County's Land Commissioner is responsible for all tax-forfeited land management in that county.

URBAN FORESTRY

The urban forestry program provides assistance with community projects that involve local units of government, on lands within municipal boundaries that are maintained for public use, and with shade or ornamental trees regardless of their location.

The program assists the community with the planning of its overall forestry program, including the development of tree inventories, management plans, city tree ordinances, and budgets. Advice and training are given in the selection of plant materials, planting techniques, and spacing and location of trees in urban areas. This advice and training help the community develop wildlife habitat within its urban environment, improve its watershed areas, minimize soil erosion, and establish windbreaks where needed. The division also provides management assistance for school and municipal forests.

UTILIZATION AND MARKETING (U&M)

The twofold goal of the U&M program is to improve the utilization of the forest resource through increased harvesting and processing efficiency, and to increase the utilization of forest resources through marketing and economic development of wood products industries. Major program areas include primary wood processing, resource analysis and industrial development, marketing, wood fuel and byproducts, timber harvesting and secondary processing of timber products. The major U&M activity of area personnel is assisting landowners in finding markets for their timber. Special resource analyses and market development work are provided by the Brainerd Region U&M Specialist.

MAINTENANCE AND ADMINISTRATION

The goal of this program is to provide the administrative support needed to achieve the goals of other division programs. Major activities include personnel management and training, equipment maintenance, and building management and maintenance.

Personnel Management and Training

In March of 1984 the Moose Lake Area complement included 18 permanent full time, two 90 percent seasonal, and 10 part time seasonal employees. In addition there are four part time seasonal employees contracted through the Greenview program. Special work projects such as tree planting, fire fighting, timber stand improvement, trail maintenance, and campground maintenance result in variation in the number of part time laborers employed. Over the years the number of laborers employed on work crews has varied from 10 to 20. Table 2.35 describes the area personnel complement in more detail.

Table 2.35. Moose Lake Area Personnel Complement, March 1984.

| RAD | Working Title | Civil Service Classification | Type of Appointment | Full time Equivalent | Filled or Vacant |
|-----|---------------------------|------------------------------|---------------------|----------------------|------------------|
| 340 | Area Forest Supervisor | N.R. Spec. 4 | full time unl. | 1.0 | filled |
| 340 | Ass't. Area Forester | N.R. Spec. 2 | full time unl. | 1.0 | filled |
| 340 | Area Silviculturist | N.R. Spec. 2 | full time unl. | 1.0 | filled |
| 340 | PFM Specialist | N.R. Spec. 2 | full time unl. | 1.0 | filled |
| 340 | Area Tech. (Fire & Rec.) | N.R. Technician | full time unl. | 1.0 | filled |
| 340 | Area Tech. (PFM & Timber) | N.R. Technician | full time unl. | 1.0 | filled |
| 340 | Forestry Repairman | General Repair Worker | full time unl. | 1.0 | filled |
| 340 | Area Office Assistant | Clerk Steno 3 | full time unl. | 1.0 | filled |
| 340 | Office Ass't. part time | Clerk Typist 2 | 90% time | 0.9 | vacant 3/16/84 |
| 341 | Dist. Forester | N.R. Spec. 2 | full time unl. | 1.0 | filled |
| 341 | Dist. Tech. | N.R. Technician | full time unl. | 1.0 | filled |
| 342 | Dist. Forester | N.R. Spec. 2 | full time unl. | 1.0 | filled |
| 342 | Dist. Tech. | N.R. Technician | full time unl. | 1.0 | filled |
| 343 | Dist. Forester | N.R. Spec. 2 | full time unl. | 1.0 | filled |
| 343 | Dist. Tech. | N.R. Technician | full time unl. | 1.0 | filled |
| 343 | Dist. Tech. | N.R. Technician | 90% time | 0.9 | filled |
| 344 | Dist. Forester | N.R. Spec. 2 | full time unl. | 1.0 | filled |
| 344 | Dist. Tech. | N.R. Technician | full time unl. | 1.0 | filled |
| 345 | Dist. Forester | N.R. Spec. 2 | full time unl. | 1.0 | filled |
| 345 | Dist. Tech. | N.R. Technician | full time unl. | 1.0 | vacant(1) |
| | Hot Shot | Lab. I, tenured | seasonal | 0.66(2) | filled |
| | MCC Crewman | State Summer Aide | 6 month | 0.5(3) | filled |

(1) Incumbent has not resigned or been terminated, is working toward a disability retirement.

(2) The employment season for hot shot crew is variable. Can be 7 to 9 months or as fire season warrants. Eight months used to calculate full time equivalents.

(3) MCC crew appointment is 6 months.

Equipment Maintenance

Table 2.36 provides the current inventory for major equipment in the Moose Lake Area. A more realistic equipment replacement schedule needs to be implemented. Under the present schedule items tend to get so old and rundown that they are unsafe to operate. Maintenance costs also rise steadily on the older equipment.

Some items need replacement every year. Others last five years or more. Cost of replacement of the larger, longer lived equipment must be prorated over the years and added with similar costs from other administrative areas so that the annual equipment budget is adequate for both the large specialized items and standard items such as pickups.

Slight changes are needed in the type of equipment to be acquired (e.g., replace 1/2 ton with 3/4 ton pickups). Specialized fire fighting and trail maintenance equipment must be budgeted for in the appropriate accounts in addition to the regular equipment budget.

Table 2.36. Moose Lake Area Equipment Inventory.

| <u>Vehicles up to 1 ton</u> | <u>Number</u> |
|-----------------------------|---------------|
| 1/2 T. 2x4 pickup | 4 |
| 3/4 T. 2x4 pickup | 2 |
| Ram 4x4 | 1 |
| 1/2 T. 4x4 pickup | 1 |
| 3/4 T. 4x4 pickup | 8 |
| 1 T. 4x4 | 2 |
| Passenger van | 1 |
| Sedan/Wagons | 1 |
| <hr/> Subtotal | <hr/> 20 |
| <u>Vehicles over 1 ton</u> | |
| Schwartz | 2 |
| Bus | 1 |
| Dump truck | 1 |
| 6x6 pumper | 1 |
| <hr/> Subtotal | <hr/> 5 |
| <u>All Terrain Vehicles</u> | |
| Bombardier J-5 | 3 |
| Bombardier J-8 | 1 |
| Cushman ATV | 1 |
| <hr/> Subtotal | <hr/> 5 |
| <u>Tractors</u> | |
| Cats | 4 |
| Tractor, wheeled | 2 |
| Clark snowplow | 1 |
| Road grader | 1 |
| <hr/> Subtotal | <hr/> 8 |
| <u>Fire Equipment</u> | |
| Fire pumps | 33 |
| Fire plows | 7 |
| Slip on tanks | 33 |
| Tank trailers | 7 |
| <hr/> Subtotal | <hr/> 80 |
| <u>Miscellaneous</u> | |
| 3 Wheel ATC | 1 |
| Snowmobile | 6 |
| Chainsaw | 16 |
| <hr/> Subtotal | <hr/> 23 |
| TOTAL | 141 |

Building Management and Maintenance

The Moose Lake Area office of the DNR Division of Forestry is located in Moose Lake, Minnesota. The area is subdivided into five geographic districts, each of which contains an administrative site. District offices are located at Moose Lake, Duxbury (Eaglehead District), Nickerson, Mora and Hinckley. Each of the five sites includes a number of buildings. In addition, the area maintains eight fire towers. These structures are described below.

Moose Lake Area and District

1. The Moose Lake Area and District offices are housed in a two story, wood frame structure containing 2,912 square feet (28'x52'). The upper floor consists of a general office reception area, 5 offices and a bathroom. The basement contains a meeting room, coffee room, file and radio room, 2 offices, a bathroom and a utility room. Present office space is inadequate because of recent staff expansions and office equipment additions:
2. The shop-warehouse is a wood frame structure containing 2,952 square feet (36'x82'). This building has six garage stalls, one of which is a heated shop area. Fire Fighting equipment stored in the unheated stalls frequently freezes up in early spring seriously hampering fire protection capabilities. There is currently inadequate space in the Moose Lake Area buildings to store existing equipment. Unleaded fuel for area vehicles is also unavailable.
3. The fire tower at Moose Lake is a stairway type tower. This tower is manned during severe fire seasons.
4. The Willow River Nursery fire tower is a ladder type tower. This tower has not been used for years because of more efficient aerial detection.

Duxbury (Eaglehead District).

1. The combination office-warehouse is a wood frame structure containing 1,860 square feet (62'x30'). The office portion (300 square feet, 30'x10') consists of 2 rooms which are used for office space and a bathroom. The garage has four unheated stalls. The heat source for the office is a small space heater which is inadequate. There is presently no hot water to the office bathroom. Water pipes which connect the residence with the offices often freeze up during the winter.
2. The residence is a wood frame structure containing 2,240 square feet (28'x40'). It consists of 3 bedrooms, a living room, a combination kitchen-dining area, a basement and a bathroom. The residence is in need of substantial renovation.
3. The warehouse storage building is an old wood frame Civilian Conservation Corps building containing 1,207 square feet (60'4"x20'). This building is structurally unsound, the tar paper roof leaks and the doors are beyond repair. Safety considerations dictate that this building should be destroyed.
4. The outhouse is a pit toilet facility that is necessary because of the water pipe freezing problems of the office bathroom. It is also used by Youth Conservation Corps groups who camp on the district office grounds during the summer.
5. The fire tower located 4½ miles west of the Duxbury (Eaglehead District) office is a ladder type fire tower with a small cab. Because of its remote location and state of repair this structure poses safety and vandalism problems. This tower has not been used since 1979 because of more reliable aerial detection and future use is not expected.
6. The fire tower at Askov is a stairway type fire tower which receives little use. The tower steps have not been treated with preservative and are in poor condition.

Nickerson District

1. The office-warehouse at Nickerson is a wood frame structure containing 2,064 square feet. The building consists of two rectangular sections. The office and two garage stalls comprise one rectangle that measures 40'x30'6". The other section contains 2 garage stalls and measures 36'6"x24'. The 14'x24' office contains 2 rooms which are being used as offices and a bathroom. The garage adjacent to the office is used as a heated shop area. The remaining 3 stalls are unheated. There is presently no hot water to the office bathroom.
2. The residence is a wood frame structure containing 2,304 square feet of space (24'x48'). It consists of 3 bedrooms, a living room, a kitchen-dining room combination, a bathroom and a basement. This structure is in poor overall shape and is in need of major repair and remodeling.
3. The storage shed contains 120 square feet of space (10'x12'). It is used for the storage of signs, posts and other small items.
4. The outhouse is a pit toilet type of facility which is no longer used.
5. The fire tower at Nickerson adjacent to the office is a stairway type tower which is used during severe fire weather. This tower receives heavy use during the summer by tourists.

Hinckley District

1. The office-warehouse is a wood frame structure containing 1,860 square feet (30'x62'). The office portion of the building contains two rooms of offices (12'x30') and a bathroom. The garage portion contains 4 stalls, one of which is heated by a wood stove. The existing heating system is inadequate to heat the office during cold weather and the wood stove is a safety problem. The heated portions of the building are not adequately insulated.

The building's foundation is cracked and in need of repair. Lighting in the garage portion of the building is inadequate and bathroom plumbing needs to be replaced.

2. The fire tower in St. Croix State Park is a stairway type tower which has not been used for the last two years. This tower no longer serves forestry needs.

Present storage space is inadequate to store the district's equipment. Gas and oil are presently stored in the office warehouse building causing an unsafe situation. The yard of the Hinckley forestry office adjoins a residential area. This yard is often used to store equipment or other necessary items. Although neatly kept, the yard is unsightly for neighboring homeowners.

Mora District

1. The office-warehouse is a wood frame structure containing 1,860 square feet (30'x62'). The office portion contains two office rooms and a bathroom. The dimensions of the front office are 14'6"x11'3", the back office is 15'6"x7'6". The garage portion of the building contains 4 stalls, one of which is heated by a wood stove. This building is in need of painting. The bathroom has no hot water at present. Gas and oil is presently stored in a building not designed for that purpose. The existing gas pump is old and in need of replacement.
2. The warehouse-storage building is a cement block structure containing 1,800 square feet of space (30'x60'). This building is essentially a barn with one large entry door. Structural repairs to this building are necessary, particularly to the north wall. This building presently has no electrical service.
3. The fire tower at Woodland is a stairway type tower which is not being used because of aerial detection.
4. The fire tower at Pomeroy is a stairway type tower which is used during severe fire weather.

MOOSE LAKE AREA FOREST RESOURCE MANAGEMENT PLAN

3. LAND MANAGEMENT PLAN

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PROCEDURE USED TO DEVELOP THE LAND MANAGEMENT PLAN

IDENTIFICATION OF FOREST RESOURCE MANAGEMENT COMPARTMENTS

The basic purpose of the land management plan is to describe how Division of Forestry administered lands in the Moose Lake Area will be managed. The Division of Forestry proposed and the Interdisciplinary Planning Team agreed to use forest resource management compartments defined in terms of resource characteristics and ownership patterns as the basic unit in the land management plan.

A forest resource management compartment is defined as a contiguous or nearly contiguous area of Division of Forestry administered land with resource characteristics that permit management under a specified set of guidelines to produce a desired mix of forest resource outputs.

Approximately 125 forest resource management compartments were identified in the Moose Lake Area. Twenty of the compartments fall within existing state forest boundaries. District Foresters were responsible for delineating preliminary compartments within state forests based on their perception of areas that are currently managed under various sets of guidelines. These preliminary compartments were modified when necessary to reflect future management direction. Ten of the compartments are administrative sites. The remaining compartments include all forestry administered lands outside of state forests (i.e. undedicated lands). The boundaries of these compartments were based almost entirely on ownership patterns. That is, each contiguous tract of land became a compartment. The compartments are shown on the Moose Lake Area Land Ownership/Land Administration map attached to this plan.

COMPLETION OF COMPARTMENT FORMS

A forest resource management compartment form was completed for each compartment. The form was designed to present resource information needed to make land management and allocation decisions. Appendix D includes all of the compartment forms for the Moose Lake Area. The compartment form includes four sections which are described below.

Compartment Description

This section includes information on the location and administrative status of the compartment. Location information includes compartment name and/or number, district designation, county, township, range, and section. Administrative data includes acreage by land status and current DNR management unit designation.

Compartment Highlights

This section includes resource information for use in making resource management and land allocation decisions. The nine categories of information collected are described below.

Access

Access to the compartment was described. Legal access via public roads or unrestricted easements was differentiated from restricted access such as through informal agreements with adjacent owners. Physical features such as rivers, wetlands, or bluffs that restricted access within the compartment were also noted.

Cover Types

The Phase II Forest Inventory was used to determine the percent of the compartment in various cover types. Cover types that presented possible management problems or opportunities were noted. Natural Heritage Program plant or plant community elements occurring on the compartment were noted.

Forest Protection

The presence of fire, insect, disease, or erosion hazards serious enough to warrant modification of management practices was noted.

Fish and Wildlife

Unique fish habitats (e.g. trout streams) and fisheries management practices (e.g. stream improvement, stocking) were described. The presence of deer yards, significant species or habitats, or Natural Heritage Program wildlife elements was noted. Past or planned wildlife management practices on the compartment were described.

Minerals and Soils

The metallic mineral potential class as described in the Land Suitability Program interim report (MN DNR-Planning, 1983) was listed. Known sand or gravel deposits were described. The presence of peat was inferred using Minnesota Soil Atlas (Univ. of Minn.-Ag. Exp. Sta., 1977 and 1980) maps or Phase II Forest Inventory information. The geomorphic region in which the compartment occurs was listed. Management restrictions for major soil types within each geomorphic region are included in Appendix H.

Ownership and Land Use

The land use and disposition recommendations from the DNR Land Ownership/Classification Report were noted. The ownership of inholdings and adjacent lands were described. Potential land use conflicts and the probability of trespass or land line location problems were mentioned. Existing leases affecting the compartment were described.

Recreation

Existing, proposed, and potential recreational facilities and uses were described.

Water

The presence of protected waters, wetlands, and Wild and Scenic Rivers within the compartment was noted.

Other

Other features that would influence land allocation or management decisions were described. Examples include administrative sites and educational, historic, archaeological, or scientific features.

Prime Forest Land Designation

The Forest Resource Management Act of 1982 calls for "the identification of prime forest land according to criteria developed by the commissioner." The interim report on DNR-Administered Public Lands: Their Suitability to Meet Natural Resource Management Objectives (DNR-Planning, 1983) contained a preliminary list of eight criteria that qualify land for designation as prime. Features that qualified the compartment as prime forest land were marked with an asterisk on the compartment forms in Appendix D. Table 3.1 lists those compartments that meet one or more of the prime forest land criteria. The designation is applied at the compartment level since that was the smallest unit considered in developing the land management plan.

Prime forest land designation was one of the factors used in developing the land allocation recommendations. Other factors considered were access, existing management unit boundaries, surrounding land use and ownership, mineral potential, and statutory restrictions relating to various types of land.

Table 3.1. Compartments Meeting One or More Prime Forest Land Criteria - Moose Lake Area, 1984.

| Compartment | Acres | Timber | Fish and Wildlife | Recreation | Water | Other |
|---|--------|--------|----------------------|------------|-------|--------------------|
| 1. Chengwatana (Snake River CG) | 42 | X | | X | X | |
| 2. Chengwatana (General Management) | 16,348 | X | | X | X | |
| 3. D.A.R. (General Management) | 360 | | | X | X | |
| 4. Fond du Lac - LUP 40 | 40 | X | | | | |
| 5. General C.C. Andrews (Dago Lake) | 10 | X | X | X | X | |
| 6. General C.C. Andrews (Nursery) | 350 | X | | X | | Nursery |
| 8. General C.C. Andrews (Willow River CG) | 132 | X | | X | X | |
| 9. General C.C. Andrews (General Management) | 4,081 | X | | X | X | Seed orchards |
| 10. Nemadji (Black Lake Natural Area) | 1,414 | X | | | X | Bog community |
| 11. Nemadji (East) | 10,240 | X | X | X | X | |
| 12. Nemadji (Gafvert CG) | 751 | X | | X | X | |
| 13. Nemadji (Grouse Management Area) | 3,028 | X | X | X | X | |
| 14. Nemadji (General Management) | 75,048 | X | X | X | X | |
| 15. Rum River (Mille Lacs WMA) | 640 | X | X | | X | |
| 16. Rum River (General Management) | 2,717 | X | X | X | X | |
| 17. St. Croix (Boulder CG) | 40 | X | | X | X | |
| 18. St. Croix (Tamarack River Horse Camp) | 15 | X | | X | X | |
| 19. St. Croix (General Management) | 27,063 | X | X | X | X | Eastern Hemlock |
| 20. Snake River (General Management) | 7,884 | X | X | | X | |
| 31. 16-46-18 | 354 | | | | X | |
| 32. 36-46-18 | 320 | X | | | X | |
| 33. 16-47-18 | 160 | | X | | | |

| Compartment | Acres | Timber | Fish and Wildlife | Recreation | Water | Other |
|--------------|-------|--------|----------------------|------------|-------|--------------|
| 34. 36-46-19 | 280 | X | | | | |
| 35. 16-47-19 | 560 | X | | | X | |
| 37. 16-46-20 | 112 | | | | X | Gravel |
| 40. 36-46-20 | 279 | | | | X | |
| 45. 16-47-20 | 123 | | | | X | |
| 46. 16-47-20 | 130 | | | | X | |
| 49. 28-47-20 | 40 | | | | X | |
| 50. 36-47-20 | 80 | X | | | | |
| 57. 36-46-21 | 360 | X | | | X | |
| 61. 16-47-21 | 480 | | | | X | |
| 62. 36-47-21 | 240 | | | | X | |
| 63. 8-43-20 | 80 | X | | | | |
| 64. 36-43-20 | 160 | X | | | | |
| 65. 8-44-20 | 104 | X | | | X | |
| 66. 16-44-20 | 144 | X | | | X | |
| 67. 16-44-20 | 77 | X | | | X | |
| 68. 20-44-20 | 160 | X | | | | |
| 69. 30-44-20 | 152 | X | | | | |
| 72. 16-45-20 | 425 | X | | X | X | |
| 74. 34-43-21 | 153 | X | | | X | |
| 75. 36-43-21 | 120 | | | | X | |
| 76. 16-44-21 | 320 | | | | X | |
| 77. 36-44-21 | 160 | X | | | | |
| 78. 16-45-21 | 160 | X | | | | Seed orchard |
| 79. 36-45-21 | 280 | X | | | | |
| 81. 16-47-16 | 160 | | X | X | X | |
| 82. 36-47-16 | 640 | X | X | | X | |
| 84. 16-46-17 | 360 | | X | | X | |
| 85. 16-47-17 | 280 | | X | | X | |
| 86. 36-47-17 | 560 | X | X | | X | |
| 88. 16-44-17 | 640 | X | | | | |
| 90. 16-44-18 | 360 | X | X | | | |
| 91. 36-44-18 | 640 | | | X | | |
| 92. 16-45-18 | 80 | | | | X | |
| 93. 36-45-18 | 440 | | | X | | |

| Compartment | Acres | Timber | Fish and Wildlife | Recreation | Water | Other |
|---------------------|---------|--------|----------------------|------------|-------|--------------|
| 95. 16-43-16 | 640 | X | | | | |
| 97. 16-43-17 | 320 | X | | | X | |
| 98. 36-43-17 | 640 | | | X | X | |
| 99. 16-42-18 | 320 | | | | X | Seed orchard |
| 100. 36-42-18 | 440 | | | | X | |
| 102. 36-43-18 | 640 | | | X | | |
| 103. 16-42-19 | 520 | | X | | | |
| 104. 36-42-19 | 40 | | | | X | |
| 105. 36-43-19 | 640 | | | | X | |
| 106. 16-41-19 | 160 | | | | X | |
| 107. 36-41-19 | 400 | | | | X | |
| 109. 4-41-20 | 40 | | | X | X | |
| 110. 10-41-20 | 80 | X | X | | | |
| 112. 16-41-20 | 80 | | | X | X | |
| 113. 36-42-20 | 520 | X | | | | |
| 117. 36-41-22 | 560 | | X | | | |
| 120. 36-41-23 | 360 | X | X | | | Fire Tower |
| 121. 16-42-23 | 560 | X | | | X | |
| 123. 16-42-24 | 520 | | | | X | |
| 124. 36-42-24 | 160 | X | | | | |
| 125. 8-39-25 | 80 | X | | | X | |
| 126. 23,24,26-39-25 | 400 | X | X | | | |
| 127. 36-40-25 | 60 | X | | | X | |
| TOTAL | 168,556 | | | | | |

Resource Management Guidelines

The resource management guideline section describes how the compartment will be managed. The guidelines reflect the compartment highlights and area resource management objectives. Guidelines were developed only when special actions were required or standard management practices needed modification to meet compartment resource conditions. Guidelines were listed under the following categories: access, fish and wildlife habitat management, fire management, forest pest management, soils management, land administration, law enforcement, recreation, and timber management.

Proposed Disposition

This section lists the planning team's preliminary recommendation on whether or not the compartment should remain in state ownership. If it is to be retained the proposed management unit designation is usually listed.

INTEGRATION WITH PROGRAM AND OPERATIONAL PLANS

The Department of Natural Resources has developed a number of program plans (e.g., SCORP, MFRP, State Forest Road Plan, recreational plans) that affect land management activities in the Moose Lake Area. These plans were considered when management guidelines for the compartments were developed. In most cases the projects or guidelines contained in the program plans were compatible with proposed compartment management guidelines. Where deviations from the program plan were proposed the reasons were noted on the compartment form. For example some road projects proposed in the State Forest Road Plan were modified and a few additional projects were identified.

The division continuously develops operational plans (e.g. forest development proposals, planned cut lists) to implement approved program and land management plans. In the future, operational plans affecting a given compartment will be reviewed for compliance with the resource management guidelines applicable to that compartment. If there are conflicts the operational plan should be modified to meet the compartment guidelines if

possible. If the operational plan cannot be modified the compartment guidelines should be revised and the changes reviewed by the affected interests.

SUMMARY OF RESOURCE MANAGEMENT GUIDELINES AND PROPOSED ACTIONS

The following sections describe the standard management guidelines that apply to Division of Forestry administered lands and list specific projects or exceptions to the standard guidelines that are proposed for various compartments.

ACCESS

Access proposals for the Moose Lake Area are of two types: those which concern the construction, upgrading, and redevelopment of the existing state forest roads and those to acquire legal access to Division of Forestry administered lands. The proposals for access were derived from two basic sources, the State Forest Road Plan (Minnesota Department of Natural Resources, Division of Forestry, 1982) and the Moose Lake Area Forest Resource Management Compartment Forms (Appendix D). Proposals from the road plan were modified as necessary using information included in compartment analysis.

In general most of the land in the Moose Lake Area within state forest boundaries is well accessed by 249.2 miles of state forest roads. About 64.3 miles of this total are considered permanent, all weather road (Class 1 to 4). The remaining mileage is Class 5 and generally useable during dry periods or in the winter only. This plan recommends 12 miles of new permanent road (see Table 3.2). Another 13.8 miles are scheduled for major redevelopment to better serve transportation needs (see Table 3.3). Class 5 roads for timber access will continue to be developed on an as needed basis. Road development proposals will be reviewed by the Division of Waters for compliance with water permit and floodplain management requirements. Two compartments, the Nemadji-East and the Nemadji-Black Lake Bog SNA, restrict new road building.

Table 3.2. Proposed State Forest Road Construction - Moose Lake Area, 1985-94.

| Road Name | County | State Forest | Construction Miles | Class |
|-----------------|--------|-----------------|--------------------|-------|
| Net Lake | Pine | Nemadji | 3.0 | 4 |
| General Andrews | Pine | General Andrews | 9.0 | 4 |
| TOTAL | | | 12.0 | |

Table 3.3. Proposed State Forest Road Reconstruction - Moose Lake Area, 1985-94.

| Road Name | County | State Forest | Miles of Reconstruction | Class |
|------------|---------|--------------|-------------------------|--------|
| Park Trail | Pine | Nemadji | 4.4 | 4 to 3 |
| Tamarack | Pine | St. Croix | 5.1 | 4 to 3 |
| Kanabec | Kanabec | Rum River | 4.3 | 4 to 3 |
| TOTAL | | | 13.8 | |

Access to some areas of state forests and a number of undedicated parcels is constrained by lack of adequate legal access. Adequacy of legal access to each compartment was determined as part of the compartment analysis. Proposals for acquisition of legal access were made for selected compartments which were proposed for continued Division of Forestry management (those within state forests or those proposed for addition to state forests). Acquisition of 10.75 miles of new right-of-way is proposed. Most acquisition will probably take the form of easements across private property. Table 3.4 identifies access proposals on a compartment basis.

Table 3.4. Access Acquisition Proposals - Moose Lake Area, 1985-94.

| Compartment | Acres of State Land Accessed | Approximate Mileage Necessary for Legal Access | Access Priority Score* | Comments |
|---|------------------------------|--|------------------------|---|
| 9. General C.C. Andrews (General Management) | NA | 1 | 50, 46, 31 | Three separate projects. See Appendix D for details. |
| 14. Nemadji (General Management) | NA | 2 | 65 | See Appendix D for details. |
| 19. St. Croix (General Management) | 292 | 1/4 | 59 | Identify existing township rights-of-way to northern portion of forest. Obtain legal land access to 36-42-16. |
| 20. Snake River (General Management) | 1,500 | 1/2 | 62 | Construct class 5 road on easement. |
| 37. 16-46-20 | 40 | 1/4 | 30 | |
| 39. 16-46-20 | 40 | 1/4 | 30 | Possible gravel. Obtain access only if gravel is present. Otherwise dispose of land. |
| 46. 16-47-20 | 130 | 1/4 | 26 | Access land west of river. |
| 56. 32-46-21 | 480 | 1/4 | 31 | |
| 61. 16-47-21 | 480 | 1/2 | | Access land south of river. |
| 65. 16-44-20 | 104 | 1/4 | 39 | On Fox Lake. |
| 67. 16-44-20 | 77 | 1/4 | 39 | On Little Mud Lake. |
| 74. 34-43-21 | 153 | 1/2 | 23 | On Elbow and Grass lakes. |
| 76. 16-44-21 | 320 | 1/4 | 33 | Access land east of Little Bremen Creek. |
| 79. 36-45-21 | 280 | 1/4 | 50 | |
| 81. 16-47-16 | 80 | 3/4 | | Total public land accessed 440 acres. |
| 105. 36-43-19 | 640 | 1/4 | | Also access 206 acres of county land. |

| Compartment | Acres of State Land Accessed | Approximate Mileage Necessary for Legal Access | Access Priority Score* | Comments |
|-----------------------|------------------------------|--|------------------------|--|
| 107. 36-41-19 | 100 | 1 | 35 | Access land east of Sand Creek. |
| 117. 36-41-22 | 560 | 1/2 | 54 | Develop class 5 road on easement. |
| 121. 16-42-23 | 160 | 1 | 30 | Develop class 5 road on easement. Also accesses 200 acres of county and 80 acres of wildlife land. |
| 124. 36-42-24 | 160 | 1/2 | 42 | Develop class 5 road on easement. |
| 126. 23, 24, 26-39-25 | 400 | 1/4 | 49 | Develop class 5 road on easement. |
| TOTAL | | 10 3/4 miles | | |

*Access priority score determined based on number of years until access is needed for timber or wildlife habitat management, state forest status, and acreage accessed. Possible scores range from 23 to 65.

Minnesota Statutes 88.22 authorizes the Commissioner of Natural Resources to close roads into lands used for conservation purposes to reduce fire hazards, protect roads during wet periods, and effectively enforce timber trespass and game laws. The authority to close roads has been delegated to Regional Forest Supervisors. Current procedures for closing forest roads are detailed in Division of Forestry Circular Letter 2960. Updated policies and procedures regarding closure of forest roads will be developed during the life of this plan.

It is often desirable to have gates that can be closed to prohibit vehicular access to selected roads. The primary reasons for limiting access are to:

1. Prevent rutting of roads during wet periods.
2. Limit hunter access to foot traffic only on roads or trails developed as part of wildlife habitat improvement projects.

3. Limit use of certain sensitive areas and to reduce the need for road maintenance.
4. Protect grass or clover ground cover planted on roads or trails without gravel surfaces.

Table 3.5 lists the locations where gates are proposed on existing roads or trails. Gates will be included in plans for new roads.

Table 3.5. Road and Trail Gate Proposals - Moose Lake Area, 1985-94.

High Priority

| | | | |
|-----|--------------------------|------------------------------|----------|
| 32. | 36-46-18 | Access Trail | 36-46-18 |
| 14. | Nemadji (Gen. Mgmt.) | Aspen Trail | 11-44-17 |
| 14. | Nemadji (Gen. Mgmt.) | Spruce Trail | 13-44-17 |
| 14. | Nemadji (Gen. Mgmt.) | Access Trail off Harlis Road | 26-46-16 |
| 14. | Nemadji (Gen. Mgmt.) | Round Lake Trail | 27-46-16 |
| 14. | Nemadji (Gen. Mgmt.) | Bald Eagle Trail | 17-45-16 |
| 14. | Nemadji (Gen. Mgmt.) | Lost Trail | 4-45-16 |
| 88. | 16-44-17 | Black Bear Trail | 16-44-17 |
| 19. | St. Croix (Gen. Mgmt.) | Wilma Road | 16-42-17 |
| 19. | St. Croix (Gen. Mgmt.) | St. Croix Trail | 4-41-16 |
| 19. | St. Croix (Gen. Mgmt.) | Access Trail | 31-42-16 |
| 14. | Nemadji (Gen. Mgmt.) | Access Trail | 32-44-16 |
| 14. | Nemadji (Gen. Mgmt.) | Access Trail | 18-44-16 |
| 19. | St. Croix (Gen. Mgmt.) | Access Trail | 30-42-16 |
| 2. | Chengwatana (Gen. Mgmt.) | Chengwatana Forest Road | 15-39-20 |
| 16. | Rum River (Gen. Mgmt.) | Kanabec Forest Road | 7-39-25 |

Medium Priority

| | | | |
|-----|--------------------------------------|--|----------|
| 13. | Nemadji (Gen. Mgmt.) | Ruffed Grouse Road | 19-45-16 |
| 19. | St. Croix (Gen. Mgmt.) | Basswood Trail | 29-42-17 |
| 14. | Nemadji (Gen. Mgmt.) | Access Trail | 26-44-16 |
| 2. | Chengwatana (Gen. Mgmt.) | Boundary Trail Crossing | --- |
| 1. | Chengwatana (Snake River Campground) | Boundary Trail Crossing | --- |
| 2. | Chengwatana (Gen. Mgmt.) | Access Trail at end of Chengwatana Forest Road Extension | 19-39-19 |

Low Priority

| | | | |
|-----|---------------------------------------|--------------------------------------|----------|
| 7. | General C.C. Andrews (Separate Sect.) | Access Trail | 36-45-19 |
| 2. | Chengwatana (Gen. Mgmt.) | Access Trail at end of township road | 36-40-20 |
| 20. | Snake River (Gen. Mgmt.) | Chesley Brook Road Fuelwood Area | 1-42-23 |

FISH AND WILDLIFE HABITAT MANAGEMENT

Division of Forestry administered lands in the Moose Lake Area are managed in accordance with the department policy on wildlife/forestry coordination (DNR Policy #8, revised 5/3/82) and the associated Forestry/Wildlife Habitat Management Guidelines (MN DNR, Wildlife, 1984). This land management plan was developed in cooperation with the Division of Fish and Wildlife representatives on the interdisciplinary planning team as required by the department policy. Development and approval of this plan does not replace the project review procedure established by the wildlife/forestry coordination policy. Specific project proposals (e.g. planned cut lists, road development, boundary adjustment) will be developed and reviewed as this plan is implemented. The project review process should work more smoothly in the future because this plan: 1) documents the longer term objectives that specific projects are designed to meet, 2) identifies compartments where certain types of projects are permitted or prohibited, and 3) lists potential projects that can be used to set priorities or identify alternative sites for projects.

Wildlife management in the Moose Lake Area will emphasize forest game species including deer, grouse, bear, beaver, woodcock, and snowshoe hare. These species are favored by young forests, smaller cuttings, and a high proportion of aspen.

High populations of these game species benefit hunters and others interested in viewing wildlife. Habitat for these game species benefits many other kinds of wildlife that need openings and young forest. It also provides a good food source for various predators and scavengers.

To provide adequate habitat for deer and other forest game species each four square mile area should consist of:

- 35-65% intolerant hardwoods of aspen, birch, oak or upland brush, with 25-65% being in the aspen type managed on a 40-60 year rotation age;
- 3-5% grassy openings on the upland 2-4 acres in size;
- 10-20% conifer cover of cedar, spruce-fir, or jack pine;

- not more than 30% of the upland in conifer plantations, spruce-fir, or northern hardwoods or 45% in combination;
- 10% of the upland in regeneration types (0-10 years).

Different goals would apply to those areas being managed for wildlife other than the forest game species (e.g., old growth species, threatened and endangered species, transition zone species, waterfowl).

Most forest resource management compartments will be managed for game species according to the Forestry/Wildlife Habitat Management Guidelines. However, there are many sites where management practices will be modified to benefit endangered, threatened, and special concern species or to provide for other significant wildlife or habitat conditions. Table 3.6 lists significant fish or wildlife conditions and habitat management proposals affecting various compartments in the Moose Lake Area.

To protect fisheries habitat in lakes, rivers and streams: maintain buffer strips of vegetation along lake and stream margins; construct erosion control devices, especially on logging roads and harvested areas; properly design and locate stream crossings; use pesticide application methods that prevent pesticides from getting into water systems; and maintain good age class diversity of timber stands for watershed protection.

Resource management proposals, such as timber management and recreation or road development, will be modified as necessary to maintain or enhance the significant fish or wildlife conditions on these compartments. Additional habitat management proposals will likely be developed when the four square mile wildlife habitat compartment analyses and associated composition goals are completed.

Table 3.6. Significant Fish and Wildlife Conditions and Habitat Management Proposals - Moose Lake Area, 1984.

| Compartment | Significant Condition or Management Proposal |
|--|--|
| 2. Chengwatana (General Management) | Sandhill crane and American bittern habitat. Potential water impoundment sites. |
| 5. General C.C. Andrews (Dago Lake Day Use Area) | Determine impact of proposed recreation development on use of Dago Lake as a fish rearing pond. |
| 6. General C.C. Andrews (General Andrews Nursery) | Need to limit deer damage to seedlings and windbreaks, possibly through special hunting regulations. |
| 7. General C.C. Andrews (Separate Section) | Possible great grey owl habitat. |
| 8. General C.C. Andrews (Willow River Campground) | Stanton Lake is possible loon nesting habitat. Wild rice in lake is managed to improve waterfowl and furbearer habitat. |
| 9. General C.C. Andrews (General Management) | Develop peat excavation sites as wildlife ponds if feasible. Manage proposed oak fire breaks for mast production. |
| 10. Nemadji (Black Lake Bog SNA) | Continue to allow hunting and trapping. No active habitat management permitted. |
| 11. Nemadji (East) | Wolf, moose, bobcat, possible lynx and great gray owl habitat. Restrict logging to winter. Restrict ORV use on new logging roads. |
| 12. Nemadji (Gafvert Campground) | Post as loon nesting area and erect wood duck houses. Trout stream. |
| 13. Nemadji (Grouse Management Area) | Modify timber management to increase grouse and other upland game populations. |
| 14. Nemadji (General Management) | Wolf, moose, bobcat, possible lynx and great gray owl habitat. Three heron colonies. Modify timber cutting and maintain beaver ponds in vicinity of heron colonies. Trout stream. |
| 16. Rum River (General Management) | Maintain waterfowl impoundments and deer yards. |
| 17. St. Croix (Boulder Campground) | Manage Rock Lake as walleye-yellow perch fishery. |
| 19. St. Croix (General Management) | Sandhill crane, Louisiana waterthrush, bald eagle, osprey, and wood turtle present. Trout streams. A water control structure may be needed to maintain existing water level in Grace's Lake. |
| 20. Snake River (General Management) | Deer yards. Potential for further waterfowl impoundment development. Amend Bean Dam WMA project boundary to reduce overlap in boundaries. |

| Compartment | Significant Condition or Management Proposal |
|--------------|--|
| 31. 16-46-18 | Potential impoundment or sharp-tail grouse management. Trout stream. |
| 32. 36-46-18 | Trout stream. |
| 34. 36-46-19 | Retain snags for cavity nesting birds. |
| 35. 16-47-19 | Retain white cedar stand for deer yard. |
| 42. 6-47-20 | Field check for great grey owl nesting. |
| 50. 36-47-20 | Conduct field wildlife survey prior to disposal. |
| 51. 6-46-21 | Possible impoundment or sharp-tail grouse management. |
| 53. 8-46-21 | Evaluate potential for sharp-tail management before exchange. |
| 54. 16-46-21 | Manage lowlands for waterfowl. |
| 55. 24-46-21 | Evaluate potential for sharp-tail management. |
| 56. 32-46-21 | Sharp-tail grouse management. |
| 57. 36-46-21 | Ruffed grouse management. |
| 61. 16-47-21 | Burn upland brush. |
| 65. 8-44-20 | Erect wood duck houses. |
| 66. 16-44-20 | Erect wood duck houses. |
| 67. 16-44-20 | Erect wood duck houses. |
| 68. 20-44-20 | Deer yard. |
| 69. 30-44-20 | Possible rail and American bittern habitat. |
| 72. 16-45-20 | Possible osprey breeding habitat. |
| 73. 16-43-21 | Field check for sandhill crane and sharp-tailed grouse. |
| 74. 34-43-21 | Waterfowl or loon management. |
| 75. 36-43-21 | Waterfowl management. Possible rail and American bittern habitat. |
| 81. 16-47-16 | Deer yard. Trout stream. |
| 82. 36-47-16 | Deer yard. Trout stream. |
| 84. 16-46-17 | Trout stream. |
| 85. 16-47-17 | Trout stream. |
| 86. 36-47-17 | Deer yard. Trout stream. |
| 90. 16-44-18 | Increase browse near deer yard. |
| 92. 16-45-18 | Provide waterfowl nesting structures. |
| 95. 16-43-16 | Possible great grey owl habitat. |
| 97. 16-43-17 | Possible sandhill crane habitat. |
| 99. 16-42-18 | Trout stream. |

| Compartment | Significant Condition or Management Proposal |
|-----------------------|---|
| 103. 16-42-19 | Deer yard. |
| 110. 10-41-20 | Deer yard. |
| 113. 36-42-20 | Possible sandhill crane and sharp-tailed grouse habitat. |
| 117. 36-41-22 | Deer yard. Possible sandhill crane and sharp-tailed grouse habitat. |
| 118. 36-42-22 | Possible sandhill crane and sharp-tailed grouse habitat. |
| 119. 36-38-23 | Conduct field check of pheasant habitat before disposal. |
| 120. 36-41-23 | Deer yard. |
| 121. 16-42-23 | Remove from WMA project boundary. |
| 123. 16-42-24 | Possible sandhill crane habitat. |
| 124. 36-42-24 | Possible deer yard. |
| 126. 23, 24, 26-39-25 | Deer yard. Dam will be built to create wetland. |

FIRE MANAGEMENT

The Moose Lake Area Fire Plan describes fire management activities in the area. It also contains historical information on the location and causes of wildfires. A few compartments require special fire protection actions. Three recreation areas have been identified for increased prevention activities to inform users of fire hazards. These are the Gafvert Campground which is located in a fairly remote portion of the Nemadji State Forest, the Snake River Campground in the Chengwatana State Forest, and the Blackhoof River area (16-47-17) which receives heavy use by trout fishermen during the spring fire season. Efforts are also required to break up the extensive conifer types in the General C.C. Andrews State Forest by establishing oak strips and by maintaining hardwoods along natural fire breaks such as the Willow River.

FOREST PEST MANAGEMENT

Integrated pest management is an approach to insect and disease control that utilizes a combination of silvicultural, biological, chemical, or mechanical techniques to achieve economical control in an environmentally sound manner. Integrated pest management can reduce the occurrence, severity, and spread of insect and disease problems and thereby lessen the problems associated with direct control techniques. Insect and disease management guidelines have been developed for the major pests in the aspen, paper birch, oak, lowland hardwood, central hardwood, northern hardwood, red pine, white pine, jack pine, black spruce, white spruce, spruce-fir, northern white cedar, and tamarack forest types (MN DNR, Forestry, 1984). To the extent possible, these guidelines will be integrated with other proposed management activities on all compartments in the Moose Lake Area.

The pine tussock moth and jack pine budworm have caused extensive defoliation and top kill in pine stands in and around the General C.C. Andrews State Forest. This area contains numerous overstocked natural jack pine stands on droughty soils. Outbreaks in the 1960's and 70's required direct control operations and salvage harvests to avoid additional tree mortality and product loss due to bark beetles. To reduce future losses, annual detection and evaluation surveys will be conducted, jack pine in

this compartment will be managed on a 40 year rotation to remove mature stands, and timber stand improvement practices will be used to regulate basal area, remove culls, and improve vigor. Newly established plantations will contain less susceptible species or will be closely regulated for increased growth.

Specific pest protection plans should be developed for the General Andrews Nursery, seed orchards, developed recreation sites, and scenic waterways.

SOILS

Appendix H describes the management limitations of the major soil types within each of the geomorphic regions occurring in the Moose Lake Area. The limitations deal with such things as erosion potential, equipment trafficability, suitability for roads, and suitability for various tree species. The geomorphic region(s) that each compartment is located in is noted under the minerals and soils heading on each compartment form in Appendix D. The limitations applicable to each soil in the compartment should be noted when specific project proposals are developed. The Regional Soil Specialist should be contacted if there are questions as to the appropriateness of the management proposal for the soil type.

LAND ADMINISTRATION

Each compartment form in Appendix D lists a "proposed disposition" based on resource characteristics, management opportunities, and legal constraints. Implementation of these proposals will require modification of management unit boundaries, transfers of administrative control or internal exchange, exchanges between the state and counties, disposal of surplus lands, and acquisition of land. The Minnesota Forest Resources Plan includes a goal of achieving an optimum land ownership pattern for the multiple-use management of forest resources. The land administration proposals described below are designed to move toward that goal.

Retain in State Forest

This was the usual disposition decision for lands which are presently in state forests. Changes in state forest boundaries will be proposed to eliminate areas of private land, to incorporate adjacent state land or county land obtained in exchanges, and to reduce or eliminate overlap with other DNR management units. Table 3.7 lists compartments, totaling 150,861 acres, proposed for retention in state forests.

Table 3.7. Compartments Proposed for Retention as State Forests - Moose Lake Area, 1985-94.

| Compartment | Acres (a) |
|---|------------|
| 1. Chengwatana - Snake River Campground | 42 |
| 2. Chengwatana - General Management | 16,348 |
| 3. D.A.R. - General Management | 360 |
| 4. Fond du Lac - LUP 40 | 40 |
| 5. General C.C. Andrews - Dago Lake | 10 |
| 6. General C.C. Andrews - Nursery | 350 |
| 7. General C.C. Andrews - Separate Section | 640 |
| 8. General C.C. Andrews - Willow River Campground | 132 |
| 9. General C.C. Andrews - General Management | 4,081 |
| 10. Nemadji - Black Lake Bog SNA | 1,414 (f) |
| 11. Nemadji - East | 10,240 |
| 12. Nemadji - Gafvert Campground | 751 |
| 13. Nemadji - Grouse Management Area | 3,028 |
| 14. Nemadji - General Management | 75,048 |
| 15. Rum River - Mille Lacs WMA | 640 |
| 16. Rum River - General Management | 2,717 |
| 17. St. Croix - Boulder Campground | 40 |
| 18. St. Croix - Tamarack River Horse Camp | 15 |
| 19. St. Croix - General Management | 27,063 (b) |
| 20. Snake River - General Management | 7,885 (c) |
| 21. Admin. and Scattered - Area Headquarters | 7 (d) |
| 23. Admin. and Scattered - Moose Lake Tower | 2 (d) |
| 24. Admin. and Scattered - Nickerson Headquarters and Tower | 0 (e) |
| 25. Admin. and Scattered - Askov Tower | 3 (d) |
| 26. Admin. and Scattered - Eaglehead Headquarters | 1 (d) |
| 28. Admin. and Scattered - Hinckley Headquarters | 2 (d) |
| 29. Admin. and Scattered - Mora Headquarters | 2 (d) |
| TOTAL | 150,861 |

Notes:

- (a) Includes only Division of Forestry lands inside existing boundaries unless otherwise noted.
- (b) Includes 25,993 acres of Division administered land and 1,070 acres of Dept. administered land within the boundary of the St. Croix State Forest.
- (c) Includes 66 acres of Division administered land within the boundary not currently coded as part of the forest.
- (d) Acreage coded as Admin. and Scattered State Forest on DNR Land Ownership/Classification report but not included in statutory description of forest boundaries (MS 89.021).
- (e) Five acres currently miscoded as part of Nemadji (General Management).
- (f) The Black Lake Bog SNA is proposed as a secondary ORA unit within Nemadji State Forest.

Add to State Forests

Thirty-six compartments comprising 9,762 acres were recommended for addition to state forests (see Table 3.8). These compartments are currently undedicated Division of Forestry administered trust land. Four compartments (1,680 acres) would be incorporated into adjacent state forests. The remainder would be designated as Administrative and Scattered State Forest land. Detailed boundary descriptions will be developed and submitted for department review prior to submission for legislative action as required by the Wildlife/Forestry Coordination and Transfer of Administrative Control policies.

Table 3.8. Compartments Proposed for Addition to State Forests - Moose Lake Area, 1985-94.

| Compartment | Acres | State Forest Added to |
|-----------------------|-------|--------------------------|
| 34. 36-46-19 | 280 | 01. Admin. and Scattered |
| 37. 16-46-20 | 112 | 01. Admin. and Scattered |
| 38. 16-46-20 | 80 | 01. Admin. and Scattered |
| 45. 16-47-20 | 123 | 01. Admin. and Scattered |
| 46. 16-47-20 | 130 | 01. Admin. and Scattered |
| 63. 8-43-20 | 80 | 01. Admin. and Scattered |
| 65. 8-44-20 | 104 | 01. Admin. and Scattered |
| 66. 16-44-20 | 144 | 01. Admin. and Scattered |
| 67. 16-44-20 | 77 | 01. Admin. and Scattered |
| 68. 20-44-20 | 160 | 01. Admin. and Scattered |
| 69. 30-44-20 | 152 | 01. Admin. and Scattered |
| 75. 36-43-21 | 120 | 01. Admin. and Scattered |
| 77. 36-44-21 | 160 | 01. Admin. and Scattered |
| 78. 16-45-21 | 160 | 01. Admin. and Scattered |
| 82. 36-47-16 | 640 | 01. Admin. and Scattered |
| 84. 16-46-17 | 360 | 01. Admin. and Scattered |
| 88. 16-44-17 | 640 | 35. Nemadji |
| 90. 16-44-18 | 360 | 01. Admin. and Scattered |
| 92. 16-45-18 | 80 | 01. Admin. and Scattered |
| 94. 36-44-19 | 280 | 01. Admin. and Scattered |
| 95. 16-43-16 | 640 | 35. Nemadji |
| 97. 16-43-17 | 320 | 35. Nemadji |
| 99. 16-42-18 | 320 | 01. Admin. and Scattered |
| 103. 16-42-19 | 520 | 01. Admin. and Scattered |
| 106. 16-41-19 | 160 | 01. Admin. and Scattered |
| 107. 36-41-19 | 400 | 01. Admin. and Scattered |
| 115. 16-40-22 | 80 | 01. Admin. and Scattered |
| 116. 16-41-22 | 280 | 01. Admin. and Scattered |
| 117. 36-41-22 | 560 | 01. Admin. and Scattered |
| 118. 36-42-22 | 160 | 01. Admin. and Scattered |
| 120. 36-41-23 | 360 | 01. Admin. and Scattered |
| 121. 16-42-23 | 560 | 01. Admin. and Scattered |
| 123. 16-42-24 | 520 | 01. Admin. and Scattered |
| 124. 36-42-24 | 160 | 01. Admin. and Scattered |
| 125. 8-39-25 | 80 | 43. Rum River |
| 126. 23, 24, 26-39-25 | 400 | 01. Admin. and Scattered |
| TOTAL | 9,762 | |

State-County Land Exchanges

Thirty-five compartments containing 11,234 acres of state land have been identified for potential land exchanges involving state and county lands. All proposed exchanges will require additional analysis and agreement between the state and the appropriate county. The primary purpose of the exchanges would be to increase forest resource management efficiency through consolidation of ownerships. Individual exchanges would be processed according to the DNR Land Exchange Policy. Table 3.9 lists the state land acreage, estimated county acreage, and proposed administrator if the exchange is completed. In addition to the compartments listed there are possible exchanges involving county lands within or adjacent to existing state forests (e.g., Chengwatana, General C.C. Andrews, Nemadji, St. Croix and Snake River). It is anticipated that the land in state ownership after the exchanges are completed will be added to state forests.

Cooperative land management agreements are sometimes proposed as alternatives to land exchanges. Cooperative land management agreements have been successfully implemented by the Department and other agencies. Examples include the Salt Springs land management agreement between the DNR and the University of Minnesota and several state-county agreements covering peat leases. In addition, the U.S. Forest Service engages in cooperative agreements with private land owners for forest management. Other examples of agreements are those between private timber companies and mining companies to promote timber management on mining company lands. In the Moose Lake Area, however, these agreements are not likely to be used since the counties are the primary land exchange partners and the Minnesota Association of County Land Commissioners has expressed a clear preference for land exchanges over cooperative land management agreements (Association meeting minutes dated 2-13-85).

Table 3.9. Compartments with Potential State-County Land Exchanges - Moose Lake Area, 1985-94.

| Compartment | Acres of State Land | Acres of County Land | Proposed Administrator |
|---------------|---------------------|----------------------|------------------------|
| 31. 16-46-18 | 354 | 160 | State |
| 32. 36-46-18 | 320 | 80 | State |
| 35. 16-47-19 | 560 | 40 | State |
| 40. 36-46-20 | 279 | 32 | State |
| 42. 6-47-20 | 109 | 500+ | County |
| 43. 10-47-20 | 40 | 280+ | County |
| 44. 12-47-20 | 40 | 400+ | County |
| 51. 6-46-21 | 51 | 470+ | County |
| 52. 6-46-21 | 40 | 470+ | County |
| 53. 8-46-21 | 40 | 120+ | County |
| 54. 16-46-21 | 560 | 120 | State |
| 56. 32-46-21 | 480 | 240 | State |
| 57. 36-46-21 | 360 | 80 | State |
| 58. 2-47-21 | 71 | 440+ | County |
| 59. 2-47-21 | 40 | 440+ | County |
| 60. 6-47-21 | 40 | 620+ | County |
| 61. 16-47-21 | 480 | 80 | State |
| 62. 36-47-21 | 240 | 200 | Either |
| 72. 16-45-20 | 537 | 80 | State |
| 74. 34-43-21 | 153 | 66 | State |
| 76. 16-44-21 | 320 | 80 | State |
| 79. 36-45-21 | 280 | 280 | State |
| 81. 16-47-16 | 160 | 280 | State |
| 83. 7-46-17 | 40 | 320+ | County |
| 85. 16-47-17 | 280 | 80 | State |
| 86. 36-47-17 | 560 | 640 | State |
| 91. 36-44-18 | 640 | 640+ | County |
| 93. 36-45-18 | 440 | 720 | State |
| 96. 36-43-16 | 240 | 320 | Either |
| 98. 36-43-17 | 640 | 2000+ | County |
| 101. 16-43-18 | 640 | 1000+ | County |
| 102. 36-43-18 | 640 | 1000+ | County |
| 105. 36-43-19 | 640 | 206 | State |
| 108. 16-40-20 | 400 | 720+ | County |
| 113. 36-42-20 | 520 | 60 | State |
| TOTAL | 11,234 | | |

Transfer of Administrative Control or Internal Exchange

These compartments are usually Division of Forestry administered lands within or adjacent to other DNR management units which are better suited for management as part of the other unit. Table 3.10 lists the compartments, acreage, and present and proposed administrators for parcels suitable for transfer of administrative control. Additional transfers of administrative control or transfers of land status (i.e., transfer of trust fund status from lands in non-income producing management units to non-trust lands in state forests) may be proposed by other DNR divisions during the life of this plan.

Table 3.10. Compartments Proposed for Transfer of Administrative Control or Internal Exchange - Moose Lake Area, 1985-94.

| Compartment | Acres | Current Administrator | Proposed Administrator |
|--------------------------------|-------|-----------------------|---------------------------|
| 10. Nemadji-Black Lake Bog SNA | 1,414 | Forestry | SNA/Forestry |
| 49. 28-47-20 | 40 | Forestry | Trails & Waterways |
| 64. 36-43-20 | 160 | Forestry | Parks & Recreation |
| 72. 16-45-20 | 112 | Trails & Waterways | Forestry |
| 109. 4-41-20 | 40 | Forestry | Trails & Waterways |
| 110. 10-41-20 | 80 | Forestry | Trails & Waterways or SNA |
| 112. 16-41-20 | 80 | Forestry | SNA or Trails & Waterways |
| 127. 36-40-25 | 60 | Forestry | Wildlife |
| TOTAL | 1,986 | | |

Retain for Custodial Management

The compartments listed in Table 3.11 will be retained in state ownership but will generally not be actively managed. These parcels are typically small (40-80 acres) and inaccessible. These compartments are chiefly valuable for mineral exploration since they are in geologic formations where metallic mineral bearing units are known to occur or are in geologic environments similar to other areas of the world that are known to contain economic mineral deposits (e.g., class B or C mineral potential). The Division of Forestry will retain custodial control of these parcels.

Table 3.11. Compartments Proposed for Custodial Management - Moose Lake Area, 1985-94.

| <u>Compartment</u> | <u>Acres</u> | <u>Comments</u> |
|--------------------|--------------|----------------------------|
| 33. 16-47-18 | 160 | |
| 36. 2-46-20 | 40 | |
| 39. 16-46-20 | 40 | Assess gravel potential. |
| 55. 24-46-21 | 80 | Assess wildlife resources. |
| 70. 36-44-20 | 40 | |
| 73. 16-43-21 | 80 | |
| 89. 6-44-18 | 40 | |
| 111. 16-41-20 | 40 | |
| 114. 4-42-21 | 40 | |
| TOTAL | 560 | |

Surplus Lands

Eleven compartments (806 acres) have been tentatively identified as surplus lands. These lands generally lack resource characteristics or management opportunities which would make them suitable for continued management by the Division of Forestry or for transfer or exchange to other public agencies. In several cases a field assessment of plant communities, wildlife, gravel, or peat resources will be necessary before a final decision on whether or not to dispose of these lands is made. Minnesota Statutes 92.461 prohibits sale of lands that are chiefly valuable for deposits of peat in commercial quantities. Two of the compartments contain public waters and would have to be exchanged for other land containing public waters. Land sales would be conducted according to Minnesota Statutes, Chapter 94.10.

Table 3.12. Compartments Proposed for Disposal as Surplus Lands - Moose Lake Area, 1985-94.

| Compartment | Acres | Comments |
|--------------------------|-------|--|
| 27. Eaglehead Fire Tower | 1 | Consider leasing tower. |
| 30. Woodland Fire Tower | 1 | Consider leasing tower. |
| 41. 4-47-20 | 40 | Offer to exchange to county before sale. |
| 47. 22-47-20 | 40 | Offer to exchange to county before sale. |
| 48. 22-47-20 | 40 | Offer to exchange to county before sale. |
| 50. 36-47-20 | 80 | Assess wildlife and mineral resources potential before sale. |
| 80. 16-46-16 | 40 | |
| 100. 36-42-18 | 440 | Exchange for other land containing public waters. |
| 104. 36-42-19 | 40 | Exchange for other land containing public waters. |
| 119. 36-38-23 | 40 | Assess wildlife resources, exchange to Wildlife if retained. |
| 122. 6-41-24 | 44 | |
| TOTAL | 806 | |

Land Acquisition

Table 3.13 lists lands that have been identified as desirable additions to state forests. Land will only be purchased from willing sellers. The Soo Line Railroad which crosses the Nemadji and St. Croix state forests is being considered for abandonment. Acquisition of the railroad land would prevent fragmentation of ownership within the forests. The 350 acre tract on the Snake River and the 40 acres in the Rum River State Forest are isolated by state land. The 198 acres in the Chengwatana would provide additional public land along the St. Croix River and would nearly connect the northern and southern portions of the state forest. The 40 acres in 16-46-18 would facilitate development of a wildlife impoundment. The remaining tracts are adjacent to developed state forest recreation facilities.

There may be additional lands that become available for addition to state forests through donation or purchase. These lands will be evaluated using the following criteria:

1. Is the land within or adjacent to an existing state forest or state land proposed for state forest status in this plan?
2. Will the public have unrestricted legal access to the land? Does it provide access to currently inaccessible public land?
3. Is the land capable of producing timber on a sustained yield basis?
4. Does the land have significant recreational value? Is it adjacent to existing recreational facilities or areas where such development is proposed?
5. Does the land have significant fish or wildlife habitat value or provide habitat for endangered, threatened, or special concern plants or animals?
6. Is the land adjacent to protected waters?
7. Does the land have significant educational or historical value?
8. Does the land have natural area preservation or wilderness potential?
9. Is it likely that the land will be used for purposes incompatible with adjacent state forest land if it is not acquired?
10. Does the land have potential mineral resources?

Lands that meet one or more of the above criteria will be considered for addition to state forests. A parcel that meets several criteria will likely receive higher priority for acquisition than one that meets only one criterion. Acquisition by purchase will be subject to availability of funds.

Table 3.13. Land Acquisition Proposals - Moose Lake Area, 1985-94.

| Compartment | Acres | Comments |
|--|-------|---|
| 2. Chengwatana (Gen. Mgmt.) | 198 | NSP land along St. Croix River. |
| 5&9. General C.C. Andrews (Dago Lake/General Mgmt.) | 121 | Willing seller of inholding adjacent to Dago Lake Day Use Area. |
| 8. General C.C. Andrews (Willow River Campground) | 1 | Willing seller of inholding between campground and freeway. |
| 12. Nemadji (Gafvert Campground) | 99 | Two parcels with shoreline on Net and Pickerel lakes adjacent to recreation facility. |
| 14&19. Nemadji (Gen. Mgmt.) St. Croix (Gen. Mgmt.) | 421 | Acquire Soo Line R.R. land within boundaries of state forests when abandoned for use as road. |
| 16. Rum River (Gen. Mgmt.) | 40 | Isolated inholding. |
| 20. Snake River (Gen. Mgmt.) | 350 | Private land outside boundary that is cut off by Snake River and state forest land. |
| 31. 16-46-18 | 40 | Desirable for development of impoundment. |
| TOTAL | 1,072 | |

LAW ENFORCEMENT

Eleven compartments in the Moose Lake Area have special enforcement needs (see Table 3.14). The majority of these compartments are associated with a developed recreation facility. Specific enforcement procedures have been established by the area for each of these facilities. They include having caretakers present during times of peak use, forest officer campground patrols, and campground patrols from conservation offices and other law enforcement agencies. If serious problems are encountered by forestry

personnel, backup is requested from conservation officers and other law enforcement agencies as needed. These procedures will be continued and their adequacy monitored.

Table 3.14. Compartments with Law Enforcement Needs - Moose Lake Area, 1985-94.

| Compartment | Enforcement Needs |
|--|-------------------------------------|
| 1. Chengwatana (Snake River Campground) | Recreation |
| 3. D.A.R. (General Management) | Recreation |
| 5. General C.C. Andrews (Dago Lake Day Use Area) | Recreation |
| 8. General C.C. Andrews (Willow River Campground) | Recreation |
| 12. Nemadji (Gafvert Campground) | Recreation |
| 13. Nemadji (Grouse Management Area) | Recreation/Hunting |
| 16. Rum River (General Management) | Recreation |
| 17. St. Croix (Boulder Campground) | Recreation |
| 18. St. Croix (Tamarack River Horse Camp) | Recreation |
| 82. 36-47-16 | Check for agricultural trespass |
| 85. 16-47-17 | Check for littering in trout stream |

RECREATION

Detailed recreation development proposals for the Moose Lake Area are contained in the Moose Lake Recreational Sub-Area Plan (Appendix G). Recreation proposals call for the upgrading and continued maintenance of 6 campgrounds, 1 day-use area, and 115 miles of trail. New development proposals include one day-use area, 20 miles of trail, and 3 new parking lots.

The Kettle, St. Croix, and Snake rivers are designated Canoe and Boating Routes. The Kettle is a State Wild and Scenic River and the St. Croix is a Federal Wild and Scenic River. Each of these rivers and the Minnesota-Wisconsin Boundary Trail cross or are adjacent to several compartments in the Moose Lake Area. The Kettle and St. Croix rivers and the Boundary Trail each have a management plan. Resource management activities on affected compartments will be compatible with the appropriate management plan.

Table 3.15. Compartments Containing Developed Recreational Facilities or with Potential for Developed Recreational Facilities - Moose Lake Area, 1985-94.

| Compartment | Description |
|--|--|
| 1. Chengwatana (Snake River Campground) | Upgrade and maintain as per Recreation Sub-Area Plan. Potential for canoe campsites on St. Croix and Kettle rivers. Potential for campground near St. Croix at 24, 26, 34-38-20. |
| 2. Chengwatana (General Management) | Upgrade, specify use and maintain trails as per Recreation Sub-Area Plan. |
| 3. D.A.R. (General Management) | Upgrade and maintain campground as per Recreation Sub-Area Plan. |
| 5. General C.C. Andrews (Dago Lake Day Use Area) | Develop and maintain as per Recreation Sub-Area Plan. |
| 8. General C.C. Andrews (Willow River Campground) | Upgrade and maintain as per Recreation Sub-Area Plan. |
| 9. General C.C. Andrews (General Management) | Upgrade and maintain trails as per Recreation Sub-Area Plan. |
| 10. Nemadji (Black Lake Bog SNA) | No developed facilities. Restrict motorized access. |
| 11. Nemadji (East) | Do not maintain snowmobile trail. |
| 12. Nemadji (Gafvert Campground) | Upgrade and maintain as per Recreation Sub-Area Plan. |
| 13. Nemadji (Grouse Management Area) | Develop, specify use, and maintain trails as per Recreation Sub-Area Plan. |
| 14. Nemadji (General Management) | Upgrade, specify use, and maintain trails as per Recreation Sub-Area Plan. Potential for small campgrounds on Round, Mud and DeLong lakes. |

| Compartment | Description |
|---|---|
| 16. Rum River (General Management) | Upgrade, specify use, maintain trails, and upgrade day-use area as per Recreation Sub-Area Plan. |
| 17. St. Croix (Boulder Campground) | Upgrade and maintain as per Recreation Sub-Area Plan. |
| 18. St. Croix (Tamarack Horse Camp) | Upgrade and maintain as per Recreation Sub-Area Plan. |
| 19. St. Croix (General Management) | Upgrade, specify use, and maintain trails as per Recreation Sub-Area Plan. Potential for canoe campsites on Snake and St. Croix rivers. Potential for small campsites on Little Tamarack and Graces lakes and on the Hay Creek Flowage. |
| 20. Snake River (General Management) | Develop, specify use, and maintain trails as per Recreation Sub-Area Plan. Potential backpacking trail. |
| 49. 28-47-20 | Potential canoe campsites on Kettle River. |
| 64. 36-43-20 | Possible addition to Banning State Park. |
| 81. 16-47-16 | Proposed route of Minnesota-Wisconsin Boundary Trail. |
| 93. 36-45-18 | Continue grants-in-aid ski trail lease. Close Range Line snowmobile trail when MN-WI Trail is complete. |
| 109. 4-41-20 | Potential canoe campsite on Kettle River. |
| 124. 36-42-24 | Grant lease for Vasaloppet ski race trail. |

TIMBER MANAGEMENT

State statutes require timber on Division of Forestry administered lands to be managed according to multiple use and sustained yield principles. The statutory reforestation policy requires the division to reforest harvested lands and other deforested or poorly stocked lands. Within these general policies the division seeks to match tree species to the site quality and to maintain diverse and productive forests to meet anticipated timber demand.

The Division of Forestry has adopted the "Manager's Handbook" series of general technical reports published by the North Central Forest Experiment Station (1977) as its basic guidelines for the management of the jack pine, red pine, black spruce, northern white cedar, aspen, oak, black walnut, and northern hardwood forest types. Guidelines for other types are contained in conference reports on birch management and artificial regeneration of conifers and various technical articles and white papers. The division's insect and disease specialists have developed integrated pest management guidelines for 14 forest types to supplement the manager's handbooks and other guidelines. The division's policy and guidelines on pesticide use are also part of the standard guidelines that apply to the majority of the compartments in the Moose Lake Area.

The procedures for developing area allowable cuts, planned cut lists, and harvest reports for each cover type are described in section J of the Timber Sales Manual (MN DNR, Forestry, 1982). A computerized timber regulation program uses Phase II inventory information to select stands for various management practices based on the following criteria: site index, stocking, damage, stand size, and distance from road. The preliminary list of stands generated by the program will be reviewed to see if the proposed practice is consistent with the specific compartment guidelines in Appendix D, wildlife objectives, and other constraints. The amended lists of stands for various practices will form the basis for annual planned cut lists and site preparation, regeneration, and timber stand improvement plans. The procedures for review of these detailed management proposals by the Division of Fish and Wildlife are described in the Wildlife/Forestry Coordination policy and associated guidelines.

Table 3.16 lists compartments (or portions of compartments) where the standard timber management guidelines will be modified. In these areas other resource management objectives take precedence over the general objective of production of a sustained yield of commercial timber and maintenance of wildlife habitat. In addition, to protect fisheries habitat in lakes, rivers and streams: maintain buffer strips of vegetation along lake and stream margins; construct erosion control devices, especially on logging roads and harvested areas; properly design and locate stream crossings; use pesticide application methods that prevent pesticides from getting into water systems; and maintain good age class diversity of timber stands for watershed protection.

Table 3.16. Forest Resource Management Compartments with Modified or Restricted Timber Management Guidelines -- Moose Lake Area, 1985-1994.

| Compartment | Modification or Restriction |
|---|--|
| 1. Chengwatana (Snake River CG) | Maintain aesthetics and continuous forest cover. |
| 2. Chengwatana (General Management) | Modify management along Kettle, St. Croix, and Snake rivers and Minnesota-Wisconsin Boundary Trail to comply with regulations and policies and to maintain aesthetics. |
| 3. D.A.R. | Maintain aesthetics and continuous forest cover around campground. |
| 5. General C.C. Andrews (Dago Lake) | Maintain aesthetics. Manage for larger trees and continuous forest cover. |
| 6. General C.C. Andrews (Nursery) | See policy on timber sales adjacent to nursery (Appendix D). Change timber status |
| | of stands within 330 feet of seedbeds from normal to limited. |
| 8. General C.C. Andrews (Willow River Campground) | Maintain aesthetics and water quality. |
| 9. General C.C. Andrews (General Management) | Reduce jack pine rotation age to 40 years. Establish oak in selected areas for fire, pest, and wildlife purposes. Reserve peat for nursery. Manage seed orchard in cooperation with nursery. |
| 10. Nemadji (Black Lake Bog SNA) | No timber management allowed. |
| 11. Nemadji (East) | Winter logging only. Maintain remnant white pine. |
| 12. Nemadji (Gafvert Campground) | Maintain aesthetics in campground, along lake, and along proposed nature trail. |
| 13. Nemadji (Grouse Management Area) | Reduce rotation age, promote winter logging, use smaller clearcuts, consider regeneration without harvest in aspen type to meet wildlife objectives. |
| 14. Nemadji (General Management) | Management along Minnesota-Wisconsin Boundary Trail in accordance with policy. Protect water quality. |
| 15. Rum River (Mille Lacs WMA) | Modify to reflect wildlife emphasis. |
| 17. St. Croix (Boulder Campground) | Maintain aesthetics and create uneven aged stand. |
| 18. St. Croix (Tamarack River CG) | Maintain aesthetics. |
| 19. St. Croix (General Management) | Limited management in maximum preservation zone along St. Croix River. Management along Minnesota-Wisconsin Boundary Trail in accordance with policy. Seed orchards managed in cooperation with nursery. |

| Compartment | Modification or Restriction |
|--------------|---|
| 66. 16-44-20 | Maintain aesthetics along Clear Lake for resort. |
| 72. 16-45-20 | Follow regulations within Kettle River land use zone. |
| 78. 16-45-21 | Manage seed orchard in cooperation with nursery. |
| 81. 16-47-16 | Protect soil, water and aesthetic values. |
| 82. 36-47-16 | Watershed protection. |
| 83. 7-46-17 | Field check for significant botanical feature. |
| 84. 16-46-17 | Protect trout stream. |
| 85. 16-47-17 | Maintain aesthetics and water quality along trout stream. |
| 86. 36-47-17 | Protect soil and water resources. |
| 99. 16-42-18 | Manage seed orchard in cooperation with nursery. |

MOOSE LAKE AREA FOREST RESOURCE MANAGEMENT PLAN

4. PROGRAM GUIDELINES

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INTRODUCTION

This chapter presents the recommended program and budget for the Division of Forestry's Moose Lake Area for the period 1985-1994. The program is consistent with the broad statewide direction provided by the Minnesota Forest Resources Plan. This section of the plan is based to a considerable extent on the sections that preceded it, the resource assessment and the land management plan for lands administered by the Division.

Budget, staffing, and accomplishment targets are projected for each of the Division's programs in the Moose Lake Area for the next 10 years. The actual figures from 1984 are also presented to permit comparison of the current and proposed program. The proposals for 1985-1994 are based on estimates of the accomplishments, budget, and staff needed to meet ongoing responsibilities and long-term goals. For each program, the estimates were made by Area, Region, and St. Paul Forestry staff who have major responsibility for the program. In addition, an Area Wildlife Manager was involved in making estimates for the fish and wildlife and timber programs and a Regional Enforcement Supervisor was involved in making estimates for the enforcement program.

Budget and Staffing Summary

Tables 4.1 and 4.2 summarize the actual and recommended budget and staffing levels from F.Y. 1984 through F.Y. 1994 for each of the 18 programs in the Moose Lake Area. Table 4.1 does not include the cost of major equipment (e.g., tractors, trucks) that is budgeted for on a department level. Capital improvement bonding for campgrounds, roads, bridges, and land acquisition is included in the Division budget, but bonding for offices and other facilities is not included.

The staffing summary in Table 4.2 is based on the amount of time actually recorded on employee time summaries for F.Y. 1984 and estimates of time that will be required for F.Y. 1985-1994. Total Area staffing levels are projected to increase from 20 full-time equivalents (fte's) in F.Y. 1984 to

24.5 fte's in F.Y. 1994. This increase is somewhat below the rate of increase projected for total Division of Forestry staffing levels in the Minnesota Forest Resources Plan.

Significant shifts in emphasis among programs are proposed, as summarized by program in the sections that follow. Increased budget and time allocations are proposed for the following programs:

- Fire Management
- Timber Management
- Training, Information and Education
- Private Forest Management
- Utilization and Marketing
- Pest Management
- Nursery and Tree Improvement

Decreased budget and time allocations are proposed for the following programs:

- Maintenance and Administration
- County Assistance
- State Forest Roads
- Forest Resource Inventory
- Forest Resource Planning
- Enforcement

These budget and staffing level projections should be viewed as general guides rather than absolute targets. One or more severe fire seasons, widespread insect or disease epidemics, significant shifts in timber markets, or unanticipated political trends could greatly alter the projections for several programs. It is therefore essential that the proposed plan be applied in a flexible way and be updated regularly as conditions change in the future.

Table 4.1. Proposed Budget Levels by Program, F.Y. 1984-94.¹

| BUDGET (thousands of dollars) | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|-------------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Forest Recreation Management | 113.3 | 196.4 | 163.9 | 164.9 | 166.9 | 167.9 | 124.4 | 83.4 | 85.4 | 89.0 | 89.0 |
| Forest Pest Management | 3.1 | 3.1 | 3.1 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| Nursery and Tree Improvement | 2.5 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| State Forest Roads | 35.5 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| Forest Soils ² | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fish and Wildlife Habitat | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| Land Administration | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| Timber Management | 231.2 | 251.6 | 275.0 | 275.0 | 275.0 | 275.0 | 275.0 | 275.0 | 275.0 | 275.0 | 275.0 |
| County Assistance | 31.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 | 15.9 |
| Private Forest Management | 70.1 | 70.1 | 70.1 | 73.2 | 108.3 | 111.6 | 111.6 | 111.6 | 111.6 | 111.6 | 111.6 |
| Urban Forestry | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| Forest Resource Inventory | 19.0 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 |
| Utilization and Marketing | 0.6 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Forest Resource Planning | 25.5 | 15.9 | 12.7 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 25.5 |
| Fire Management | 197.1 | 229.0 | 232.3 | 260.9 | 263.5 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 |
| Maintenance and Administration | 160.1 | 149.9 | 149.9 | 144.8 | 144.8 | 138.5 | 136.0 | 136.0 | 136.0 | 136.0 | 136.0 |
| Training, Information and Education | 38.2 | 47.8 | 54.2 | 54.2 | 54.2 | 54.2 | 57.3 | 57.3 | 60.5 | 60.5 | 60.5 |
| Enforcement | 19.0 | 15.9 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 |
| Totals | 965.7 | 1030.2 | 1053.0 | 1055.3 | 1121.0 | 1121.6 | 1083.1 | 1041.6 | 1046.8 | 1050.4 | 1066.3 |

¹All dollar figures are in constant 1985 dollars.

²This program is funded at the regional level.

Table 4.2. Proposed Staffing Levels by Program, F.Y. 1984-94.¹

| STAFFING (full-time equivalents) ² | 1984 ³ | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|-------------------|------|------|------|------|------|------|------|------|------|------|
| Forest Recreation Management | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.7 | 1.7 |
| Forest Pest Management ¹ | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Nursery and Tree Improvement | 0.08 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| State Forest Roads | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Forest Soils ¹ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fish and Wildlife Habitat | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Land Administration | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Timber Management | 5.2 | 6.4 | 6.5 | 6.5 | 6.5 | 6.5 | 6.6 | 6.7 | 6.8 | 6.8 | 6.8 |
| County Assistance | 1.0 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Private Forest Management | 2.2 | 2.2 | 2.2 | 2.3 | 3.4 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Urban Forestry | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Forest Resource Inventory | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Utilization and Marketing ¹ | 0.02 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Forest Resource Planning | 0.8 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.8 |
| Fire Management | 2.4 | 2.4 | 3.4 | 3.5 | 4.4 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Maintenance and Administration | 2.8 | 2.4 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| Training, Information and Education ⁴ | 1.2 | 1.5 | 1.7 | 1.7 | 1.7 | 1.7 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 |
| Enforcement | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| TOTALS | 20.0 | 20.0 | 21.0 | 21.0 | 23.0 | 23.2 | 23.5 | 23.6 | 23.8 | 23.9 | 24.5 |

4-4

¹ Only Moose Lake Area staffing levels are shown on this sheet. Therefore, programs administered by the Region (Forest Pest Management, Forest Soils, and Utilization and Marketing) show lower staffing levels on this table than on the tables that follow for each program.

² One full-time equivalent equals approximately 1,730 working hours per year.

³ F.Y. 1984 figures are based on actual time summary totals, while F.Y. 1985 through 1994 figures are based on 3-year time summary averages, position descriptions, the 1984 workload analysis and other projections.

⁴ Through changes in time recording there will be a shift of hours from various programs to training.

FOREST RECREATION MANAGEMENT PROGRAM

The goal of the Forest Recreation Program is to fulfill the outdoor recreation potential of Minnesota forest lands by providing developed recreational areas and opportunities for dispersed recreational activities. Recreational developments are generally limited to primitive, minimum impact campgrounds, day-use areas and recreational trails. Division recreation facilities are managed in accordance with DNR Policy No. 8, "Recreational Use of State Forests" and other DNR recreation policies.

Forest recreation management activities include planning, development, rehabilitation and maintenance of recreation facilities as well as enforcement of rules and regulations. Appendix G contains the Recreation Sub-Area Plan which assesses recreation demand in the Moose Lake Area and describes the types of facilities to be provided.

The Moose Lake Area has one area staff member assigned half-time to recreation. The five District Foresters and their technicians also contributed 0.9 person years in F.Y. 1983 to recreation activities. In addition, one person year is contracted with Greenview, Inc. to maintain campgrounds, and other local contractors are used to groom snowmobile trails. Minnesota Conservation Corps workers assist in recreation facility rehabilitation and maintenance. The proposed program calls for increasing the Area's recreation effort from 1.6 person years in F.Y. 1984 to 1.7 person years by F.Y. 1994 (see Table 4.3). Contracts with Greenview, Inc. are projected to increase to 1.5 person years by F.Y. 1994. General Fund expenditures for the forest recreation program are projected to increase from \$54,300 in F.Y. 1984 to \$68,500 in F.Y. 1994.

Forest Recreation Management Program Priorities for 1985-94

- Adequately operate and maintain forest recreation facilities.
- Improve enforcement of forest recreation regulations in cooperation with the Division of Enforcement and local law enforcement agencies.
- Improve coordination and communication with the Trails and Waterways Unit, Division of Enforcement, other DNR divisions, and other public agencies with recreational responsibilities in the Area.

- Rehabilitate or expand existing facilities and develop new facilities as outlined in the sub-area plan.
- Cooperate with the local tourism industry and other agencies to market outdoor recreation and tourism opportunities.
- Assist in the development of new state forest user maps in cooperation with other DNR divisions, units, and bureaus.
- Revise recreation sub-area plan as needed.
- Monitor use of selected recreation facilities as outlined in Circular Letter 3530-1.

Coordination With Other Divisions, Agencies and Organizations

Recreation management within the Moose Lake Area involves four DNR Divisions (Forestry, Parks and Recreation, Fish and Wildlife, and Enforcement), and one DNR Unit (Trails and Waterways) along with other agencies such as the National Park Service, the Department of Transportation, local units of government (county and city) and private recreation developers. Because of the various agencies and jurisdictions involved, coordination of activities is important.

The Division of Forestry will coordinate recreation development, rehabilitation and maintenance activities with these various agencies as necessary. Special emphasis will be given to coordination with the DNR Division of Enforcement and the Trails and Waterways Unit. Coordination with Enforcement will involve a cooperative effort to patrol state forest recreation facilities, to enforce rules and regulations, and to prevent illegal or disruptive activities from occurring (see Enforcement Program). Coordination with Trails and Waterways will involve a cooperative effort to integrate maintenance of recreational trails with timber harvesting activities, as well as closer coordination with both the Wild and Scenic River Program and the Canoe and Boating Route Program. The Trails and Waterways Unit has agreed to reevaluate the Minnesota-Wisconsin Boundary Trail with respect to summer use. Regular meetings (at least annually) will be scheduled with these units to coordinate these activities. Meetings or informal contact with other divisions or agencies will be scheduled as necessary to insure that recreation management in the Moose Lake Area takes place in a coordinated, cooperative manner.

All plans to upgrade or develop new recreational facilities will be reviewed by the Division of Waters prior to implementation to ensure that sewage facilities and structures are in compliance with state shoreland, floodplain, wild and scenic river and sewage regulations. Efforts will also be made to conform whenever possible with local zoning provisions. Modification of any existing non-conforming toilet/sewage facilities will be given priority in project scheduling.

Table 4.3

Moose Lake Area
Forest Recreation Management Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|------------------|---|--------------|---------------------------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund (Salaries) | \$(000's) | 40.9 | 40.9 | 40.9 | 40.9 | 40.9 | 40.9 | 40.9 | 40.9 | 43.5 | 43.5 | |
| 2. General Fund (Campgrounds) | \$(000's) | 13.4 | 13.5 | 19.0 | 20.0 | 21.0 | 22.0 | 23.0 | 24.0 | 25.0 | 25.0 | 25.0 |
| 3. Forest Recreation Development and Rehabilitation | \$(000's) | 7.0 | 80.0 | 43.0 | 37.5 | 37.5 | 37.5 | 0 | 0 | 0 | 0 | 0 |
| 4. Game and Fish Fund--Water Access Maintenance | \$(000's) | 0 | 0 | 0 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 5. Trail Maintenance | \$(000's) | 12.0 | 12.0 | 16.0 | 16.0 | 17.0 | 17.0 | 18.0 | 18.0 | 19.0 | 20.0 | 20.0 |
| 6. Trail Development and Rehabilitation | \$(000's) | 40.0 | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 | 42.0 | 0 | 0 | 0 | 0 |
| Total | \$(000's) | 113.3 | 196.4 | 168.9 | 164.9 | 166.9 | 167.9 | 124.4 | 83.4 | 85.4 | 89.0 | 89.0 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| Total | fte/year | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.7 | 1.7 |
| Objectives | | | | | | | | | | | | |
| Planning | | | | | | | | | | | | |
| 1. Assist in recreation component of unit plans. | plans | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2. Assist in the development of recreation sub-area plans. | plans | 1 | 1 | Revise sub-area plans as needed | | | | | | | | |
| 3. Work with the local tourist industry to market outdoor recreation and tourism opportunities. | contacts | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Enforcement | | | | | | | | | | | | |
| 1. Improve enforcement of forest campground regulations. | patrols | To be scheduled by Area as needed (see Enforcement program) | | | | | | | | | | |
| Information | | | | | | | | | | | | |
| 1. Assist in the development and distribution of new forest user maps. | | | | | | | | | | | | |
| a. maps showing state lands and recreation facilities for specific areas. | maps | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

FOREST PEST MANAGEMENT PROGRAM

The goal of the forest pest management program is to reduce resource losses and constraints on forest productivity to acceptable levels. The efficient and economical accomplishment of this goal will require the integration of forest pest management techniques into forest nursery production and forest management practices from site preparation to harvest.

The role of the division's forest pest management program is to monitor pest populations and to provide management guidelines, standards, examples, and risk evaluation systems for addressing forest pest management on public and private lands in the state. Cooperative relationships with university, public, and private agencies are also required to insure that forest managers have the information necessary to implement proper forest management practices.

Area and district forestry personnel are responsible for implementing integrated pest management techniques to reduce losses. The Brainerd Regional Insect and Disease Specialist assists the Moose Lake Area. Sites requiring special pest management attention in the area include the Willow River Nursery, seed orchards, and recreation areas. The Moose Lake Area has an active vegetation management program which involves the use of herbicides and mechanical treatments to control competing vegetation in forest plantations.

The major historic pest problems in the Moose Lake Area (e.g. pine tussock moth, jackpine budworm, white pine blister rust, white pine weevil, forest tent caterpillar, canker diseases) will be addressed in the next 10 years through continuing survey, evaluation, and information transfer efforts. Pest survey, evaluation, prevention, and control activities will continue as part of the cooperative funding agreement with the U.S. Forest Service. Land managers will receive assistance in the identification of forest pest problems and training to reduce losses to forest pests. Stand risk rating systems will be used to identify stands needing shortened rotations, directed harvest, or timber stand improvement activities. Cleaner harvests, better site preparation, matching species to site, and limiting the size of single species plantings will be emphasized in all regeneration

projects. Work will continue to develop and evaluate harvest regulations and site preparation techniques to reduce the impact of weed competition, root rots, and regeneration insects on newly established plantations. Specific pest management techniques will be incorporated into the silvicultural guidelines for each forest type.

Forest Pest Management Program Priorities for 1985-94

- Reestablishment of white pine in low and moderate blister rust hazard zones using genetically improved seedlings, annual plantation inspections, and pathological pruning.
- Complete risk rating of all jack pine stands and take appropriate actions to reduce potential losses to jackpine budworm and pine tussock moth.
- Conduct surveys and investigations to determine the presence of forest pests, monitor infestation levels, and evaluate the damage or potential for damage by forest pests.
- Implement pest management guidelines and control strategies for each major timber type to reduce losses to forest pests.
- Evaluate the effectiveness of prescribed pest management techniques and control strategies.
- Provide technical review of forest development proposals utilizing pesticides to insure their safe, effective, and economical use.
- Restrict the losses within forest plantations due to weed competition.
- Provide training for public, industry, private, and urban forest managers in pest management techniques and their integration into forest management practices.
- Assess the impacts of major forest pests on the Moose Lake Area's forest resources.
- Maintain up-to-date expertise in forest pathology, entomology, silviculture, vegetation management, and the use of pesticides through continuing education opportunities to provide a technical background for developing management techniques and guidelines.

- Request and participate in the revision of the DNR policy on pesticide use to: clarify the role of pesticides in natural resource management; provide greater flexibility in the use of pesticides within legal and safety guidelines; and develop improved pesticide monitoring and reporting standards.

Coordination with other Divisions, Agencies and Organizations

Agencies of federal, state, and local governments cooperate in efforts to detect, monitor, control and provide information on forest pests in the Moose Lake Area. The Division of Forestry is responsible for pest management assistance on state, county, and private forest lands. The Minnesota Department of Agriculture is responsible for nursery inspections, pesticide regulations, and gypsy moth survey and eradication. The Minnesota Agricultural Extension Service develops educational materials for landowner assistance and provides information through its county agents. The University of Minnesota departments of pathology, entomology, forestry, and horticulture conduct research on forest pests. The U.S. Forest Service supports forest pest management efforts by maintaining cooperative program and funding agreements with the DNR. Local governments, county land departments, and municipal foresters also assist in detection, information transfer, and control efforts. The Moose Lake Area and the Regional Forest Insect and Disease Specialist will strive to maintain effective working relationships with all of these agencies and organizations during the next 10 years.

Table 4.4
Moose Lake Area
Forest Pest Management Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 2.5 | 2.5 | 2.5 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| b. Supplies and Expenses | \$(000's) | .6 | .6 | .6 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Total | \$(000's) | 3.1 | 3.1 | 3.1 | 6.2 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| 1. Region (1) | fte/year | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 2. Area | fte/year | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Total | fte/year | 0.3 | 0.3 | 0.3 | 0.4 |
| Objectives | | | | | | | | | | | | |
| State-Federal Cooperative Targets | | | | | | | | | | | | |
| 1. Conduct surveys and investigations to determine presence of forest pests and evaluate damage or potential damage. | M acres/yr. | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 |
| 2. Conduct cooperative projects for developing integrated pest management techniques. | projects | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Integration of Pest Management Principles with Forest Management Activities | | | | | | | | | | | | |
| 1. Implement pest management guidelines and control strategies for each major timber type in the Moose Lake Area. | guidelines | 0 | 3 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2. Begin risk rating forest lands. | M acres | 0 | 1.2 | 2 | 10 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| 3. Improve forest protection efforts on seed orchards to reduce the potential of losses. | % of sites | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|------------------------|------|------|------|------|------|------|------|------|------|------|------|
| 4. Provide for greater age class and species diversity between adjacent stands to reduce risk of losses to fire, insects, and disease. | % of lands regenerated | 50 | 80 | 80 | 85 | 85 | 90 | 90 | 95 | 95 | 100 | 100 |
| Surveys, Evaluations, and Research | | | | | | | | | | | | |
| 1. Evaluate the effectiveness of prescribed pest management techniques and control strategies. | systems evaluated | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 7 | 7 |
| 2. Develop criteria for evaluating weed competition and control needs in forest areas. | criteria developed | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. Conduct field reviews of projects utilizing pesticides to determine their effectiveness and methods for improvement. | % of projects | 30 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 4. Monitor the environmental impacts of pesticides used in forest management. | % of projects | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 5. Work in cooperation with the Department of Agriculture to monitor, prevent, and control the introduction of new forest pests. Participate in Gypsy Moth monitoring program. | traps | 25 | 50 | 60 | 70 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| Training | | | | | | | | | | | | |
| 1. Maintain expertise in forest pathology, entomology, silviculture, vegetation management, and the use of pesticides through continuing education, including literature review. | hours | 40 | 50 | 60 | 60 | 60 | 70 | 70 | 70 | 80 | 80 | 80 |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|----------------------|------|------|------|------|------|-----------------------------|------|------|------|------|------|
| 2. Provide at least one day of forest pest management training annually for DNR forest managers on ways to integrate pest management practices into silvicultural systems, harvest practices, and allowable cut projections; also provide pesticide use training. | person-days | 17 | 20 | 20 | ? | ? | ? | ? | ? | ? | ? | ? |
| | | | | | | | (depends on staffing level) | | | | | |
| 3. Develop information and education materials. | publications | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Pesticide Use in Forest Management | | | | | | | | | | | | |
| 1. Provide technical review of forest development proposals utilizing pesticides to insure their safe, effective, and economical use. | % proposals reviewed | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Suppression of Insects and Diseases | | | | | | | | | | | | |
| 1. Participate in a Division of Forestry review team to address problem solving on sites with repeated forest management failures or nursery problems related to insects and diseases. | field reviews | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Special Projects | | | | | | | | | | | | |
| 1. Jack pine budworm permanent plot monitoring. | plots | 0 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 2. Hazardous waste site. | projects | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. Pine tussock moth evaluation. | projects | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

(1) Region time includes Insect and Disease Specialist's and Seasonal Plant Health Specialist's time spent in the Moose Lake Area.

NURSERY AND TREE IMPROVEMENT PROGRAM

The goal of the nursery program is to produce tree planting stock for use on public and private land for afforestation, reforestation, windbreaks, shelterbelts, erosion control, soil and water conservation, wildlife habitat, and environmental education. The nursery program strives to meet the demand for tree seedlings in the most economical and efficient manner possible. The goal of the tree improvement program is to increase the productivity of public and private forest lands in Minnesota through the use of genetic principles. The program will result in the production or acquisition of genetically superior seeds, or cuttings, for use in the growing of planting stock or other regeneration activities. The target is the highest level of genetic improvement possible within the restrictions of available resources, current information, and probable economic returns.

The nursery and tree improvement program is the responsibility of staff at the General C.C. Andrews nursery, which is located in the Moose Lake Area but is not considered part of the Area administratively. However, Area staff do play a role in carrying out the nursery and tree improvement programs. Area personnel manage timber in and adjacent to the General Andrews Nursery as well as special use areas associated with the nursery.

The General Andrews Nursery includes all seedbeds, interior windbreaks, exterior windbreaks, and all improvements. The only responsibilities Area staff have with management of the nursery itself relate to providing assistance with any commercial timber harvests within the nursery and with management of a 330 foot buffer strip around the nursery.

Most management activities the Area staff are involved in are associated with special use areas within the General Andrews State Forest. These areas include three disposal sites in the vicinity of the nursery, a residence area for nursery staff, the peat resources in the forest, and seed orchards within the Moose Lake Area. Area staff also provide assistance to tree improvement specialists in seed source selection, seed production area development, and seed orchard development.

During 1982 the Area spent 0.08 person years of effort and \$2,500 on the nursery and tree improvement program. The proposed program would increase personnel commitment to 0.1 person years and the annual budget to \$3,100 by 1985, primarily due to increases needed to make the nurseries self-supporting. Under the proposed program the nurseries become self-supporting in fiscal year 1985 (see Table 4.5). This would result in a shift of appropriations from the nursery to the Area timber management program. The Area will then buy seedlings from the nursery for planting on state lands. Although the nursery and tree improvement programs are expected to grow considerably over the next ten years, the Area is only expected to increase its personnel commitment by 20 percent. Any additional staffing needs will have to be funded out of the state nursery budget.

Nursery and Tree Improvement Program Priorities for 1985-94

- For priority species, provide all seed needed by the nurseries for planting and by the Area for direct seeding and planting from identified seed sources.
- Plant 16 acres of jack pine seedling seed orchards.
- Develop 40 acres of control-pollinated second generation white spruce seed orchards.
- Plant a 5 acre grafted white pine seed orchard, a 5 acre white pine seedling seed orchard, a 5 acre European larch seedling seed orchard, and a 5 acre grafted Scotch pine seed orchard.
- Manage a buffer strip around the General Andrews nursery.
- Visit each seed production and seed orchard with the Tree Improvement Specialist for on-site inspection to determine management prescription.
- Develop vegetative management prescription for each seed orchard and seed production area.
- Remove jack pine windbreaks and replace as per policy guidelines.
- Thin norway pine windbreaks and area between nursery residence, entrance road and windbreak west of B1 nursery compartment.
- Conduct annual seed cone survey to determine production level and viability.
- Inspect seed locations where private individuals may pick cones for sale to the state nursery.

Table 4.5
Moose Lake Area
Nursery and Tree Improvement Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 2.00 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| b. Supplies and Expenses | \$(000's) | .50 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| Total | \$(000's) | 2.50 | 3.1 |
| Staffing | fte | 0.08 | 0.1 |
| Objectives | | | | | | | | | | | | |
| Seed Orchards and Seed Production Areas | | | | | | | | | | | | |
| 1. Assist in development of management plans for vegetative management and maintenance of seed orchards and seed production areas. | hours | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 | 72 |
| 2. Conduct ongoing analysis for need to establish additional seed orchards and seed production areas. | hours | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Windbreaks | | | | | | | | | | | | |
| 1. Make one timber sale, provide supervision of windbreak harvest, site preparation and regeneration. | hours | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Seed Collection | | | | | | | | | | | | |
| 1. Conduct seed cone survey. Inspect seed sources and collect required seed to meet area regeneration needs. | hours | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 |

STATE FOREST ROAD PROGRAM

The goal of the State Forest Road Program is to develop and maintain Minnesota's state forest road system to facilitate the protection, management, and recreational enjoyment of state forest lands. This 1,800 mile statewide system of roads also provides for public transportation, commerce, and development activities on several million acres of county, federal, and private forest lands.

In response to growing user demands and the need to provide consistent long range program direction, a comprehensive State Forest Road Plan was developed in 1982. The information in the State Forest Road Plan has been updated and was used in developing this proposed program for the Moose Lake Area.

The Moose Lake Area contains 249.2 miles of Division of Forestry administered forest roads. About 64.3 miles of this total are considered permanent, all weather road. The remaining road miles can be used only during dry periods or in the winter. These roads are permanent, but may be used only intermittently for resource management and development activities.

The permanent forest road system in the Moose Lake Area is close to complete with only an additional 12 miles of road construction proposed during the next 10 years. Three roads or sections of road totaling 13.8 miles are scheduled for upgrading from class 4 to class 3. It has been determined that these roads require upgrading to provide for safe and efficient travel and to meet the demands of expected use.

Some Division of Forestry administered lands in the Moose Lake Area are not currently accessible. The Land Management portion of the Moose Lake Area Plan identified 21 parcels of state land without adequate road access. Efforts will be made to obtain legal access to these lands through easements, cooperative agreements or gifts. Approximately 10.75 miles of new right of way are anticipated. Most acquisition will take the form of easements across private property.

In addition to construction and renovation, Class 1-4 state forest roads require a regular schedule of maintenance and repairs to adequately and safely meet demands placed upon them. The frequency and type of maintenance required varies depending on road construction, soil type, road use, and other factors. The Moose Lake Area also contains 185 miles of Class 5 forest roads. These road corridors may be maintained or replanted as management prescriptions dictate.

Some forest roads will be gated and vehicle use restricted based on the need to control access and protect the roads and adjacent lands from damage. A road identification system will also be developed and road signs installed as outlined in the State Forest Road Plan. Forest roads will then be mapped, signed, and identified on state trail maps for user safety and convenience.

Potential negative impacts of forest road building on the forest environment will be addressed early in the design and layout stages of road development. Proper planning, design, and road construction minimizes such impacts and can, at the same time, significantly increase road utility and lifespan. Efforts to control soil erosion and stream sedimentation will include slash removal, construction of water bars, and timely replacement of culverts and other water control structures. Proposed road improvements will be reviewed with the Division of Waters to ensure that all water permits and floodplain program requirements are addressed.

Recent developments in timber harvest technology, especially the introduction of wide-tired tree skidders capable of all-season wood transport over longer distances, allow for timber harvest without excessive road building or environmental damage. Improvements in road building technology also may alter future road construction standards and development specifications. DNR personnel time spent on this program will trend more toward supervision of contracts and part-time labor crews, and less to actually doing the work.

State Forest Road Program Priorities for 1985-94

- Update and maintain the state forest road inventory for the Moose Lake Area.
- Select, evaluate, and rank state forest road and bridge construction and improvement projects.
- Develop a forest road and right-of-way maintenance schedule and budget.
- Coordinate timber harvest activities with recreational trail use and development.
- Establish priorities for road signing and installation of gates.
- Reconstruct existing state forest roads to meet safety and use requirements, particularly where growing demands for timber, fish and wildlife management, recreational use, or other development are found to exist.
- Develop priorities and an implementation schedule for accessing Division of Forestry lands across other ownerships.
- Clarify responsibility for the management, maintenance, and construction of forest roads accessing areas of mixed forest ownership.

Coordination with Other Divisions, Agencies and Organizations

The Division of Forestry will continue to cooperate with townships, county, and Department of Transportation road engineers on transportation issues. Cooperative agreements with other public and private road users will be pursued, especially where mixed land ownerships or shared road use makes this a priority. Coordination with the DNR's recreational trail program and fisheries and wildlife habitat improvement programs will be essential to obtain cooperative project funds and in developing forest access priorities. Forest road projects will be reviewed by the Division of Waters to ensure that all water permits and floodplain requirements are addressed.

Table 4.6

Moose Lake Area
State Forest Road Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 20.5 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 | 15.3 |
| b. Supplies and Expenses | \$(000's) | 5.0 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |
| 2. Technical Assistance, Support and Rentals | \$(000's) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Total | \$(000's) | 35.5 | 29.0 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| 1. Area | fte | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Objectives | | | | | | | | | | | | |
| 1. Update and maintain the state forest road inventory. | inventory | -- | -- | 1 | -- | -- | -- | 1 | -- | -- | -- | 1 |
| 2. Complete road construction and reconstruction projects. (1) | projects | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 3. Perform annual maintenance on Class 1-4 state forest roads. (2) | | | | | | | | | | | | |
| a. Road Bed Maintenance | | | | | | | | | | | | |
| - blading | miles | 43 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 |
| - culverts (3) | culverts | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| - signs | signs | 5 | 12 | 128 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| - gating | gates | -- | 6 | 10 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| b. Right of Way Maintenance | | | | | | | | | | | | |
| - brush control | miles | 11 | 8 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| - mowing | miles | -- | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 |
| 4. Develop access to inaccessible parcels. | parcels | -- | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

(1) All construction and reconstruction will be through contracts.

(2) Road maintenance will be primarily through contracts.

(3) Does not include culverts installed as part of road construction and reconstruction projects.

FOREST SOILS PROGRAM

The goal of the forest soils program is to provide site specific forest soil interpretations to forest managers. These interpretations will enable the Division of Forestry to concentrate intensive timber management on the most productive forest land, to assist in the development of soil surveys in forested areas, and to provide technical soils information to forest managers and planners. Soils information is used by area land managers to assist in making management and forest development decisions.

The Regional Soils Specialist conducts field examinations of specific sites to identify and interpret the impact that different soils have on forest production and management activities, works with other regional and area staff specialists to integrate soil management principles into silvicultural practices, and works cooperatively with other agencies in the development of soil surveys in forested areas. This soils information is made available to area forestry and regional engineering staffs for road construction, reconstruction, and other forest development projects.

Over the next 10 years increased emphasis will be given to analyzing soils data in understocked areas and nonstocked lowlands suitable for regeneration (see Table 4.7). Soils analysis will also be done on more potential harvest sites prior to harvest. More specific management guidelines for the Area will be developed as additional soils information becomes available (see Appendix H for a discussion of soil resource interpretations specific to the Moose Lake Area).

Forest Soils Program Priorities for 1985-94

- Use soils information on sites that involve high levels of investment (e.g., sites undergoing species conversion, road construction, or site preparation).
- Use soils information in conducting management activities, including herbicide application, insect and disease management, timber sales, and timber stand improvement.

- Involve field foresters in training sessions on the use of soils information in forest management through silvicultural and soils workshops.
- Assist in developing management guidelines and productivity ratings on soils specific to the Area in order to provide foresters with interpretive information on forest soils.

Coordination With Other Divisions, Agencies, and Organizations

Over the next decade Area staff and the Regional Soils Specialist will increase cooperative efforts with the three Soil and Water Conservation Districts, primarily in conjunction with the PFM program. The Area staff and the Regional Soils Specialist will also cooperate with SCS in trying to make soil survey information useful to forest managers. All forest development projects will be reviewed by the Division of Waters to ensure that all facets are in compliance with state shoreland, floodplain, wild and scenic river and other public waters regulations.

Table 4.7
Moose Lake Area
Forest Soils Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|-----------------|------|------|------|------|------|------|------|------|------|------|------|
| <u>Budget</u> | | | | | | | | | | | | |
| 1. General Fund (Area) | \$(000's) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| <u>Staffing</u> (fte = full time equivalent) | | | | | | | | | | | | |
| Region (1) | fte | 0.04 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| <u>Objectives</u> | | | | | | | | | | | | |
| 1. Provide technical soils information on forest management intensification projects. | | | | | | | | | | | | |
| a. regeneration projects | acres | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| b. forest road projects | projects | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2. Assist in developing management guidelines and productivity ratings on soils specific to the Area in order to provide foresters with interpretive information on forest soils. | | | | | | | | | | | | |
| 3. Participate in soils workshops at the area level. | workshops | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 4. Regional Soils Specialist time in Moose Lake Area. | fte | .12 | .12 | .15 | .15 | .15 | .15 | .15 | .15 | .15 | .15 | .15 |

Notes:

(1) Virtually all the time spent in the Moose Lake Area by Area staff on the Forest Soils Program is charged to other programs. Therefore, staffing time shown on this table includes only time spent by the Regional Soils Specialist.

FISH AND WILDLIFE HABITAT MANAGEMENT PROGRAM

The goal of the Division of Forestry's fish and wildlife habitat management program is to ensure that integration of forestry and wildlife management takes place on state administered lands in accordance with the Wildlife/Forestry Coordination Policy so that wildlife populations are maintained at desirable levels. Typical activities include modifying the following forestry practices on lands under Division of Forestry jurisdiction to assure that fish and wildlife habitat is maintained or improved: timber harvest, reforestation, timber stand improvement, construction of openings, roads and trails, wildfire control, and prescribed burning. The Division of Forestry provides assistance to the Section of Wildlife in planning timber management on Wildlife Management Areas to obtain wildlife objectives. Regular meetings between the staffs of the Division of Forestry and the Division of Fish and Wildlife are an important part of maintaining coordinated management efforts. Interdisciplinary training of foresters and fish and wildlife managers is also conducted to promote improved management.

During F.Y. 1984 the Moose Lake Area spent 0.2 person years and \$6,200 on fish and wildlife habitat management efforts. Expenditures and personnel are projected to remain at current levels between F.Y. 1984 and F.Y. 1994.

Major emphasis for the next 10 year period should be placed on the following activities (see Table 4.8):

- Construction of wildlife openings in areas of greatest need such as large blocks of timber that are not sufficiently interspersed with agricultural lands. These large timbered blocks are, for the most part, located in the interior portions of the Nemadji, St. Croix, and Chengwatana state forests. Utilizing timber sale landings following harvest is the most desirable method for opening establishment. These landings are usually easy to locate for future opening maintenance by Section of Wildlife personnel.

- Construction of roads and trails primarily for timber access is a high ongoing priority. This activity makes timber more saleable, eliminates road construction expenses for the logger and provides greater habitat diversity for many wildlife species.
- Cooperation between divisions on the use of prescribed burning.
Prescribed burning can be an excellent tool for use in managing timber and creating wildlife habitat. Many of the present timber types were established as the result of fire. Many of these same fires were responsible for creating or maintaining vegetation types with great value as wildlife habitat. However, due to the risks involved with increased settlement and private landowners, burning must be conducted only under controlled conditions.
- Reforestation of harvested lands also provides an opportunity for wildlife habitat enhancement. More emphasis will be placed on providing travel lanes and openings and on selecting tree species that provide food and cover for various game and nongame wildlife.
- Integration of Forest/Wildlife Habitat Compartment information into the timber regulation program.
- Implementation of snag management recommendations. Maintain remnant white pines near water bodies as potential bald eagle nesting sites.
- Protection of colonial waterbird nesting sites.
- Identification of large areas of continuous forest cover to be protected from fragmentation.
- Protection of fisheries and water quality by maintaining buffer strips of vegetation along lake and stream margins; erosion control, especially on logging roads and harvested areas; proper design and location of stream crossings; use of pesticide application methods that prevent accidental contamination; and good age class diversity of timber stands for watershed protection.

Emphasis on Forestry/Wildlife coordination will not be limited to the activities discussed above, but must be maintained or increased for all activities. The activities mentioned here are those that have not had a great deal of emphasis in the past. Activities such as timber harvest have traditionally received more emphasis due to greater understanding of the

activities by both disciplines. Forestry/Wildlife coordination guidelines will address timber regulation, development of forest cover type composition goals, and an old growth policy for DNR administered lands.

Fish and Wildlife Habitat Management Priorities for 1985-94

- Integrate Forestry/Wildlife Habitat Management Guidelines into forest management activities.
- Obtain interdisciplinary training for foresters and fish and wildlife managers.
- Provide assistance to the Section of Wildlife in using timber management and silvicultural treatments on Wildlife Management Areas to attain wildlife management objectives.
- Participate in annual joint regional meetings with the Section of Wildlife to facilitate communications and to develop complementary goals.
- Coordinate timber management activities with the Section of Fisheries to assure protection of fisheries resources.
- Establish the Nemadji-Black Lake Bog Scientific and Natural Area.

Coordination With Other Divisions, Agencies and Organizations

The Division of Forestry will continue to cooperate with the Division of Fish and Wildlife in implementing the Wildlife/Forestry Coordination Policy and Guidelines and any future guidelines relating to fisheries/forestry coordination in the Moose Lake Area. Coordination of fish and wildlife management activities with other divisions, agencies and organizations in the Moose Lake Area will be deferred to the Division of Fish and Wildlife.

Table 4.8

Moose Lake Area
Fish and Wildlife Habitat Management Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|--------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| b. Supplies and Expenses | \$(000's) | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Total | \$(000's) | 6.2 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| 1. Area/District | fte | 0.2 |
| Objectives | | | | | | | | | | | | |
| Wildlife/Forestry Coordination Policy | | | | | | | | | | | | |
| 1. Integrate wildlife habitat management guidelines into forest management activities. | silvicultural treatments | | | | | | | | | | | |
| Meetings | | | | | | | | | | | | |
| 1. Participate in meetings with the Section of Wildlife to facilitate communications and to develop complementary goals. | meetings | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Technical Assistance | | | | | | | | | | | | |
| 1. Provide assistance to the Section of Wildlife in planning timber management or silvicultural treatments on Wildlife Management Areas to attain wildlife management objectives. | WMA's | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2. Obtain interdisciplinary training for foresters and fish and wildlife managers. | training sessions | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

LAND ADMINISTRATION PROGRAM

The goal of the Division of Forestry's land administration program is to maintain a state forest land ownership pattern that permits efficient multiple-use management and protection of forest resources. Achieving this goal requires not only an integrated effort among all administrative units of the division, but a close working relationship with the DNR Land Bureau, other DNR divisions, other public land agencies, the state legislature, and the private sector.

Land administration involves land acquisition, exchange, sales and leasing; land classification; and maintaining land records. The State Forest Management and Policy Supervisor in St. Paul is the main liaison with the Land Bureau. Area staff are involved in identifying proposed acquisitions, sales, leases, or exchanges; inspecting leases; and maintaining contacts with other agencies and individuals. Once the division has determined its land administration priorities and projects, the Land Bureau assumes follow-up responsibilities for negotiations, appraisals, record keeping, and other services.

In the Moose Lake Area the division currently administers 88 leases (Table 4.9). The majority are hunting cabin leases in the Nemadji, St. Croix, and Chengwatana state forests. The number and acreage of land exchanges, sales, and acquisitions from F.Y. 1980-83 are listed in Table 4.10. In addition, 121 acres are currently proposed for purchase as additions to the Dago Lake Day-Use Area and the Willow River Campground in the General C. C. Andrews State Forest. Four hundred eighty acres in T42-R19 have been offered to the DNR as a gift and are proposed for inclusion in state forest.

Table 4.9. Leases in the Moose Lake Area, July 1984.

| Type of Lease | Number of Leases |
|-----------------------|------------------|
| Hunting cabin sites | 50 |
| Utility rights-of-way | 15 |
| Other rights-of-way | 8 |
| Gravel | 3 |
| Agricultural | 3 |
| Miscellaneous | 9 |
| TOTAL | 88 |

Source: MN DNR Division of Forestry, Moose Lake Area Staff, 1984.

Table 4.10. Number and Acreage of Land Exchanges, Sales and Acquisitions in the Moose Lake Area, 1980-83 (Acres are given in parentheses).

| Activity | 1980 | 1981 | 1982 | 1983 |
|-------------------|--------|--------|--------|--------|
| Land exchanges | -- | 1 (59) | -- | -- |
| Land sales | -- | -- | 1 (40) | -- |
| Land acquisitions | 2 (45) | -- | 1 (28) | 1 (40) |

Source: MN DNR Division of Forestry and MN DNR Land Bureau, 1984.

This plan proposes a number of land administration activities designed to increase the efficiency of forest resource protection and management. Emphasis will be on reducing the overlap in DNR management unit boundaries and adding selected parcels of undedicated state land to management units. As a result of the recent amendment to the state constitution allowing exchange of tax-forfeited and trust fund land, there will be an attempt to consolidate ownership in state and county management units. Cooperative

land management agreements, sometimes suggested as an alternative to State-County land exchanges, have not received the support of the Minnesota Association of County Land Commissioners (Association meeting minutes dated 2/13/85).

No new hunting cabin leases will be offered and existing hunting cabin leases will be phased out whenever opportunities occur. Following considerable study and discussion, the Moose Lake Area will attempt to phase out hunting cabin leases wherever and whenever possible. The establishment of these leases dates back to a time when public demands on public lands were minimal. Present user pressures on public land are substantial and will continue to increase. Forest managers must attempt to provide recreational and resource users an optimum in opportunities while protecting the land and other resources. Hunting cabin leases do not fit this management philosophy as they limit the use to individuals.

Over the years managers have experienced many problems stemming from lease holder expectations and demands. Lease holders tend to treat their lease and surrounding lands as "their private domain." In some cases they expect excellent access maintained while in other cases they complain when roads are constructed or improved. Lease holders often complain when new recreation trails are constructed near their cabins or when logging takes place. Due to these concerns and others, the following procedures will be followed:

1. Whenever a hunting cabin lease expires, it will be eliminated and will not be available for future use.
2. When the conditions of a hunting cabin lease are violated, and/or not corrected within the prescribed time, the lease will be terminated and discontinued.
3. Requests for hunting cabin lease transfers will be closely scrutinized and considered for elimination.
4. No new hunting cabin leases will be authorized.

Land Administration Program Priorities for 1985-94

- Administer leases on state lands in compliance with DNR policies and regulations.
- Add undedicated state lands listed in the Land Management Plan to state forests and other DNR management units.
- Propose boundary changes and transfers of administrative control to reduce or eliminate overlapping of DNR management units.
- Consolidate state and county management units through exchange of tax-forfeited and trust fund lands.
- Obtain legal access to selected forest resource management compartments identified in the Land Management Plan.
- Encourage donations of land or easements in return for tax benefits.
- Phase out hunting cabin leases.
- Establish the Nemadji-Black Lake Bog Scientific and Natural Area.

Coordination with other Divisions, Agencies, and Organizations

Most of the proposed transfers of administrative control involve the Division of Forestry and Division of Fish and Wildlife. Smaller transfers may also involve the Division of Parks and Recreation and the Trails and Waterways Unit. All divisions will be involved in reviewing specific land exchange proposals that are developed within the framework outlined in the Land Management Plan. Joint DNR/Pine County and DNR/Carlton County committees should be established to define state and county management units and to propose specific land exchanges. The DNR Land Bureau should expect an increase in transfer of administrative control and land exchange proposals as a result of this plan. The Division of Forestry and the National Park Service should continue to coordinate land and resource management activities along the St. Croix River.

Table 4.11
Moose Lake Area
Land Administration Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|-------------------|------------|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| b. Supplies and Expenses | \$(000's) | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Total | \$(000's) | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| Area | fte/year | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Region | fte/year | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Total | fte/year | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Objectives | | | | | | | | | | | | |
| Leases and Permits | | | | | | | | | | | | |
| 1. Provide for field supervision, administration, and service for leases and related requests on state lands administered by the Division of Forestry. | | | | | | | | | | | | |
| a. hunting cabin leases | leases | 50 | 48 | 46 | 44 | 42 | 40 | 38 | 36 | 34 | 32 | 30 |
| b. other leases | leases | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| Acquisition, Sale, Exchange, or Transfer (1) | | | | | | | | | | | | |
| 1. Initiate or review land adjustment proposals involving DNR administered lands. | | | | | | | | | | | | |
| a. surplus land sales or exchange | acres | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0 | 0 |
| b. exchanges with counties (DNR land to be exchanged) | acres | 0 | 10-year goal is to exchange 5,000 acres | | | | | | | | | |
| c. transfers of admin. control | acres | 0 | 500 | 640 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| d. acquisition by purchase or gift | | | | | | | | | | | | |
| - land | acres | 0 | 122 | 105 | 160 | 240 | 400 | 280 | 200 | 200 | 200 | 200 |
| - access easements | miles | 0 | 0 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| - Soo Line right of way (19 miles) | acres | -- | -- | -- | 420 | -- | -- | -- | -- | -- | -- | -- |
| 2. Establish joint DNR/County land adjustment committees. | committees active | no | no | yes | yes | yes | yes | yes | ? | ? | ? | ? |

TIMBER MANAGEMENT PROGRAM

The goals of the Moose Lake Area's timber management program are 1) to maintain state lands in the appropriate cover types, stocking densities, and growth rates to secure optimum public benefits consistent with multiple-use, sustained-yield forest management; and 2) to continue to supply the Area's market share of timber for harvest.

The timber management program includes two major functions: timber stand regeneration and regulation of harvest. To a lesser degree it also includes some timber stand improvement functions, primarily release and pruning. Timber stand regeneration involves coordinating regeneration plans with timber harvest to assure state lands are maintained in appropriate cover types to meet future multiple-use demands. The major purpose of regulating harvests is to promote sustained yields of all forest products. These functions are accomplished through coordination of various aspects of timber scaling, sales, timber harvest, stand regeneration, and stand maintenance.

The timber management program is funded from a variety of sources including BWCAW, Forest Management Intensification, Forest Management Fund (Trust Fund and other), and State Forest Development. It is very difficult to break these funding sources down to less than a region level. The percentage of each funding source spent in the area is very similar to that of the funding source for the region. In general 25.4% of the regional timber management budget comes from the BWCAW funds, 9% from Forest Management Intensification (General Fund), 55% from the Forest Management Fund, and 10.4% from State Forest Development Fund. In addition, money is spent in the area on timber management projects which are beneficial for both wildlife habitat management improvement and timber management. These additional funds come from the Game and Fish Fund.

The timber management program was responsible for the sale of approximately 11,500 cords of timber from state owned lands in 1984. At the present time approximately 230 acres of recently harvested and understocked lands are reforested annually. This figure will increase significantly as more

timber is harvested. Timber stand improvement (TSI) activities are expected to increase from 400 acres in 1983 to more than 1,500 acres in 1994.

In 1984 the budget for the timber management program was \$231,200 and staffing involved 5.2 full-time equivalents. To meet the projected timber management targets the average annual budget will have to increase to \$275,000 by 1994. In the event that there is no new staffing, other arrangements will have to be made such as hiring consultants or contracting for services. If use of consultants or contracts is increased, administrative costs will go up. A portion of the budget increase is due to the fact that, at the present rate of planting, the Division will have to spend about \$10,000 per year to purchase seedlings when the nursery is put on a self-supporting basis in fiscal year 1985.

Timber Stand Regeneration

All regeneration projects involve pest management considerations and efforts to promote species diversity within management blocks and optimize tree vigor on each site. Soils considerations are also important to ensure that species planted match site conditions, and that the site is capable of handling the machinery needed for TSI and harvest activities. Pest management and soils are discussed in more detail in their respective program narratives.

There are three forest regeneration objectives in the Moose Lake Area. The first objective is to regenerate an equivalent amount of acreage as is harvested each year. This is to be accomplished primarily by natural sprouting or seeding of those stands that should and can be adequately restocked by themselves. Clearcuts, stripcuts, or some form of shelterwood cuts are normal practices. The second objective is to regenerate recently cut-over stands that likely cannot restock themselves in a short period of time or should be regenerated to a more suitable species. This involves mechanical, chemical, or mechanical-chemical site preparation, followed by artificial planting or seeding. The third objective is to regenerate the unstocked and understocked sites. Regeneration without harvest techniques will be used to restock the understocked stands which are primarily

overmature aspen stands. The vast majority of unstocked sites are lowland sites with a brush or grass cover type. There are, however, many factors to consider prior to any management actions:

1. Has the site ever produced a commercial stand?
2. Why is the site unstocked presently?
3. What conditions are present to prevent future stand establishment?
4. What measures will be required to deal with the factors and conditions investigated in numbers 1, 2 or 3? These measures may include activity only in dry years to facilitate access; draining excess water; using only crawlers with wide pads, bedding equipment for site preparation, or lowland tree planters; or a combination of these measures.
5. What are the treatment options for release and timber stand improvement? These options include special herbicides and application techniques, mechanical treatment, or chemical-mechanical treatment.
6. What are the wildlife values of the site in its present condition, and how will these values be affected by the proposed management actions?

Regulation of Harvest

The main objective of regulated harvest is to provide a continuous, stable supply of wood fiber. To meet this objective, measurement and sales functions must be coordinated with regulated harvest and regeneration programs. These two activities include measurement research, scaling, check scaling, training sessions, and timber sales administration.

With completion of the Phase II forest inventory in the Moose Lake Area, Area staff will use a computer program to develop annual targets for harvest and regeneration (see Appendix E for details). The timber regulation program is designed to assist in making timber management decisions by helping Area personnel handle the vast amount of data collected during the area Phase II forest inventory. A key element used in implementation of the management plan for the Area will be the timber management program developed through use of the timber regulation program. The timber management program will include:

1. The forest regulation base and stands to be regenerated without harvest.
2. The clear cut base and stands to be regenerated following harvest.
3. The recommended regeneration treatments for acreage to be regenerated.
4. A regulation scheme for the rotation that, as far as practical, provides for approximately the same amount of acreage by 10 year age class after all of the stands included initially in the forest regulation base have been treated.
5. The selective cut base and stands to be selectively cut or thinned.

During 1985-89 there will probably be considerable applied research on how to treat unstocked stands but little physical accomplishment. The period from 1990-94 should produce large gains in the acreage reclaimed through the effective use of knowledge acquired over the previous five years. Along with acquiring the expertise to deal with lowland reclamation, the availability of specialized equipment will be an important aspect in reaching the goals and objectives. The emphasis should be concentrated on the larger sites which were previously forested.

Timber Management Program Priorities for 1985-94

- Prepare and maintain a regulated harvest timber management plan for the area.
- Continue to supply the state market share of the timber harvested within the Area.
- Conduct an intensive regeneration program to maintain a sustained-yield of forest products, including regenerating overmature, non-merchantable timber without harvest to insure that timber stands remain productive.
- Conduct timber stand improvement activities in accordance with Division guidelines.
- Carry out general forest management activities to protect against encroachment or damage to forest resources.

Coordination With Other Divisions, Agencies, and Organizations

The Timber Management Program requires coordination with several other DNR Divisions, but especially with the Division of Fish and Wildlife. Although the Division of Fish and Wildlife has the primary responsibility for management of fish and wildlife populations, the Division of Forestry is responsible for habitat management on Forestry administered lands. Since wildlife management is such a major concern on Forestry administered lands, the divisions of Fish and Wildlife and Forestry have prepared a comprehensive policy for coordination to insure that forest management practices result in achievement of the objectives of both divisions.

Fisheries management is also an important concern in forest management, although a specific policy has not been developed for coordination. In most cases fish management concerns are insured by public waters and protected wetlands regulations. Proposed forest development projects will be reviewed by the Division of Waters to ensure compliance with all public waters and floodplain regulations.

Area staff will be expected to help other divisions develop timber management plans for other DNR administered lands. For example, area staff will assist the Division of Parks and Recreation in determining a timber regulation scheme for state parks in the area upon request.

The Area staff will still be expected to coordinate timber management with the three counties in the Moose Lake Area. Coordination with Kanabec and Carlton counties will probably remain at its current low level. Coordination with Pine County will probably change considerably because of their recently adopted forest management plan and the hiring of a professional forester. Involvement will change from direct management of county administered land toward trying to achieve common management objectives.

Involvement with private industry, primarily coordination of access to timber lands, will probably continue at the present level.

Table 4.12
Moose Lake Area
Timber Management Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 133.0 | 163.7 | 166.3 | 166.3 | 166.3 | 166.3 | 168.8 | 171.4 | 173.9 | 173.9 | 173.9 |
| b. Supplies and Expenses | \$(000's) | 32.6 | 40.1 | 40.7 | 40.7 | 40.7 | 40.7 | 41.3 | 42.0 | 42.6 | 42.6 | 42.6 |
| 2. Forest Development | \$(000's) | 65.6 | 47.8 | 68.0 | 68.0 | 68.0 | 68.0 | 68.0 | 68.0 | 68.0 | 68.0 | 68.0 |
| Total | \$(000's) | 231.2 | 251.6 | 275.0 |
| Staffing (fte = full time equivalent) | fte (1) | 5.2 | 6.4 | 6.5 | 6.5 | 6.5 | 6.5 | 6.6 | 6.7 | 6.8 | 6.8 | 6.8 |
| Objectives | | | | | | | | | | | | |
| Management Plans | | | | | | | | | | | | |
| 1. Prepare and maintain timber management plan for Area to address sustained-yields, regulated forests, regeneration needs, and forest areas suitable for energy production (fuelwood). | plans | 1 | | 1 | | | | | | | | |
| 2. Encourage coordination of resource management activities on different ownerships | meetings | 5 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Timber Harvest | | | | | | | | | | | | |
| 1. Continue to offer for sale the market share of timber within the area. | | | | | | | | | | | | |
| a. Appraise, offer for sale, and supervise the harvest of timber on state lands (include fuelwood). | acres | 2179 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| - clearcut | acres | 716 | 1140 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 | 1150 |
| - partial cut | acres | 308 | 378 | | | | | | | | | |
| - salvage | acres | 449 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|-----------------|------|------|------|------|------|------|------|------|------|------|------|
| 2. Appraise and supervise the sale of special fuelwood permits on state lands. | permits | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| 3. Scale or account for the volume of wood harvested on state land that requires measurement after cutting. | cords | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 |
| a. Administer and supervise of consumer scale agreements. | agreements | 6 | 14 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Forest Regeneration | | | | | | | | | | | | |
| 1. Conduct regeneration surveys on all natural regeneration, plantations, and seedlings as scheduled. | acres | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| 2. Regenerate an equivalent amount of acreage as is harvested each year. | acres | 600 | 1165 | 1340 | 1340 | 1340 | 1340 | 1340 | 1340 | 1340 | 1340 | 1340 |
| 3. Regenerate recently cut-over stands. | acres | 98 | 83 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 |
| 4. Regenerate unstocked or under-stocked state lands. | acres | 156 | 90 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| Timber Stand Improvement | | | | | | | | | | | | |
| 1. Conduct TSI in accordance with the Division's guidelines. | | | | | | | | | | | | |
| a. chemical release | acres | 450 | 150 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| b. mechanical release | acres | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| c. pruning | acres | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| d. non-commercial thinning | acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(1) Staffing for 1984 is based on time summary figures for that year. Staffing for 1985 is based on a 3-year average plus the 1984 Workload Analysis. Projections for F.Y. 1987 through 1994 show an increase based on the analysis and projections that more time consuming factors will be influencing how timber sales are made.

COUNTY ASSISTANCE PROGRAM

The goal of the County Assistance Program (CAP) is to improve the efficiency and effectiveness of county forest management programs. Towards this end, CAP provides professional forest management support to counties in their efforts to intensify the multiple-use, sustained-yield management of county administered tax-forfeited lands. This assistance is tailored to meet a variety of needs, and is intended to complement the management efforts of the counties involved. In addition to CAP, Area forestry personnel are available to assist with county land and timber sale appraisals and timber sale reviews.

There are no full-time CAP foresters assigned to the counties in the Moose Lake Area. During fiscal year 1984, a vacant CAP position was temporarily used to develop a forest management plan for Pine County's 45,000 acres of tax-forfeited land. For fiscal year 1985 state cost share funds will be provided to foster plan implementation. Beginning in F.Y. 1986, CAP assistance will be provided on a project basis. Division of Forestry personnel also work with the Kanabec County Auditor to manage that county's 10,500 acres of tax-forfeited land. Land Commissioners in Pine and Carlton counties are responsible for tax-forfeited land management in those counties.

Carlton County has expressed interest in developing a forest management plan for that county's approximately 72,500 acres at some point in the future. Plans also call for CAP efforts to encourage Kanabec County to become more actively involved in the management of the county's tax-forfeited forest lands.

County Assistance Program Priorities for 1985-94

- Assist counties in the development of comprehensive forest management plans.
- Encourage greater state-county cooperation in all phases of management activities.
- Cooperate with counties in recreation resource development on county lands.

- Provide counties with specialized technical assistance and advisory support upon request (e.g., aerial photo interpretation, insect and disease assistance, forest inventory and mapping, silvicultural techniques, coordination of timber and recreation).

- Review county timber sales for accuracy of appraised timber values and silvicultural practices.
- Assist in planning and conducting forest development projects on county lands.
- Review and make recommendations regarding the sale or exchange of county land.

Coordination With Other Divisions, Agencies And Organizations

The CAP program fosters improved cooperative relations between the state and counties in the management of public forest lands. Closer cooperation, particularly in the areas of forest inventory, road building, land exchange, timber harvest, land classification, and forest development projects, can benefit both the state and counties in effectively managing the forest resource. Both Area and CAP staff will continue to work closely with Carlton, Kanabec and Pine counties in efforts to intensify the management of county forest lands.

Table 4.13
Moose Lake Area
County Assistance Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 25.6 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 |
| b. Supplies and Expenses | \$(000's) | 6.3 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Total | \$(000's) | 31.9 | 15.9 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| 1. CAP (1) | fte | 0.8 | 0.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2. Area | fte | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Total | fte | 1.8 | 1.0 | 1.0 | 0.5 |
| Objectives (2) | | | | | | | | | | | | |
| Technical Assistance | | | | | | | | | | | | |
| 1. Encourage increased county forest management staffing. | fte of county staff | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 2. Increase timber harvest levels on county lands consistent with multiple-use, sustained-yield forest management principles. - timber and fuelwood | M cords | 10 | 15 | 15 | 20 | 25 | 25 | 25 | 30 | 30 | 30 | 30 |
| 3. Increase site preparation and tree planting on county lands. | | | | | | | | | | | | |
| a. site preparation | acres | 150 | 150 | 150 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 |
| b. tree planting | | | | | | | | | | | | |
| - bare root stock | MM seedlings planted | 125 | 125 | 125 | 145 | 145 | 145 | 145 | 145 | 145 | 145 | 145 |
| - containerized stock | MM seedlings planted | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| 4. Assist counties in the development of comprehensive forest management plans. | | | 1 | -- | 1 | 1 | -- | -- | -- | -- | -- | -- |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|-----------------|------|------|------|------|------|------|------|------|------|------|------|
| 5. Conduct joint state-county training sessions, hold regular staff meetings, and participate in cooperative management projects to improve coordination between state and county forest management programs. | | | | | | | | | | | | |
| a. joint DNR-county meetings | meetings | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| b. cooperative projects | projects | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| 6. Assist in county land sales and exchanges. | | | | | | | | | | | | |
| a. land sales | acres | 300 | 1000 | 500 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| b. exchanges | number | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 7. Review county timber sales for accuracy of appraised timber values and silvicultural practices. | | | | | | | | | | | | |
| a. timber permits | permits | 20 | 30 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| b. fuelwood permits | permits | 100 | 150 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| 8. Assist counties in improving timber sales administration and encourage increased use of timber auction sales. | auction permits | 1 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 9. Process timber trespass cases. | cases | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Administrative Assistance | | | | | | | | | | | | |
| 1. Assist counties in planning and conducting timber development projects. | projects | 10 | 12 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

Notes:

- (1) County Assistance Program (CAP) foresters are not considered to be Area staff.
- (2) The objectives are for total accomplishments in Pine, Kanabec and the southern half of Carlton counties, not just accomplishments attributable to CAP budget and staff. The objectives include increased effort by a Pine County Forester. CAP will provide one-half of the Pine County Forester's salary and benefits in 1985 and 1986. The position will be fully funded by the county thereafter.

PRIVATE FOREST MANAGEMENT PROGRAM

The goal of the private forest management (PFM) program is to provide for improved multiple-use forest resource management on NIPF lands to benefit the landowners, economy, and environment of Minnesota. The division's strategy for achieving this goal involves improving forest management on NIPF lands by targeting assistance to those landowners who make a commitment to manage their land and by taking into account regional and landowner differences. The PFM program promotes retention and management of NIPF lands through cost-share and tax incentive programs. Multiple-use management and environmental protection are emphasized.

Typical PFM activities in the Moose Lake Area include: 1) promoting forest management through personal contacts with landowners and the use of the media; 2) conducting educational workshops, clinics, and field days; 3) developing multiple-use management plans for landowners; 4) providing technical and financial assistance for management practices such as tree planting and timber stand improvement; and 5) providing utilization and marketing assistance associated with timber harvesting. There are currently 359 land management plans covering 16,219 acres of private forest land in the Area.

The Moose Lake Area has one area staff forester assigned almost full-time to PFM. The five District Foresters and their technicians also conduct a substantial amount of PFM fieldwork, which amounted to 1.4 person years in FY 1984. The proposed program calls for increasing the area's PFM effort from 2.2 person years in FY 1984 to 3.5 person years by FY 1994, including 1.7 years of effort by District Foresters and technicians. Funding for technical assistance is projected to increase from 70,100 in FY 1984 to 79,600 per year by FY 1994.

In the next 10 years the Moose Lake Area would like to increase accomplishments in two key areas: timber stand improvement (TSI) and reforestation. Goals in other target areas will not be sacrificed for the sake of TSI or reforestation; rather, existing strategies will be reemphasized and new strategies tried.

TSI in hardwood stands will receive more emphasis. Crop tree release and cull tree removal will be integrated more with fuelwood harvesting. More work will be done in developing vendors for release work and thinning of pine plantations. Much work needs to be done in these areas, as vendors are difficult to find. Review of old management plans and more active followup of recent plans should also provide additional potential for greater TSI accomplishments.

Reforestation goals will also be increased slightly. One of the big needs in the Area to help accomplish these goals is to obtain a simazine sprayer and attach it to the planting machine. This attachment would greatly facilitate ease of site preparation and survival of plantings. In addition, modifying the machine to have a live or manual hydraulic hook-up would make planting much easier, as the manual pumping of the standing knife/coulter is very tiring.

An aerial survey of potential planting sites should be done to find planting sites. District involvement will be needed here. Also, as with TSI, vendor development is needed, especially in the area of chemical/mechanical site preparation.

Both target areas, TSI and reforestation, will be developed gradually over a period of years and greater amounts of District participation will be needed to make the efforts successful.

Private Forest Management Program Priorities for 1985-94

- Provide management planning assistance on 4,900 acres of nonindustrial private forest (NIPF) land each year by 1994.
- Increase the number of NIPF landowners assisted annually to 415 by 1994.
- Improve the quality of management on NIPF lands through educational programs, technical assistance, and other means.
- Expand the role of consulting and industrial foresters in private forest management.

- Promote multiple-use management on NIPF lands.
- Reduce the rate of conversion of NIPF land to non-forest uses.

Coordination With Other Divisions, Agencies, and Organizations

Much of the PFM Program's effectiveness depends upon maintaining good working relationships with other agencies and organizations. The PFM Program helps administer the American Tree Farm Program, which is sponsored by the American Forest Institute and supporting forest products firms. There are currently 145 Tree Farms in the Area. Tree Farms will be inspected once every five years to help insure needed followup and to keep accomplishments high. Greater participation by private landowners in the Tree Farm Program will be encouraged. Because they improve the Area staff's abilities to market timber sales, additional contacts with private industry are also beneficial and will be pursued.

Since cost-sharing assistance is available to landowners for activities such as site preparation, tree planting, release, and thinning from individual county ASCS offices, it is essential that the PFM Forester maintain rapport with the ASCS offices and handle all aspects of technical assistance and paperwork between the landowner and the ASCS offices. The ASCS has monthly meetings in which the county committee approves or disapproves all forestry cost-sharing practices. Many times it is beneficial for the forester to attend the meetings to explain any of the particulars involved with various practices. Area staff will attend at least one county ASCS meeting per month.

The Soil Conservation Service often contacts landowners with woodlands that need management beyond the scope of SCS expertise. Many of these contacts are referred to the PFM Specialist, so maintaining good rapport with the District Conservationist and District Board is desirable. A positive working relationship will be maintained with the SCS, the local Soil and Water Conservation Boards, and other governmental agencies such as the University of Minnesota, County Extension Offices, and the U.S. Forest Service. The University of Minnesota and the County Extension Offices

provide up to date educational materials on forestry subjects and are partners with the Division of Forestry in conducting certain educational activities.

The PFM Program promotes the educational aspects of forestry to the general public by handling forestry field tours, workshops, and seminars. Assistance from private landowner associations and the Minnesota Forestry Association is important in carrying out these activities, so rapport with these associations will also be maintained.

PFM practices often affect resources that are managed primarily by other DNR divisions. Therefore, open communications will be maintained with appropriate divisions, especially the Division of Fish and Wildlife.

Table 4.14

Moose Lake Area
Private Forest Management Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 56.3 | 56.3 | 58.8 | 87.0 | 89.6 | 89.6 | 89.6 | 89.6 | 89.6 | 89.6 | 89.6 |
| b. Supplies and Expenses | \$(000's) | 13.8 | 13.8 | 13.8 | 14.4 | 21.3 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 |
| 2. Technical Ass't. and Support | \$(000's) | | | | | | | | | | | |
| Total | \$(000's) | 70.1 | 70.1 | 70.1 | 73.2 | 108.3 | 111.6 | 111.6 | 111.6 | 111.6 | 111.6 | 111.6 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| 1. Area/District | fte | 1.4 | 1.4 | 1.4 | 1.5 | 1.6 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| 2. PFM Forester | fte | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| Total | fte | 2.2 | 2.2 | 2.2 | 2.3 | 3.4 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Objectives | | | | | | | | | | | | |
| State and Federal Cooperative Targets | | | | | | | | | | | | |
| 1. Number of Assists | assists | 350 | 290 | 300 | 315 | 458 | 475 | 475 | 475 | 475 | 475 | 475 |
| 2. Forest Land Management Plans | plans | 58 | 85 | 90 | 94 | 139 | 140 | 140 | 140 | 140 | 140 | 140 |
| 3. Reforestation | acres | 274 | 260 | 270 | 270 | 413 | 427 | 427 | 427 | 427 | 427 | 427 |
| 4. Timber Stand Improvement | acres | 397 | 300 | 310 | 315 | 469 | 476 | 476 | 476 | 476 | 476 | 476 |
| 5. Wildlife Habitat Improvement | acres | 76 | 339 | 355 | 355 | 532 | 532 | 532 | 532 | 532 | 532 | 532 |
| 6. Recreation Improvement | acres | 4 | 45 | 47 | 47 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| 7. Management Plan Acres | acres | 4,095 | 3,000 | 3,000 | 3,150 | 4620 | 4900 | 4900 | 4900 | 4900 | 4900 | 4900 |
| 8. Watershed Protection | acres | | | | | | | | | | | |
| 9. Timber Harvested (1) | M cords | 7 | 4 | 4 | 4.2 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| | number | 52 | 32 | 33 | 33 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | acres | 470 | 500 | 520 | 545 | 784 | 812 | 812 | 812 | 812 | 812 | 812 |
| | MBF | 678 | 314 | 325 | 325 | 497 | 497 | 497 | 497 | 497 | 497 | 497 |
| 10. Referrals to Consultants | referrals | 23 | 25 | 26 | 26 | 39 | 39 | 39 | 39 | 39 | 39 | 39 |
| Informational and Educational Programs | | | | | | | | | | | | |
| 1. Conduct tree planting clinics. | clinics | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2. Sponsor forestry field days. | field days | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|---------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| 3. Conduct vendor training sessions. | sessions | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 4. Write newspaper releases. | releases | 12 | 12 | 12 | 12 | 18 | 20 | 20 | 20 | 20 | 20 | 20 |
| 5. Provide Tree Farm Program assists. | reinspections new Tree Farms | 25 | 20 | 20 | 20 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| 6. Conduct general PFM education programs | sessions | 10 | 10 | 11 | 11 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| | | 15 | 15 | 15 | 16 | 24 | 25 | 25 | 25 | 25 | 25 | 25 |
| Training Sessions | | | | | | | | | | | | |
| 1. Attend PFM workshops. | workshops | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2. Attend other training sessions (taxation, planning and zoning, etc.). | sessions | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Meetings With Other Agencies | | | | | | | | | | | | |
| 1. Attend county ASC development meetings. | meetings | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 |
| 2. Attend county ASC monthly meetings. | meetings | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| 3. Attend county SWCD meetings. | meetings | 4 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 4. Attend county planning and zoning meetings. | meetings | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 |

(1) Drop from 1984 to 1985 due to large timber salvage effort in 1984.

URBAN FORESTRY PROGRAM

Urban forestry is the term used to describe those forest management practices applied in areas where trees and associated plants grow individually, in small groups, and under forest conditions within cities, towns, and their suburbs. However, "urban forestry" is the term that should be used any time or anywhere forestry practices are prescribed and/or performed on trees and associated plants grown for ornamental purposes or managed for the aesthetic pleasure they bring.

The goal of the Division's urban forestry program is to help cities, towns, and suburbs maintain and improve their community forests and to assist private homeowners, no matter where they are located (on a farm, near a lake shore, in a small town or large metropolitan area), with the management of any trees or associated plants they are growing for ornamental, aesthetic, or conservation purposes.

The private forest management specialist coordinates all urban forestry activities occurring in the Moose Lake Area. Combining private forest management and urban forestry responsibilities has caused confusion for the specialist. Occasionally it is difficult to determine what activity belongs to what program. Private forest management involves helping homeowners upgrade their woodlots through accepted timber stand improvement and reforestation practices. Urban forestry involves helping a community, regardless of size, plan its overall forestry program, including the development of tree inventories, management plans, city tree ordinances, and budgets. Advice and assistance are given to community officials and private homeowners in the selection of plant materials, planting techniques, and spacing and location of trees in urban and residential areas. This aid helps these community officials and private homeowners develop wildlife habitat, improve watershed areas, minimize soil erosion, establish windbreaks, and manage trees and associated plants for the aesthetic pleasure they bring. Identifying the many insect and disease problems that affect municipal and residential trees is a particularly important urban forestry responsibility of the Area. Any work involved with school and municipal forests is also considered urban forestry.

The Area's urban forestry effort in F.Y. 1984 was 0.2 person years. It is doubtful that this figure will increase in the years to come since funding for the program has been so erratic. There will be some new initiatives made, however. The Area will focus on assisting each major municipality within its jurisdiction in developing a tree planting program and on promoting Arbor Day activities within as many schools and communities as possible. If the Division's proposed grant program for urban forestry is accepted and additional funds and responsibilities are assigned to the field offices, the Area's urban forestry activities and person years of effort will increase.

Urban Forestry Program Priorities for 1985-1994

- Increase the number of Arbor Day activities occurring in schools and municipalities.
- Assist communities with the development of tree planting programs, tree management plans, city tree ordinances, forestry budgets, and the utilization or disposal of urban forest resource wastes.
- Identify for homeowners and communities the insect and disease problems affecting residential and public trees.
- Increase the number of school and municipal forests.
- Distribute news releases concerning local urban forestry activities to the media and provide urban forestry information (pamphlets, books, etc.) to interested individuals.
- Nominate and confirm candidates for the Division's Native Big Tree Registry.
- Cooperate, when possible, with other agencies such as the Soil Conservation Service and the County Extension Service in all urban forestry efforts.
- Acquaint community developers with the benefits of urban forest management and encourage them to protect existing vegetation at construction sites.

Coordination with Other Divisions, Agencies and Organizations

The Area will be working primarily with the city councils and town boards. The Soil Conservation Service and the County Extension Service might become involved in the Area's urban forestry activities. At the community level, the Division of Fish and Wildlife, with its nongame wildlife program, might also be a participant in some urban forestry efforts. The Area will certainly assist schools with Arbor Day projects and school forest management. To protect building sites from ongoing construction damage, the Area will work with community developers. Organizations like the Minnesota Forestry Association will be contacted regarding tree distribution programs.

Table 4.15
Moose Lake Area
Urban Forestry Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| <u>Budget</u> | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| b. Supplies and Expenses | \$(000's) | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Total | \$(000's) | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| <u>Staffing (fte = full time equivalent)</u> | | | | | | | | | | | | |
| Total | fte | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| <u>Objectives</u> | | | | | | | | | | | | |
| To Promote Urban Forest Management Within the Area | | | | | | | | | | | | |
| 1. Assist communities with Arbor Day activities. | projects | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| 2. Assist communities with the development of tree planting programs, tree management plans, city tree ordinances, and forestry budgets; with the utilization or disposal of urban forest resource wastes; and with the distribution of any monetary grants that might be available. | assists | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 |
| 3. Help homeowners and communities identify insect and disease problems affecting their trees. | assists community individual | 140 | 135 | 135 | 135 | 130 | 130 | 130 | 125 | 125 | 120 | 120 |
| 4. Participate in the development and maintenance of school and municipal forests (inspections, timber sales, educational events). | activities | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 5. Work with the media concerning local urban forestry efforts. | activities | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 6. Nominate and confirm candidates for the Division's Native Big Tree Registry. | inspections | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 7. Cooperate with other agencies on urban forestry activities. | projects | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| 8. Assist community developers with the protection of existing vegetation at construction sites. | assists | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

FOREST RESOURCE INVENTORY PROGRAM

The goal of the forest resource inventory program is to collect and maintain the data needed to develop effective forest management plans to meet present and anticipated demands for forest resources. The Division's forest inventory unit examines forest lands to determine the location and condition of various forest resources. On timbered lands species distribution, size class, density, productivity, and operability are recorded.

The "Phase II" forest inventory has been completed on all Department of Natural Resources administered land within the Area. The Phase II forest inventory is based on a field examination of each stand on state and county administered land. Field work was completed in 1983 and computer data entry was completed in 1984. The primary outputs of the "Phase II" inventory are township maps showing the location of each stand and computerized files of inventory data.

During F.Y. 1983 the Area committed 1.64 person-years of effort and spent approximately \$40,000 on forest resource inventory. The proposed program decreases the annual time spent on forest inventory to 1 person-year.

An important feature of the inventory is the ability to record changes in the forest cover due to harvest, fire, planting and other activities. Area staff will be responsible for submitting changes to the Grand Rapids inventory staff to insure the inventory records are up to date. The alterations are primarily caused by changes due to fire, silvicultural treatments, timber sales, or acquisitions and sales of land.

In addition to maintaining Phase II forest survey data, there will be increased efforts to inventory nonindustrial private forest lands in the Moose Lake Area. Carlton County is being inventoried as a pilot project and is scheduled for completion in 1986. Pine and Kanabec counties are not scheduled for private lands inventories.

The Area is responsible at least once during the planning cycle for transfer of section corner locations from district 9x9 aerial resource photos to the Area set and for distribution of both sets. The Area is also responsible for final review and acceptance of all 9x9 high altitude air photos. A final responsibility of the Area staff is to provide Phase II inventory to other resource managers. This involves determining what information the managers need, ordering it from Grand Rapids and distributing it to the person who requested it.

Forest Resource Inventory Program Priorities for 1985-94

- Maintain the alterations records to keep the computer files and maps up to date.
- Provide maps and summaries of forest inventory information to other land managers with management responsibilities on state lands.
- Transfer section corners and distribute 9x9 resource photography.
- Obtain supplemental (35mm format) air photos of specific project areas.
- Assist the Grand Rapids inventory staff in planning for a program to reevaluate and update the Phase II inventory data for the Area at ten year intervals.
- Assist in planning, designing, and implementing an inventory program for nonindustrial private forest lands.

Table 4.16
Moose Lake Area
Forest Resource Inventory Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|------------------|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 15.3 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 |
| b. Supplies and Expenses | \$(000's) | 3.7 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Total | \$(000's) | 19.0 | 12.7 |
| Staffing (fte = full time equivalent) | fte | 0.6 | 0.4 |
| Objectives | | | | | | | | | | | | |
| Phase II - State and County Lands | | | | | | | | | | | | |
| 1. 10-year reevaluation. | acres | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2. Data maintenance. | alterations | To be completed later | | | | | | | | | | |
| Non-Public Land Cover Type Assessment (B) | | | | | | | | | | | | |
| 1. Assist in carrying out nonpublic land survey. | acres/year | 220,000 | 110,000 | | | | | | | | | |
| Aerial Photography | | | | | | | | | | | | |
| 1. Transfer of section corners on 9x9 air photos. | sq. miles | 287 | 287 | 287 | 287 | 287 | 287 | 287 | 287 | 287 | 287 | 287 |
| 2. Obtain 35mm format aerial photographs. | acres | -- | 150 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Services | | | | | | | | | | | | |
| 1. Provide maps and summaries of inventory information on request. | requests | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |

UTILIZATION AND MARKETING PROGRAM

The goal of the Utilization and Marketing (U & M) Program is twofold: to improve the utilization of the forest resource through increased harvesting and processing efficiency, and to increase the utilization of currently under-utilized forest resources through marketing and economic development of the products industries.

In Moose Lake there is a need to promote efficiency in harvesting and processing, which will lead to improved and increased utilization of the Area's timber resources. The demand for forest resources in Minnesota will approach net growth within the next twenty years. As Minnesota continues to expand its forest products industries and more demand is shifted to the Moose Lake Area, it will become critical that wise and prudent utilization be made of our existing resources.

Responsibilities for implementation of the U & M Program lie mainly with the Region and St. Paul staff. However, the Area staff does have the responsibility to recognize situations where U & M assistance is needed and to request specialized help. The Area staff also assists in various aspects of the U & M Program.

The six major program categories that the U & M staff are involved in include:

- Primary processing
- Secondary processing
- Resource analysis and industrial development
- Marketing
- Fuel and by-products
- Harvesting

The Moose Lake Area staff is involved in the following U & M activities:

- Conducting programs to salvage wood lost through fire, flood, and insects and diseases
- Merchandising raw materials for the highest value products

- Proper grading of products sold through timber sales
- Bringing together producers and consumers of wood products
- Serving as local contacts for loggers and industry
- Serving as local advisors to Region and St. Paul U & M staff with regard to quantity and quality of the local timber resource
- Harvesting assistance

Utilization and Marketing Program Priorities for 1984-94

- Assist primary processing industry with specific requests for assistance.
- Analyze the Area's forest resources for potential wood products industrial development opportunities.
- Assist local processors in bringing together suppliers and consumers of their products.
- Promote the best use of area timber resources.
- Identify timber and residue resources so that the wood energy program will be developed properly.
- Expand efforts to increase the Area's timber market share.
- Upgrade timber products through proper bucking practices and separating high value products, and improve the overall efficiency of producers by improving timber sale design.

Coordination with Other Divisions, Agencies, and Organizations

The primary coordination the Area has with other DNR divisions is to assist in marking and selling timber. As on Forestry administered land, the timber is marked and sold for its highest value product.

The Moose Lake Area staff has worked quite extensively with Pine County in the past by administering their timber sales program and providing U & M assistance. That involvement has dropped off since the county has hired their own professional staff. The other area of involvement with the counties is in providing information and assistance to the County Extension Service of Carlton, Kanabec and Pine counties as needed.

Another area of coordination involves providing utilization and marketing assistance to private landowners through the PFM Program.

Table 4.17
Moose Lake Area
Utilization and Marketing Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | .5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| b. Supplies and Expenses | \$(000's) | .1 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| Total | \$(000's) | .6 | 3.1 |
| Staffing | | | | | | | | | | | | |
| 1. Region | fte | 0.20 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 2. Area | fte | 0.02 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Total | fte | 0.22 | 0.3 |
| Objectives | | | | | | | | | | | | |
| 1. Assistance to primary processing industry. | | | | | | | | | | | | |
| a. provide mill analysis assistance upon request | requests | | | | | 1 | | | | | | |
| b. provide technical assistance upon request | requests | | | | | | | | | | | |
| c. initiate assistance projects | projects | | 1 | 1 | | | | 1 | | | | 1 |
| d. conduct workshops and seminars, and give presentations | # conducted | | | 1 | | | 1 | | | | 1 | |
| 2. Assistance to secondary manufacturing industry. | | | | | | | | | | | | |
| a. provide mill analysis assistance upon request | requests | | | | | | | | | | | |
| b. provide technical assistance upon request | requests | | | | 1 | | | 1 | | | 1 | |
| c. initiate assistance projects | projects | | 1 | 1 | | | 1 | | | | 1 | |
| d. conduct workshops and seminars, and give presentations | # conducted | | | | | | | | | | | |
| 3. Assistance to harvesting industry. | | | | | | | | | | | | |
| a. provide technical assistance upon request | requests | | | 1 | 1 | | | | 1 | | | 1 |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|-----------------|------|------|------|------|------|------|------|------|------|------|------|
| b. conduct workshops and seminars, and give presentations | # conducted | | | | 1 | | | | | 1 | | |
| 4. Marketing activities. | | | | | | | | | | | | |
| a. provide market analysis upon request | requests | | | | | | | | | | | |
| b. provide technical marketing assistance upon request | requests | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| c. produce marketing publications | publications | | | | | | | | | | | |
| d. conduct workshops and seminars, and give presentations | # conducted | | | | | | | | | | | |
| e. initiate marketing assistance projects | projects | | | 1 | | | | | 1 | | | |
| 5. Fuel, energy and by-products. | | | | | | | | | | | | |
| a. provide analyses of projects upon request | requests | | | | | | | | | | | |
| b. provide technical assistance upon request | requests | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| c. conduct workshops and seminars, and give presentations | # conducted | | 1 | | | | | | | | | |
| d. initiate energy related projects | projects | 1 | | | | 1 | | | | 1 | | |
| 6. Conduct resource analysis for industrial development. | | | | | | | | | | | | |
| a. provide resource analysis upon request | requests | | 1 | | 1 | | 1 | | 1 | | 1 | |
| b. provide technical assistance upon request | requests | 1 | 1 | | | | | | | | | |
| c. conduct workshops and seminars, and give presentations | # conducted | | | | | | | | | | | |
| d. initiate resource analysis related projects | projects | | 1 | 1 | | | 1 | | | | 1 | |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|-----------------|------|------|------|------|------|------|------|------|------|------|------|
| 7. Promote utilization of the private land timber resource in a manner consistent with multiple use land management. | | | | | | | | | | | | |
| a. increase number of landowners utilizing professional assistance in commercial timber harvest | assists | 20 | 20 | 20 | 22 | 22 | 22 | 24 | 24 | 24 | 26 | 26 |
| b. increase number of acres harvested as a result of PFM effort | acres | 500 | 500 | 540 | 580 | 620 | 660 | 700 | 740 | 780 | 820 | 860 |

Note: Objectives for the Utilization and Marketing Program are currently being developed.

FOREST RESOURCES PLANNING PROGRAM

The primary goal of the Division of Forestry's forest planning program in the Moose Lake Area is to maintain and implement a comprehensive management plan to guide the protection, management, and use of the Area's forest resources. The Moose Lake Area Forest Resource Management Plan assesses the current forest resource situation in the Area; includes a detailed land management strategy for all Division of Forestry-administered land in the Area; and proposes a program that sets forth 10-year budget, staffing, and accomplishment targets for the Area's 18 forest resource management programs. The Area's plan reflects the general direction for resource management established in the statewide Minnesota Forest Resources Plan (MFRP).

Planning at the Area level also includes helping prepare multiple-use management plans for other DNR-administered lands, including state parks and wildlife management areas. Planned timber cut lists and drain records are prepared as part of the plans. Periodic revisions are made to keep plans current.

In F.Y. 1984 Area staff spent 0.8 person years engaged in planning activities. This time expenditure is projected to decrease to 0.3 person years by F.Y. 1987 and remain stable until F.Y. 1994, when an increase will be needed to help prepare an updated Moose Lake Area Forest Resource Management Plan.

Over the next several years Moose Lake Area staff will be involved in planning functions designed to implement the Area plan. Developing and testing a revised time and accomplishment reporting system will be the cornerstone to monitor implementation of the plan as well as to provide information to carry out implementation functions. These functions will include accomplishment reporting, work planning, and budgeting. This system will be a model for use in other Division of Forestry Areas.

In addition, the Moose Lake Area staff will help with work planning, budgeting, and resource planning at the regional and St. Paul levels. They

will be actively involved in the revision of the MFRP, which sets the statewide direction for Division of Forestry programs.

Forest Resource Planning Program Priorities for 1985-1994

- Implement the Moose Lake Area Forest Resource Management Plan by holding quarterly and annual reviews of how well accomplishment targets are being met.
- Develop a revised time and accomplishment reporting system that will provide a model for use elsewhere in the state.
- Help prepare multiple-use management plans for non-Forestry administered DNR lands in the Area.
- Develop annual accomplishment reports.
- Develop specific annual Area work plans and budgets.
- Help apply annual Area work plans and budgets to the annual, regional, and St. Paul work planning and budgeting process.
- Help develop updates of the Minnesota Forest Resources Plan.
- Update the Moose Lake Area Forest Resource Management Plan by F.Y. 1994.

Coordination With Other Divisions, Agencies, and Organizations

Public involvement is an important part of the forest resource planning process. Numerous DNR divisions, bureaus, units, and offices have been and will be involved in developing, implementing, and updating the Moose Lake Area Forest Resource Management Plan. Other public agencies as well as numerous private organizations and individuals also have been and will be involved as well.

The Division of Forestry will attempt to increase joint planning efforts for non-Forestry state lands over the next 10 years. Close coordination with the Division of Parks and Recreation, the Division of Fish and Wildlife, and other divisions is required in developing these plans.

Table 4.18

Moose Lake Area
Forest Resources Planning Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|-----------------|------|-------------------|------|------|------|------|------|------|------|------|------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 20.5 | 12.8 | 10.2 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 20.5 |
| b. Supplies and Expenses | \$(000's) | 5.0 | 3.1 | 2.5 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 5.0 |
| Total | \$(000's) | 25.5 | 15.9 | 12.7 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 | 25.5 |
| Staffing | fte | 0.8 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.8 |
| Objectives | | | | | | | | | | | | |
| 1. Prepare or revise the Moose Lake Area Forest Resource Management Plan. | plans | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2. Evaluate and update targets established in the Moose Lake Area Forest Resource Management Plan. | plan updates | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 3. Develop a revised time and accomplishment reporting system that will provide a model for use statewide. | systems | 0 | under development | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4. Help prepare multiple-use management plans for non-Forestry administered state lands. | plans | | | | | | | | | | | |
| 5. Develop an annual accomplishment report. | reports | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 6. Develop an annual Area work plan and budget. | plans/budgets | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7. Help develop updates of the Minnesota Forest Resources Plan. | plans | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |

MAINTENANCE AND ADMINISTRATION PROGRAM

The goal of this program is to provide the administrative support needed to achieve the goals of other Division programs. Major activities include personnel management, equipment maintenance, and building maintenance.

Personnel Management

The Moose Lake Area complement currently consists of 18 permanent full time, and two 90 percent seasonal. In addition there are four part time seasonal employees contracted through the Greenview program. Special work projects such as tree planting, fire fighting, timber stand improvement, trail maintenance, and campground maintenance result in variation in the number of part time laborers employed. Over the years the number of laborers employed on work crews has varied from 10 to 20.

In F.Y. 1984 Moose Lake Area personnel spent 2.8 full-time equivalents per year on personnel or fiscal administration.

Equipment Maintenance

The current and proposed inventory of major equipment in the Moose Lake Area is listed in Table 4.19. A proposed equipment replacement schedule is also included in the table. Under the present schedule items tend to get so old and rundown that they are unsafe to operate. Maintenance costs also rise steadily on the older equipment. Some items need replacement every year. Others last five years or more. Cost of replacement of the larger, longer lived equipment must be prorated over the years and added with similar costs from other administrative areas so that the annual equipment budget is adequate for both the large specialized items and standard items such as pickups. Changes are needed in the type of equipment to be acquired (e.g., replace 1/2 ton with 3/4 ton pickups).

Table 4.19. Moose Lake Area Equipment Inventory, Maintenance Costs, and Replacement Schedule

| Item | Inventory | | Annual Costs | | Replacement | Remarks |
|-----------------------------|-----------|----------|----------------|-----------------|-------------|---|
| | Present | Proposed | Present Maint. | Proposed Maint. | | |
| <u>Vehicles up to 1 ton</u> | | | | | \$30,000 | Replace 3 vehicles up to 1 ton each year. Average vehicle life 8 years. Average vehicle replacement cost \$10,000. |
| 1/2 T. 2x4 pickup | 4 | 0 | \$ 1,000 | \$ 0 | | |
| 3/4 T. 2x4 pickup | 2 | 6 | 500 | 1,500 | | |
| "Ram" type 4x4 | 1 | 2 | 250 | 500 | | |
| 1/2 T. 4x4 pickup | 1 | 1 | 250 | 250 | | |
| 3/4 T. 4x4 pickup | 8 | 8 | 2,000 | 2,000 | | |
| 1 T. 4x4 | 2 | 2 | 500 | 500 | | |
| Passenger van | 1 | 2 | 250 | 500 | | |
| Sedan/wagon | 1 | 0 | 250 | 0 | | |
| Sub-Total | 20 | 21 | \$ 5,000 | \$ 5,250 | \$30,000 | |
| <u>Vehicles over 1 ton</u> | | | | | | |
| Schwartz | 2 | 2 | \$ 600 | \$ 600 | \$ 4,285 | Replace 1 every 7 years. Average life 14 years. Average cost \$30,000. Bus, dump truck and pumper replacements are usually surplus vehicles. |
| Bus | 1 | 1 | 300 | 300 | 0 | |
| Dump truck | 2 | 2 | 600 | 600 | | |
| 6x6 pumper | 1 | 1 | 2,000 | 2,000 | 0 | |
| Sub-Total | 6 | 6 | \$ 3,500 | \$ 3,500 | \$ 4,285 | |
| <u>All Terrain Vehicles</u> | | | | | \$ 6,000 | Replace or recondition 1 ATV every 5 years. Average cost \$30,000. |
| Bombardier J-5 | 3 | 4 | \$ 500 | \$ 600 | | |
| Bombardier J-8 | 1 | 1 | 500 | 500 | | |
| Cushman ATV | 1 | 0 | 250 | 0 | | |
| Trail Groomer | 0 | 1 | 0 | 750 | | |
| Sub-Total | 5 | 6 | \$ 1,250 | \$ 1,850 | \$ 6,000 | |
| <u>Tractors</u> | | | | | | |
| Cats | 4 | 5 | \$ 1,500 | \$ 1,875 | \$ 7,000 | Replace 1 cat every 5 years. Average cost \$35,000. Replace every 20 years. Average cost \$25,000. Replace every 20 years. Average cost \$50,000. |
| Tractor, wheeled | 2 | 2 | 500 | 500 | 1,250 | |
| Road grader | 1 | 1 | 500 | 500 | 2,500 | |
| Sub-Total | 7 | 8 | \$ 2,500 | \$ 2,875 | \$10,750 | |

| Item | Inventory | | Annual Costs | | | Remarks |
|-----------------------|------------|------------|-------------------|--------------------|-----------------|--|
| | Present | Proposed | Present Maint. | Proposed Maint. | Replacement | |
| <u>Fire Equipment</u> | | | | | | |
| Fire pumps | 33 | 35 | \$ 1,000 | \$ 1,000 | \$ 2,400 | Replace 3 pumps per year with larger pumps. |
| Fire plows | 7 | 5 | 200 | 200 | --- | 5 Hester/2 old Middlebuster. |
| Slip on tanks | 33 | 35 | 300 | 300 | 800 | Replace 3 tanks per year with larger tanks. |
| Tank trailers | 7 | 7 | 200 | 200 | --- | |
| Sub-Total | 80 | 82 | \$ 1,700 | \$ 1,700 | \$ 3,200 | |
| <u>Radios</u> | | | | | | |
| Base | 5 | 5 | | | \$ 1,000 | Replace 1 base every 5 years. |
| Mobiles | 17 | 26 | | | 4,000 | Replace 2 mobiles every year. |
| Portables | 30 | 38 | | | 4,500 | Replace 3 portables every year. |
| | | | | | 4,000 | Add to complement: 9 mobiles (2 per year/4½ years). |
| | | | | | 3,000 | 8 portables (2 per year/4 years). |
| <u>Miscellaneous</u> | | | | | | |
| 3 wheel ATC | 1 | 3 | \$ 100 | \$ 300 | \$ 180 | Replace 1 every 5 years. Average cost \$900. |
| Snowmobile | 6 | 6 | 600 | 600 | 500 | Replace 1 every 5 years. Average cost \$2,500. |
| Chainsaws | 16 | 16 | 1,000 | 1,000 | 600 | Replace 2 every year. Average cost \$300. |
| Sub-Total | 23 | 25 | \$ 1,700 | \$ 1,900 | \$ 1,280 | |
| TOTAL | 141 | 148 | \$15,650 | \$17,075 | \$71,015 | |

Building Maintenance

For administrative purposes the Moose Lake Area is subdivided into five geographic districts, each of which contains an administrative site. District offices are located at Moose Lake (in association with the area office), Duxbury (Eaglehead District), Nickerson, Hinckley, and Mora. Each of the five administrative sites includes a number of buildings. Their descriptions, repair, and improvement needs follow. In addition, the Area maintains eight towers for fire detection purposes. These are included under the appropriate district by location.

o Moose Lake Area and District

1. The Moose Lake Area and District offices are housed in a 2 floor, wood frame structure containing 2,912 square feet of space (28'x52'). The upper floor consists of a general office reception area, 5 offices and a bathroom. The basement contains a meeting room, coffee room, file and radio room, 2 offices, a bathroom, and a furnace room.

Repair or Improvement Needs:

Present office space is inadequate because of recent staff expansions and office equipment additions. A 28'x17' expansion is recommended to alleviate this space problem. This expansion would add two offices on the upper floor and an equal amount of space in the basement. A heating system change is also recommended for this building (see section on shop-warehouse).

2. The shop-warehouse is a wood frame structure containing 2,952 square feet of space (36'x82'). This building has six garage stalls, one of which is a heated shop area.

Repair or Improvement Needs:

Other than the one heated stall, the garage area is unheated. When fire season occurs in the early spring fire fighting equipment stored in these stalls freezes up, seriously hampering fire prevention capabilities. A new heating system should be installed which will heat the five remaining stalls on an as needed basis. One alternative for

heating both the garage and office area is a wood burning (Hahsa type) heating unit. This type of heating system has the advantage of efficiently burning low cost wood fuels. If heating all six stalls proves uneconomical, at least one additional heated stall should be added. A separate heated block building (10'x10') is needed for safe storage of chemicals used on forest management projects.

A new 40'x82' unheated metal building is needed because of inadequate space to store existing equipment. A new gas pump and 1,000 gallon tank needs to be installed to meet the Area's unleaded fuel requirements.

3. The Moose Lake fire tower is a stairway type tower. This tower is manned during severe fire seasons.

Repair or Improvement Needs:

None.

4. The Willow River Nursery fire tower is a ladder type tower. This tower has not been used for years because of more efficient aerial detection.

Repair or Improvement Needs:

Remove tower.

o Nickerson District

1. The office-warehouse at Nickerson is a wood frame structure containing 2,064 square feet of space. The building consists of two rectangular sections. The office and two garage stalls comprise the narrower rectangle that measures 40'x30'6". The wider section contains 2 garage stalls and measures 36'6"x24'. The 14'x24' office contains 2 rooms which are being used as offices and a bathroom. The garage stall adjacent to the office is used as a heated shop area. The remaining 3 stalls are unheated.

Repair or Improvement Needs:

Install a security system since the site will be unoccupied when the residence is removed.

2. The residence is a wood frame structure containing 2,304 square feet of space (24'x48'). It consists of 3 bedrooms, a living room, a kitchen-dining room combination, a bathroom, and a basement.

Repair or Improvement Needs:

The residence is vacant and no current employees are willing to move in. This structure is in poor overall shape and is in need of major repair and overall remodeling. The residence should be sold as surplus and removed.

3. The storage shed contains 120 square feet of space (10'x12'). It is used for the storage of signs, posts, and other small items.

Repair or Improvement Needs:

None.

4. The outhouse is a pit toilet type of facility which is no longer used.

Repair or Improvement Needs:

Remove structure.

5. The Nickerson fire tower adjacent to the office is a stairway type tower which is used during severe fire weather. This tower receives heavy use during the summer by tourists.

Repair or Improvement Needs:

None.

o Duxbury (Eaglehead District)

1. The combination office-warehouse is a wood frame structure containing 1,860 square feet of space (62'x30'). The office portion (300 square feet, 30'x10') consists of 2 rooms which are being used for office space and a bathroom. The garage has four unheated stalls.

Repair or Improvement Needs:

The existing heat source for the office is a small space heater which should be replaced because of age and inadequacy. An oil-wood combination furnace capable of heating the office and one garage stall, which could then be used as a cold weather shop repair area, should be considered. There is presently no hot water to the office bathroom. Installation of a hot water heater is necessary. Weatherization of the plumbing which connects the water source at the residence with the offices is necessary as pipes often freeze up during the winter.

2. The residence is a wood frame structure containing 2,080 feet of space (28'x40'). It consists of 3 bedrooms, a living room, a combination kitchen-dining area, a basement, and a bathroom.

Repair or Improvement Needs:

The furnace should be replaced. The addition of a basement shower would add to occupant convenience.

3. The warehouse storage building is an old wood frame Civilian Conservation Corps building containing 1,207 square feet of space (60'4"x20').

Repair or Improvement Needs:

This building is structurally unsound, the tar paper roof leaks and the doors are beyond repair. Safety considerations dictate that this building should be destroyed immediately but storage space considerations require that the building stand until it is replaced. Consideration should be given to constructing a 30'x65' building with increased storage space to accommodate use by other DNR divisions.

Safety considerations require a separate gas and oil storage building. These flammable and potentially dangerous materials are presently being stored in existing buildings.

4. The outhouse is a pit toilet type facility that is necessary because of the water pipe freezing problems of the office bathroom. It is also used by Youth Conservation Corps groups who camp on the district office grounds during the summer.

Repair or Improvement Needs:

None.

5. The Eaglehead fire tower located $4\frac{1}{2}$ miles west of Duxbury is a ladder type tower with a small cab. Because of its remote location and state of repair this structure is a safety hazard and vandalism problem. This tower has not been used since 1979 because of more reliable aerial detection and future use is not expected.

Repair or Improvement Needs:

Consider leasing tower for radio or telephone antenna or dispose of tower and site as surplus.

6. The Askov fire tower is a stairway type tower which gets some use every year. With the move to aerial detection, however, it is being used less and less.

Repair or Improvement Needs:

The tower steps should be treated with preservative to prevent rotting.

o Hinckley District

1. The office-warehouse is a wood frame structure containing 1,860 square feet of space (30'x62'). The office portion of the building contains two rooms (12'x30') and a bathroom. The garage portion contains 4 stalls, one of which is heated by a wood stove.

Repair or Improvement Needs:

The DNR plans on consolidating its Forestry, Fisheries and Wildlife offices in Hinckley at one location. The Region is currently developing preliminary plans. In the meantime Field Services should determine which interim repairs should be done at the existing Forestry station. Potential repair projects are described below.

The existing heating system is inadequate to heat the office during cold weather and the wood stove that heats one stall of the garage is a safety problem. They should be replaced with a furnace which is capable of heating both the office and the garage stall. The heated portions of the building as it presently stands are not adequately insulated. New insulation should be added and old windows replaced for energy efficiency.

Because of the inadequacy of the office heating system, bathroom plumbing froze and burst the original pipes. Presently a makeshift plumbing job on the outside of the bathroom walls supplies water. This exterior plumbing is unsightly and should be removed and replaced in the walls. The bathroom has no hot water. A hot water heater should be installed.

The building's foundation is cracked. Lighting in the garage portion of the building is inadequate. A new underground gasoline tank and a separate oil storage shed are needed.

2. The fire tower in St. Croix State Park is a stairway type tower which has not been used for the last two years because of more efficient aerial detection.

Repair or Improvement Needs:

This tower no longer serves Forestry needs and has been transferred to the Division of Parks and Recreation.

o Mora District

1. The office-warehouse is a wood frame structure containing 1,860 square feet of space (30'x62'). The office portion contains two office rooms and a bathroom. The dimensions of the front and back offices are 14'6"x11'3" and 15'6"x7'6" respectively. The garage portion of the building contains 4 stalls, one of which is heated by a wood stove.

Repair or Improvement Needs:

The bathroom has no hot water at present. Installation of a hot water heater is necessary. A new heating unit is needed to heat the office and one garage stall. A separate gas and oil storage shed is needed. The existing gas pump needs to be replaced.

2. The warehouse-storage building is a cement block structure containing 1,800 square feet of space (30'x60'). This building is essentially a barn with one large entry door.

Repair or Improvement Needs:

Structural repairs to this building are necessary, particularly to the north wall which is bowing. This building presently has no electrical service. Electricity is necessary to supply lighting and to run power tools.

3. The Woodland fire tower is a stairway type tower which is not being used because of aerial detection.

Repair or Improvement Needs:

Remove tower.

4. The Pomroy fire tower is a stairway type tower which is used during severe fire weather.

Repair or Improvement Needs:

None.

Table 4.20 summarizes building repair and improvement needs in the Moose Lake Area and indicates the timeframe within which the work should be completed. Funds for the smaller, near term projects will be requested as part of the Area budget. Larger projects will be submitted for inclusion in the DNR Six Year Capital Improvement Plan.

Table 4.20. Moose Lake Area Building Repair or Improvement Needs and Schedule.

| Building Location and Use | Repair or Improvement | Timeframe for Completion |
|-----------------------------|-------------------------------|--------------------------|
| <u>Moose Lake</u> | | |
| Area and district offices | Building expansion | Within 5 years |
| Area shop and offices | Heating system | Within 5 years |
| Proposed storage | Construct new building | 6-10 years |
| <u>Willow River Nursery</u> | | |
| Fire tower | Remove tower | 1986 |
| <u>Duxbury</u> | | |
| Office-warehouse | Hot water heater/plumbing | 1986 |
| Office-warehouse | Heating system | Within 5 years |
| Residence | Heating system | Within 5 years |
| Residence | Basement shower | 1986 |
| Proposed storage | Construct new building | 6-10 years |
| Gas and oil storage | Construct storage building | Within 5 years |
| <u>Askov</u> | | |
| Fire tower | Treat steps with preservative | 1986 |
| <u>Nickerson</u> | | |
| Office-warehouse | Security system | 1986 |
| Residence | Surplus | 1986 |
| <u>Hinckley</u> | | |
| Office-warehouse | Evaluation of interim repairs | 1985 |
| <u>Mora</u> | | |
| Office-warehouse | Hot water heater/plumbing | 1986 |
| Office-warehouse | Heating system | Within 5 years |
| Warehouse-storage | Structural repairs/electrical | 1987 |
| Gas and oil storage | Construct shed | Within 5 years |
| <u>Woodland</u> | | |
| Fire tower | Declare surplus | 1986 |

Maintenance and Administration Program Priorities for 1985-94

This plan documents the need for an increased equipment budget and a more realistic equipment replacement schedule. Needed capital improvements at administrative sites will be incorporated into the DNR capital improvement budget. Surplus facilities have been identified for disposal and a consolidation of DNR offices in Hinckley is proposed. The reduction in Area staffing time is based on a move to better identify some maintenance and administrative time under other programs, and to have some vehicle and building maintenance done by outside vendors. Program priorities for the next ten years include:

- Improve equipment replacement schedule.
- Maintain or improve district headquarter buildings.
- Expand Area headquarters.

Coordination with other Divisions, Agencies, and Organizations

The proposed plan will require increased involvement with the Field Services Bureau, Engineering and the department equipment committee to achieve the building and equipment maintenance and replacement objectives. The Brainerd Regional Administrator should take the lead in planning for the consolidation of DNR facilities at Hinckley.

Table 4.21

Moose Lake Area
Maintenance and Administration Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) (1) | 71.6 | 61.4 | 61.4 | 56.3 | 56.3 | 56.3 | 56.3 | 56.3 | 56.3 | 56.3 | 56.3 |
| b. Supplies and Expenses | \$(000's) | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 16.2 | 15.7 | 15.7 | 15.7 | 15.7 | 15.7 |
| 2. Equipment | \$(000's) | 71.0 | 71.0 | 71.0 | 71.0 | 71.0 | 66.0 | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 |
| Total | \$(000's) | 160.1 | 149.9 | 149.9 | 144.8 | 138.5 | 136.0 | 136.0 | 136.0 | 136.0 | 136.0 | 136.0 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| Total | fte | 2.8 | 2.4 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| Objectives | | | | | | | | | | | | |
| Equipment and Facility Maintenance | | | | | | | | | | | | |
| 1. Maintain all division administered buildings. | | | | | | | | | | | | |
| a. office or office/warehouse | buildings | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| b. shop/storage | buildings | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| c. residence | buildings | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| d. fire towers | buildings | 8 | 7 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| e. miscellaneous | buildings | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 2. Maintain all division vehicles and equipment. | | | | | | | | | | | | |
| a. self-propelled units | units | 45 | 45 | 46 | 46 | 47 | 48 | 49 | 50 | 50 | 50 | 50 |
| b. other 4 group equipment | units | 96 | 96 | 96 | 96 | 96 | 98 | 98 | 98 | 98 | 98 | 98 |

(1) No dollar figures are included for new construction, reconstruction or improvements on buildings.

TRAINING, INFORMATION AND EDUCATION PROGRAM

Division of Forestry personnel in the Moose Lake Area are to receive approximately 100 hours of training each year. This represents slightly over 5 percent of each employee's work hours. Many of these employees are also called on to act as instructors at training sessions. Training received or given falls into all program areas. It is extremely important that Area personnel keep up to date in all facets of their work. Resource management is constantly changing due to pressures created by needs for raw materials, recreational uses, and protection of the environment.

Training plans are in the process of being developed for each individual employee. These plans will be tailored to each employee's needs and career goals. Training plans will address both short-term and long-term goals.

Area personnel involved as trainers must spend time preparing for their presentations. They often need to travel to other parts of the state and spend time making their presentations.

Almost every Area employee spends time each year preparing displays or preparing and presenting material to the public. These activities take many forms and cover all phases of the Moose Lake Area's work programs. Activities include news releases to newspapers, radio, and television stations; displays at fairs and other locations; open houses; tours; and presentations of movies, slide programs, or talks. Substantial quantities of fire prevention material are also distributed in the Area.

The information and education activities are directed both at the general public and at specific interest groups. Subject matter is often seasonal in nature or outlines specific projects that are planned, active, or completed. Area personnel are often requested to present material to clubs, schools, or other organized groups.

Training Priorities for 1985-94

- Complete individual personnel development plans for each Area employee.
- Outline training needs of all Area personnel on a priority basis and advise Division Training Officer.
- Develop monitoring system that allows for equitable training assignments to all employees.
- Annually update training plans.
- Update fire departments on strike team and NIIMS Programs.

Information and Education Priorities for 1985-94

- Develop educational activity calendar outlining annual or seasonal events.
- Improve slide tape and movie collection in Area library.
- Develop a trailer float that can be easily changed from year to year.
- Improve techniques for county fair displays using a team management approach.
- Continue to upgrade and provide a steady flow of news releases to the local media.
- See that all personnel are properly trained in public speaking.

Coordination with Other Divisions, Agencies, and Organizations

To provide an adequate flow of quality information, it is necessary for Area personnel to use the assistance and cooperation of several agencies. The U.S. Forest Service is the primary cooperator in all phases of the Area's information and education (I & E) activities, and provides a very fine source of training reference materials. The Area also coordinates I & E activities with the National Park Service, other DNR disciplines, County Extension personnel, and 19 local fire departments, to mention a few. In the past the DNR Bureau of Information and Education has provided minimal assistance, guidance, or training of Area personnel in the area of

Table 4.22

Moose Lake Area Plan
Training, Information and Education Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|-----------------|------|------|------|------|------|------|------|------|------|------|------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 30.7 | 38.4 | 43.5 | 43.5 | 43.5 | 43.5 | 46.0 | 46.0 | 48.6 | 48.6 | 48.6 |
| b. Expenses | \$(000's) | 7.5 | 9.4 | 10.7 | 10.7 | 10.7 | 10.7 | 11.3 | 11.3 | 11.9 | 11.9 | 11.9 |
| Total | \$(000's) | 38.2 | 47.8 | 54.2 | 54.2 | 54.2 | 54.2 | 57.3 | 57.3 | 60.5 | 60.5 | 60.5 |
| Staffing | | | | | | | | | | | | |
| 1. Area | fte (1) | 1.2 | 1.5 | 1.7 | 1.7 | 1.7 | 1.7 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 |
| Objectives | | | | | | | | | | | | |
| Personnel Training | | | | | | | | | | | | |
| 1. Develop career training plans. | plans | 18 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| 2. Update career training plans. | plans | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 3. Conduct internal Area training sessions. | fte | .1 | .2 | .2 | .3 | .3 | .3 | .3 | .2 | .2 | .3 | .3 |
| 4. Attend training sessions outside Area. | fte | .1 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 5. Conduct training sessions for other cooperators. | fte | .1 | .3 | .3 | .2 | .2 | .2 | .2 | .3 | .3 | .2 | .2 |
| | fte | .9 | .8 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 |
| Public Information and Education | | | | | | | | | | | | |
| 1. Provide county fair displays. | displays | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 2. Issue news releases to papers. | news releases | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
| 3. Make daily weather reports to local radio stations. | reports | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 | 520 |
| 4. Assign personnel to public speaking training. | persons | 0 | 4 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| 5. Conduct informational tours. | tours | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6. Appear in TV special reports or spots. | reports | 0 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| 7. Make presentations (talks, films, slide programs). | presentations | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| 8. Distribute I & E materials. | peices (000's) | 20 | 20 | 20 | 20 | 21 | 21 | 21 | 21 | 21 | 22 | 22 |

(1) 1984 staffing -- a portion of staff time spent on training was included as staff time under other programs. Increased staffing level from F.Y. 1984-85 reflects shift in time recording.

FIRE MANAGEMENT PROGRAM

The goals of the fire management program are to provide effective wildfire control and to promote the safe and effective use of fire as a resource management tool. Wildfire control consists of three major components: 1) fire prevention, 2) presuppression, and 3) suppression. Prevention involves efforts to inform the public of the dangers and potential losses that can result from uncontrolled forest fires. Presuppression focuses on the need to adequately prepare and maintain fire suppression forces for the eventuality of fire outbreak. This is done through extensive planning, training, fire detection and interagency cooperation. Suppression activities involve controlling and extinguishing wild fires with a minimum of damage to property and natural resources, loss of life, and personal injury.

The Moose Lake Area Fire Plan contains a detailed analysis of fire information for the period 1971-1981. It also proposes a balanced fire control program including prevention, presuppression, and suppression activities. The Area fire plan will be updated as necessary to reflect changing conditions and the overall direction set in this plan.

The Division of Forestry is responsible for providing expertise and assistance for prescribed use of fire by DNR in the Moose Lake Area. In addition, the Division provides assistance and final approval for all uses of fire as a management tool by other agencies and organizations.

The Moose Lake Area also administers the Rural Community Fire Protection Program locally. This program is designed to assist 20 rural communities in the area in fire protection and to aid their respective fire departments in developing and improving their wildland and structural fire prevention and suppression capabilities. A federal matching fund is utilized with the fire department providing 50 percent of the project cost. The Moose Lake Area provides refurbishing and distribution services for federal excess property statewide.

The Area's prevention efforts should increase through 1989 and then should remain constant. The Area's fire suppression program budget and staffing requirements will vary depending on the severity of the wildfire problem in any particular year. During severe seasons nearly all Division of Forestry personnel in the Moose Lake Area are likely to be involved in fire control operations. It is anticipated that as more emphasis is placed on fire prevention and presuppression, less emphasis will need to be placed on fire suppression. The 2.4 person years of effort spent on fire programs in 1984 was lower than normal. Projections for 1985-94 are based on anticipated program needs and the addition of one person year to process federal excess property for distribution to fire departments and Division of Forestry stations.

Fire Management Program Priorities for 1985-94

- Increase wildfire prevention efforts.
- Use the results of the LCMR-sponsored fire planning program as part of the unit planning process to select an efficient mix of prevention, presuppression, and suppression efforts for the Moose Lake Area.
- Establish adequate depreciation and replacement schedules for specialized fire equipment in the Moose Lake Area.
- Train Division of Forestry and other emergency service agency personnel in the Moose Lake Area for conversion to, and use of, the National Interagency Incidence Management System (NIIMS), including the Incident Command System (ICS), to provide an integrated approach for dealing with emergency situations.
- Implement requirements of the fire compact with Wisconsin and Michigan.
- Continue to improve radio communication plans and capabilities between the DNR, rural fire departments, and other agencies involved in wildfire protection efforts in the Moose Lake Area.
- Provide continuing training and organizational leadership to local wildfire "strike teams" and rural fire departments to increase coordination and to effectively utilize all wildfire protection resources.

- Provide leadership in developing basic wildfire suppression training for rural fire department personnel through Vocational and Technical schools.
- Develop and implement a fuels management plan to reduce the likelihood of large fires in high hazard cover types.
- Develop and implement a program designed to identify fire prone property and, in cooperation with rural fire departments and local planning commissions, inform the public of potential danger through inspections, simulated fires, and other methods.
- Provide leadership and assistance in the use of fire as a resource management tool.

Coordination With Other Divisions, Agencies, And Organizations

The Moose Lake Area maintains cooperative agreements with several agencies and organizations. Agreements have been made with various state, federal, and county agencies to provide assistance or make equipment available for use in the suppression of wildfires. A brief overview of the cooperative agreements follows.

o U.S. Forest Service

An agreement with the United States Forest Service provides for the coordination of national mutual aid requests from any of the 50 states or federal agencies with fire or other emergency responsibilities. One of the commitments that Minnesota has, as a partner in this total mobility concept, is to maintain certain levels of training for key personnel and fire crews. This impacts the Moose Lake Area by placing time demands on selected personnel that are assigned to the area. If conditions are such that help is requested, there could be a time demand placed on the area that is not planned for, thus impacting other activities.

The states of Minnesota, Michigan and Wisconsin are in the process of developing an agreement which will be entitled the "Lake States Forest Fire Compact." When complete this compact will place an emphasis on training, prevention techniques, sharing of expertise and other items as well as actual fire suppression. While this compact will provide a total savings and improvement in fire abilities it will impact the Moose Lake Area by

requiring some expenditure of time. The compact will address border fires between Minnesota and Wisconsin with the closest forces concept. Moose Lake, being an area that borders Wisconsin in a part of both states where fire is a concern, can expect to be effected, more than other areas will be.

o State of Wisconsin

The Moose Lake Area has met annually with Forestry personnel from the State of Wisconsin to discuss problems and new fire fighting techniques. A memorandum of understanding exists regarding detection and reporting of fires across borders and procedures for suppression of fires on the border or threatening to cross the border.

Other agreements exist with the U.S. Fish and Wildlife Service, the National Park Service and the Bureau of Land Management. Most of these provide for cooperative fire prevention and for fire suppression arrangements. In most instances there is a statewide agreement with local plans, developed between the area and the specific unit, following the guidelines in the master plan. In some instances the agency is providing payment to the State of Minnesota for fire protection services.

o St. Croix National Scenic Riverway

Up to 9 firefighters will be provided by the National Park Service. Also available for use are 3 pickups with slip-ons, 5 portable pumps, 4 fold-a-tanks, various handtools, 10 motorboats, 10 canoes, and 2 pontoons. An agreement exists outlining appropriate procedures for each agency.

o State Parks

State parks located within the Moose Lake Area include St. Croix, Banning, and Moose Lake. Personnel from each park will report and then take action on all fires within or threatening their respective park. Each park will also try to make certain that equipment and personnel are available for use on fires burning outside the park. Fire evacuation and action plans have been developed for all parks and recreation areas in the area.

o Sandstone Federal Correctional Institute

The Correctional Institute will provide 30-40 trained men to assist in fire suppression activities, provided that these men can be made available without jeopardizing the security and safety of the institution. DNR Forestry personnel provide annual training to these crews.

o Fire Departments

The Moose Lake Area maintains cooperative agreements with 21 fire departments located throughout the Area. Each department will make available certain equipment, such as pumpers and tankers, for wildfire suppression. Each truck provided carries a crew of three trained firemen. Also available for use on wildfires are highly trained "Strike Teams" made up of personnel from various fire departments. Moose Lake Area personnel have trained volunteer members of several fire departments to function on Strike Teams. These teams will be provided special communications and safety equipment when called to a fire. Fire Department Teams may be in the form of tankers or hand crews. The Moose Lake Forestry Area has also provided local departments with federal excess property radios that operate on a common frequency to assure better communications.

o State Fire Marshall

State Fire/Arson Investigator Arnie Johnson has on loan to him an excess property mobile radio crystallized to the Fire Mutual Aid Frequency, 154.295. Mr. Johnson is a Strike Team leader and the radio provides radio contact with fire departments when wildfire emergencies exist and Strike Teams are called.

o Moose Lake State Hospital

The Moose Lake State Hospital has agreed to allow the Moose Lake Forestry Area the use of a 1944 D-7 cable dozer for emergency fire fighting and special projects.

o Pine County

Pine County has agreed to allow Wayne Golly, Pine County Land Commissioner, to be released from his normal duties during periods of high forest fire danger. He will be assigned to work on fire related matters.

o Willow River Corrections Camp

DNR Forestry personnel provide periodic training to organized crews at the camp. These crews are used for fire suppression work in extreme emergencies.

o St. Croix (Wilder) Camp

DNR Forestry personnel provide annual training to organized crews at this camp. These crews are used for fire suppression and have been used to cut brush along roads and trails, improving them as fire breaks.

o Adjoining Forestry Areas

The Moose Lake Area has coordinated tower and aerial detection with all adjoining Areas and Districts. Procedures for taking initial action on fires occurring along Area boundaries have been established.

o Other DNR Divisions

During high and extreme hazard conditions, personnel from the divisions of Fish and Wildlife, Parks and Recreation, and others are used in fire suppression activities. Officers from the Division of Enforcement are used for fire enforcement, security, and traffic control.

o Department of Transportation (DOT)

Meetings have been held with local DOT personnel outlining procedures for DOT burning along highways and how to deal with wildfires along highways.

o State Patrol and Sheriffs' Officers

These agencies are called on to provide traffic control, emergency evacuations, and security for fire fighting personnel and equipment as well as back up for fire law enforcement activities.

o Amateur Radio Operators

The Moose Lake Area has met with members of local "Ham" radio operators' clubs, and has reached an agreement as to how their equipment and expertise can be used in emergency situations. These club members have a local radio network consisting of base stations, repeaters, and mobile and portable radios.

Table 4.23
Moose Lake Area
Fire Management Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 61.4 | 61.4 | 87.0 | 89.6 | 112.6 | 115.2 | 117.8 | 117.8 | 117.8 | 117.8 | 117.8 |
| b. Supplies and Expenses | \$(000's) | 15.0 | 15.0 | 21.3 | 22.0 | 27.6 | 27.6 | 28.9 | 28.9 | 28.9 | 28.9 | 28.9 |
| 2. Fire Fund | | | | | | | | | | | | |
| a. Prevention (1) | \$(000's) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| b. Pre-suppression and Supp. | \$(000's) | 118.7 | 118.7 | 118.7 | 118.7 | 118.7 | 118.7 | 118.7 | 118.7 | 118.7 | 118.7 | 118.7 |
| Total | \$(000's) | 197.1 | 197.1 | 229.0 | 232.3 | 260.9 | 263.5 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| 1. Area/District | | | | | | | | | | | | |
| a. Prevention | fte | | | | | | | | | | | |
| b. Presuppression | fte | | | | | | | | | | | |
| c. Suppression | fte | | | | | | | | | | | |
| d. Rural Community Fire Protection | fte | | | | | | | | | | | |
| Total | fte | 2.4 | 2.4 | 3.4 | 3.5 | 4.4 | 4.5 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |
| Objectives | | | | | | | | | | | | |
| Training | | | | | | | | | | | | |
| 1. Continue basic fire training. | | | | | | | | | | | | |
| a. Conduct basic fire fighter training for permanent personnel. | people | 1 | 1 | -- | 1 | -- | 1 | -- | 1 | -- | 1 | -- |
| b. Train specialized fire teams (Sandstone Prison, St. Croix Camp, Willow River Correctional Camp, High Schools). | crews | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| c. Train rural fire departments in wildfire control techniques. | departments | 6 | 10 | 10 | 5 | 5 | 5 | 5 | 10 | 10 | 5 | 5 |
| d. Provide communications training for division personnel. | employees | 1 | 1 | -- | 20 | -- | 1 | -- | 1 | -- | 1 | -- |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|
| e. Conduct conversion training for the National Interagency Incidence Management System (NIIMS). | permanent personnel trained | 3 | 7 | 10 | -- | -- | 1 | -- | 1 | -- | 1 | -- |
| f. Continue fire behavior and fire danger rating system and fire weather training. | people trained | 17 | 6 | 14 | 1 | -- | 1 | -- | 1 | -- | 1 | -- |
| g. Provide suppression training to personnel from 3 state parks, fisheries and wildlife. | people | 4 | 6 | 6 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Fire Management | | | | | | | | | | | | |
| 1. Use prescribed fire as a resource management tool. (2) | acres | 45 | 143 | 195 | 295 | 335 | 395 | 495 | 635 | 695 | 795 | 935 |
| Prevention | | | | | | | | | | | | |
| 1. Expand and effectively develop programs and policies for rural fire prevention. | | | | | | | | | | | | |
| a. Increase public awareness of wildland fire problems in rural areas through mass media and public appearances. | appearances/ media spots | 10 | 12 | 14 | 16 | 18 | 20 | 20 | 20 | 20 | 20 | 20 |
| b. Distribute handout material to fire prone property owners on prevention methods and techniques. | contacts- % owners | -- | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|--------------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Presuppression | | | | | | | | | | | | |
| 1. State-Federal cooperative targets. | | | | | | | | | | | | |
| a. Inspect and inventory excess property for state fire crews and rural fire departments. | inspections | 24 | -- | 24 | -- | 24 | -- | 24 | -- | 24 | -- | 24 |
| b. Process additional requests for rural fire departments and other Forestry Areas from the excess property program. | applications in area 34 atastatewide | 5 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| | | 125 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 |
| 2. Research and program continuation. | | | | | | | | | | | | |
| a. Update area fire plan as needed. | updates | 1 | -- | -- | -- | -- | 1 | -- | -- | -- | -- | 1 |
| b. Update cooperative agreements with fire departments. | agreements | -- | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 3. Routine presuppression activities. | | | | | | | | | | | | |
| a. Issue and inspect burning permits. | permits | 5237 | 5289 | 5341 | 5395 | 5449 | 5503 | 5559 | 5614 | 5670 | 5727 | 5784 |
| b. Make daily weather observations, distribute weather forecasts and special forecasts, and maintain weather stations. | hours | 715 | 715 | 715 | 715 | 715 | 715 | 715 | 715 | 715 | 715 | 715 |
| c. Administer equipment agreements. | agreements | 18 | 20 | 20 | 20 | 20 | 20 | 22 | 24 | 26 | 28 | 30 |
| d. Train and update township fire wardens. | wardens | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 |
| e. Prepare and administer aerial detection contracts. | contracts | -- | 1 | -- | -- | 1 | -- | -- | 1 | -- | -- | 1 |
| f. Develop and update emergency park evacuation plans. | plans | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---|---------------------|------|------|------|------|------|------|------|------|------|------|------|
| 4. Write informational newsletters for: | | | | | | | | | | | | |
| a. Rural Fire Departments | newsletters | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| b. Township Fire Wardens | newsletters | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Suppression | | | | | | | | | | | | |
| 1. Suppress wildfires (10 year average). | fires | 138 | 136 | 134 | 132 | 130 | 128 | 126 | 124 | 122 | 120 | 120 |
| 2. Reduce number of acres burned (10 year average). | acres | 3239 | 3174 | 3111 | 3049 | 2988 | 2928 | 2928 | 2928 | 2928 | 2928 | 2928 |
| 3. Prepare fire reports (10 year average). | reports | 138 | 136 | 134 | 132 | 130 | 128 | 126 | 124 | 122 | 120 | 120 |
| 4. Improve reporting on fires where independent action was taken by rural fire departments. | % of fires reported | 50 | 60 | 70 | 80 | 90 | 100 | 100 | 100 | 100 | 100 | 100 |

- Notes:
- (1) A breakdown of suppression and pre-suppression costs can be found in the Fire Plan.
 - (2) Growth in acreage over 10 year period due to increased wildlife habitat acreage burned yearly and seed orchard burned every third year.

ENFORCEMENT PROGRAM

The Department of Natural Resources, divisions of Forestry and Enforcement are charged with the enforcement of certain Minnesota Statutes, as well as various administrative rules and regulations. Enforcement activities are conducted by authorized Forest Officers in cooperation with the Division of Enforcement.

Forestry enforcement responsibilities may be grouped into four primary areas: 1) forest fire laws; 2) timber sales, fuelwood, and Christmas tree theft; 3) forest recreation; and 4) lands, leases, and permits. A brief description of each follows.

In the Moose Lake Area enforcement of fire laws focuses primarily on burning permit regulations, wildland arson, and railroad caused fires. Intentionally set fires (incendiary fires) comprise 41 percent of all fires in the Area. To deal with this problem, increased effort will go into fire investigations including surveillance and undercover activities. Arson teams as well as local Forest and Conservation Officers will be utilized more fully. Unauthorized burning of trash, brush, and meadows accounts for 23 percent of Moose Lake Area fires. Stepped up enforcement of burning permit laws through a coordinated effort between Forest and Conservation Officers will be one technique used to deal with this problem. Increased fire prevention activities will also be employed. Thirteen percent of Area fires are caused by railroad traffic. Solutions to this problem will involve coordinated actions among Forestry Areas and with the State of Wisconsin. The Moose Lake Area will request through the Region that railroad companies provide speeder or aerial patrols behind trains during high hazard periods. Problem sections of track will be identified and hazard reduction prescriptions made. Hopefully, a statewide locomotive inspection system will be developed to eliminate fire causing units.

Field enforcement of state timber sale regulations and timber trespass, fuelwood theft, and Christmas tree theft laws is the responsibility of the Division of Forestry. Assistance from the Division of Enforcement is utilized when circumstances dictate. Timber sale regulations and trespass cases will be handled by the Division of Forestry as outlined in the

Division's "Timber Sales" and "Law Enforcement" manuals. Theft of fuelwood is on the rise. Problems revolving around theft of fuelwood, Christmas trees, and other state property will be dealt with in the following manner. Vehicle patrols will be utilized during problem periods. Fuelwood and Christmas tree thefts occur primarily in the autumn, especially from deer season through the week before Christmas. Additional Forestry patrols along with increased coordination with Conservation Officers in the Area will help deal with this problem.

Certain Forest Officers have been delegated specific authority by the Commissioner of Natural Resources to enforce NR-1 Rules in State Forest campgrounds and day-use areas. These are primarily peace-keeping rules which specify appropriate personal conduct and activities allowed in these recreation areas. The summer camping season constitutes the primary problem period. Vandalism and disturbing the peace are the most common violations. Under age drinking and drug use also frequently occur. Providing a quality camping experience for all users is the goal of this program. Protection of the user is key. To provide this protection, the Moose Lake Area will utilize the following procedures. Each campground will continue to have a caretaker in attendance on Friday and Saturday evenings to monitor activities and report any disturbances to the District Forester, the local Conservation Officer, or the County Sheriff. Weekend Forest Officer patrols will be continued on Saturdays to check for problems or violations. Local Conservation Officers will be asked to make routine and/or spot inspections of all campgrounds and day-use areas. When serious problems are encountered by Forestry personnel, back up will be requested from Conservation Officers and other law enforcement agencies as needed.

State Forest recreation trails pose an increasing enforcement problem. To date, Forest Officers have no delegated authority to enforce trails rules or laws in their state forests. They may enforce ORV rules or laws within campgrounds or day-use areas. Solutions to these problems will require efforts in two areas. The Division of Enforcement will be expected to make periodic patrols to check for ORV's operating in restricted areas, for unregistered machines, and other violations. Forest Officers should be authorized to issue citations when they observe a violation in a state

forest unit. Together, these two procedures will go a long way toward reducing problems on state forest trails. Minnesota Statute 84.90 covers posted trails within our state forests.

Land administration laws and rules pertain to the acquisition, sale, exchange, use, management, and control of state lands and, to some extent, county tax-forfeited lands. Problems consist of land trespass, lease violations, and unauthorized buildings. Violations of rules and statutes are handled by Forest Officers in cooperation with the Land Bureau and the Division of Enforcement if necessary. The Division of Forestry's "Land Management Manual" and its "Law Enforcement Manual" are used to guide actions taken.

Coordination between the Moose Lake Area's Forest Officers and the Division of Enforcement will be an important factor in improving the overall enforcement of Forestry laws and rules. Better communications through personal contacts and development of a mutual radio frequency will be a major goal. Involvement by Division of Enforcement Officers will fall into two main activities: 1) assistance with the more serious violations that occur in all programs; and 2) coordinated patrols to monitor campgrounds and fire problems. It will be extremely important for the local Conservation Officers to work through the Area Forest Supervisor and his District Foresters when dealing with Forestry laws.

The following general procedures will be followed when a Forest Officer encounters violations.

If the violation is ongoing, the Forest Officer shall contact a Conservation officer by the most direct means. If a Conservation Officer is not readily available, the Forest Officer shall collect appropriate information on the violation and fill out a C.O. 145 form. Copies shall be submitted to the local Conservation Officer. If this is not feasible, a copy shall be sent through the Area Enforcement Supervisor to the officer.

On a non-ongoing violation, Forest Officers shall simply record the violation on a C.O. 145 form and see to it that a copy reaches the local Conservation Officer as soon as possible.

At all times, as in any law enforcement situation, there is no substitute for good common sense. A Forest Officer should do as much as he can without endangering himself or anyone else and once he has done this he should feel that he has fulfilled his obligation.

Enforcement Priorities for 1984-1994

- Assure that all Forestry personnel receive at least the minimum training required to carry out delegated enforcement tasks.
- Improve fire investigation activities through increased training, use of Arson Teams, and local Conservation Officers.
- Increase the level of patrols and inspections of campgrounds and day-use areas.
- Increase patrols for illegal burning activities during peak hazard periods.
- Develop better communications with the Division of Enforcement and local sheriffs.
- Improve enforcement procedures affecting dispersed areas in our State Forests, including recreation trails.

Coordination with Other Divisions, Agencies, and Organizations

The Moose Lake Area relies on other enforcement agencies for assistance in many ways. Local sheriffs provide a great deal of assistance. It is imperative that Forest Officers maintain working relationships with sheriff's officers. Better communications need to be developed with County Sheriff Dispatch networks. A written agreement on law enforcement procedures between the Moose Lake Area and the St. Croix National Scenic Riverway has been drafted. It is to be followed when violations occur in our joint operating areas. A good working relationship will be maintained with the State Fire Marshall's office. Cooperation and assistance are occasionally requested from the State Highway Patrol and the Bureau of Criminal Apprehension.

Table 4.24
Moose Lake Area
Enforcement Program

| Proposed Program | Unit of Measure | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|--|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Budget | | | | | | | | | | | | |
| 1. General Fund | | | | | | | | | | | | |
| a. Salary | \$(000's) | 15.3 | 12.8 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 | 10.2 |
| b. Expenses | \$(000's) | 3.7 | 3.1 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Total | \$(000's) | 19.0 | 15.9 | 12.7 |
| Staffing (fte = full time equivalent) | | | | | | | | | | | | |
| 1. Area | fte (1) | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Objectives | | | | | | | | | | | | |
| 1. Increase enforcement and investigation procedures related to wildfire. | | | | | | | | | | | | |
| a. Train personnel in proper law enforcement procedures and techniques (Level I Officers). | people | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| b. Continuing education for Area Level II and III Officers. | people | | 7 | 8 | 7 | 8 | 7 | 8 | 7 | 8 | 7 | 8 |
| 2. Improve cost collections. | | | | | | | | | | | | |
| Civil prosecutions (50% goal). | % of bills collected | | 25% | 30% | 35% | 40% | 45% | 50% | 50% | 50% | 50% | 50% |
| | civil cases | | 36 | 43 | 51 | 58 | 65 | 72 | 72 | 72 | 72 | 72 |
| 3. Criminal prosecutions. | | | | | | | | | | | | |
| | citations (2) long form | | 15 | 20 | 20 | 20 | 18 | 16 | 15 | 15 | 15 | 15 |
| | | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 4. Improve enforcement of forest campground regulations. | | | | | | | | | | | | |
| | patrols | | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| 5. Increase patrols for Christmas tree and fuelwood theft. | | | | | | | | | | | | |
| | patrols | | | 8 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| 6. Conduct thorough timber trespass investigations. | | | | | | | | | | | | |
| | cases | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 7. Clear up all pending land trespass matters. | | | | | | | | | | | | |
| | cases | | 6 | 4 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

(1) A portion of this time is attributable to the Area Supervisor's and clerk's time spent on the statewide law enforcement program. A transfer of personnel could change this staffing level. An expected increase in time spent on enforcement activities by conservation officers is anticipated.

(2) While some projected objectives go up, others will drop due to an improved enforcement program.

MOOSE LAKE AREA FOREST RESOURCE MANAGEMENT PLAN

5. IMPLEMENTATION AND MONITORING

| <u>Chapter Contents</u> | <u>Page</u> |
|-------------------------------------|-------------|
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| Annual Work Plans | 5-2 |
| Annual Spending Plans | 5-2 |
| Time Summaries | 5-2 |
| Accomplishment Reports | 5-3 |
| Financial Reports | 5-3 |
| Position Descriptions | 5-3 |
| Implementation Responsibility | 5-4 |
| Plan Review and Revision | 5-4 |

IMPLEMENTATION AND MONITORING

Plan implementation and monitoring are important but frequently overlooked steps in the management process. Careful consideration of how the plan is to be implemented and monitored is needed if planning is to be more than an academic exercise that results in a document that sits on the shelf and has no impact.

The goal of the implementation and monitoring activities in the Moose Lake Area is to execute the Moose Lake Management Plan in an effective and efficient manner to guide the protection, management and use of the forest resources in the area. This goal will be achieved by developing and using the implementation strategy and a monitoring system outlined below.

The implementation strategy for the Moose Lake Plan specifies the procedures, methods and rules to be followed to fulfill the goals and objectives outlined in the plan. These goals and objectives are contained in the individual program write ups and the land management plan. Each program write up includes 10 year budget, staffing, and accomplishment targets. A checklist of policies and procedures to be followed to implement the Moose Lake Plan is contained in this chapter.

Monitoring of plan implementation is necessary to determine how well the program goals and objectives are being met as well as to evaluate the effectiveness and efficiency of the programs. Monitoring of the Moose Lake Plan will be done on a recurring basis using a set of reports designed for this purpose. The information generated will document how well program objectives are being met. The reports should also meet the needs of the program managers and field supervisors as well as external reporting requirements.

The monitoring and implementation system in the Moose Lake Area will consist of work plans, accomplishment reports, spending plans, expenditure records, position descriptions, time summaries, and operational evaluations. These processes will be developed at the area level so that they can be integrated into the Division's overall work planning, budgeting and accomplishment reporting structure.

The components of the proposed implementation and monitoring system for the Moose Lake Area area as follows:

ANNUAL WORK PLANS

Annual work plans will be developed at the beginning of each fiscal year. The work plan will include more refined objectives and targets for the following fiscal year and the staffing and budget requirements to carry out the plan. To the extent possible these plans will be based on the actual budget appropriation for that year and will be consistent with the goals and objectives of the Moose Lake Plan. The Moose Lake Area staff will conduct an annual meeting with other units of the DNR to inform them of proposed forest management activities which are contained in the annual work plan.

ANNUAL SPENDING PLANS

Annual spending plans link the annual work plan to the area's budget. They are used to translate the objectives identified in the annual work plan into dollars. Spending plans are not presently developed for each administrative area. It is proposed that spending plans be developed at the area level in conjunction with their development at the regional level. These will serve as a guide to budget expenditures at the area level.

TIME SUMMARIES

Time summaries are one tool to use at the area level to monitor progress in meeting the goals in the Moose Lake Plan. They are also an effective tool in personnel management to monitor the time individuals spent on activities compared to the time allocated in their position descriptions. The direction provided in the position descriptions is the link between the specified objectives of the plan and how they will be carried out. A summary of personnel time therefore would indicate progress made in implementing the plan.

The present time summaries the Division uses are deficient in recovering time of certain activities and programs. For example, training time is charged to the particular program, not to training. The time spent on training, therefore, is not readily available. This same problem exists

with administration time, fire standby, and several other activities. A system needs to be designed that can cross-reference this time and meet management needs at the area, region and St. Paul levels.

ACCOMPLISHMENT REPORTS

Accomplishment reports will be compiled quarterly and at the end of each fiscal year. These reports will include accomplishments for the objectives in the area's annual work plan, information needed to manage the field operations, and information needed to meet external reporting requirements (federal government, LCMR, the Governor, etc.).

The Moose Lake Area staff will develop and test a revised time and accomplishment reporting system as a model for use in other areas. This system will be computerized and will be capable of providing regular, up-to-date information for management purposes as well as reports for program planning and budgeting at the area, regional, and statewide levels.

FINANCIAL REPORTS

The area will keep records that show actual revenues and expenses compared with budgeted revenues and expenses. These records will be reviewed regularly to insure that spending is within budget limits and consistent with the budgeted purpose. An attempt will be made to keep these records on a program basis as well as a line item basis.

POSITION DESCRIPTIONS

Responsibility for the activities described in the programs has been delegated to area personnel through updated position descriptions. Principal responsibilities identified in position descriptions need to relate to program goals and objectives. These position descriptions will be reviewed annually as part of the employee appraisal process and will be updated at least every three years.

IMPLEMENTATION RESPONSIBILITY

Area staff will have the primary responsibility for implementation of the plan. Special assistance will be provided by the St. Paul Planning and Management Information Systems staffs in designing the accomplishment reporting and work planning systems.

The planning staff will also provide assistance in the rewriting of the plan in 1994 and will be responsible for coordinating the departmental review of the new plan.

A number of actions proposed in this plan are beyond the scope of the Moose Lake Area or Division of Forestry to resolve on their own. Cooperative efforts with other divisions or agencies will be required to:

1. Re-evaluate the Minnesota-Wisconsin Boundary Trail Plan.
2. Publish department-wide recreation user maps.
3. Develop policy on the use of off road vehicles on Division of Forestry administered land.
4. Implement the land exchanges and boundary changes proposed in this plan.
5. Re-evaluate policies and procedures for designating recreation sub-areas.
6. Develop management plan for Black Lake SNA.
7. Monitor ORV use on state land.

PLAN REVIEW AND REVISION

Continual revision of the Moose Lake Plan is necessary to ensure lasting plan utility and effectiveness. Plan revisions will occur when the following circumstances arise:

1. Operating budget is substantially different than the projected figures.
2. Program objectives change significantly.
3. Management needs change significantly.

4. New information and analytical methods become available that would have a major impact on planned activities.
5. The Minnesota Forest Resources Plan changes focus significantly.
6. Exceptional events occur such as:
 - a. a major fire year
 - b. a substantial change in the land base
 - c. major shifts in timber markets

Regular review of the plan should be done to identify emerging issues and trends which may impact the plan, to discover and address problems, and to evaluate performance in implementing the plan.

An overall rewrite of the plan will be completed no later than 1994. This will include a reassessment of the area's land base and the program directions for the area as well as development of new program objectives and an implementation plan.

MOOSE LAKE AREA FOREST RESOURCE MANAGEMENT PLAN
APPENDICES

Appendix

- A. Wildlife Species List for the Moose Lake Area
- B. Description of Principal Game, Endangered, Threatened, and Special Concern Wildlife Species in the Moose Lake Area
- C. Evaluation of Unique Plant and Plant Communities in the Moose Lake Area
- D. Moose Lake Area Forest Resource Management Compartments
- E. Timber Regulation Plan
- F. Moose Lake Area Fire Plan
- G. Moose Lake Area Recreational Sub-Area Plan
- H. Soil Resource Interpretations and Forest Management Guidelines for Geomorphic Regions in the Moose Lake Area
- I. Wild and Scenic River Rules
- J. Protected Waters Map and Inventory

APPENDIX A

Wildlife Species List for the Moose Lake Area

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| Reptiles | A-1 |
| Amphibians | A-1 |
| Mammals | A-2 |
| Birds | A-3 |
| Information and References | A-6 |

Source Codes

- (SCSP) - St. Croix State Park, 1983 inventory update.
(BSP) - Banning State Park, Master Plan.
(NA) - Northwoods Audubon, unpublished information from Mike Link for Pine County.
(DNR) - Department of Natural Resources, Nongame Program.
(JWL) - Jeffrey W. Lang, The Reptiles and Amphibians of Minnesota (unpublished draft).
(MM) - The Mammals of Minnesota, E.B. Hazard, 1982, University of Minnesota Press, Minneapolis, 281 pp.

Reptiles

| | | |
|------------------------|----------------------------------|-----------------|
| Snapping Turtle | <u>Chelydra serpentina</u> | (SCSP, NA, BSP) |
| Painted Turtle | <u>Chrysemys picta</u> | (SCSP, NA, BSP) |
| Wood Turtle | <u>Clemmys insculpta</u> | (DNR, JWL) |
| Blanding's Turtle | <u>Emydoidea blandingi</u> | (SCSP, DNR) |
| Map Turtle | <u>Graptemys geographica</u> | (JWL) |
| Spiny Softshell Turtle | <u>Trionyx spiniferus</u> | (SCSP, NA, BSP) |
| Prairie Skink | <u>Eumeces septentrionalis</u> | (JWL) |
| Fox Snake | <u>Elaphe vulpina</u> | (JWL) |
| Western Hognose Snake | <u>Heterodon nasicus</u> | (JWL) |
| Eastern Hognose Snake | <u>Heterodon platyrhinos</u> | (SCSP, NA) |
| Northern Water Snake | <u>Nerodia sipedon</u> | (SCSP, BSP) |
| Smooth Green Snake | <u>Opheodrys vernalis</u> | (SCSP) |
| Red Belly Snake | <u>Storeria occipitomaculata</u> | (SCSP, NA) |
| Plains Garter Snake | <u>Thamnophis radix</u> | (JWL) |
| Common Garter Snake | <u>Thamnophis sirtalis</u> | (SCSP, NA, BSP) |

Amphibians

| | | |
|-------------------------|------------------------------|-----------------|
| Blue-spotted Salamander | <u>Ambystoma laterale</u> | (NA) |
| Tiger Salamander | <u>Ambystoma tigrinum</u> | (NA) |
| Mudpuppy | <u>Nexturus maculosus</u> | (NA) |
| Redback Salamander | <u>Plethodon cinereus</u> | (NA, BSP) |
| American Toad | <u>Bufo americanus</u> | (SCSP, NA, BSP) |
| Spring Peeper | <u>Hyla crucifer</u> | (SCSP, NA, BSP) |
| Gray Treefrog | <u>Hyla versicolor</u> | (SCSP, NA) |
| Striped Chorus Frog | <u>Pseudacris triseriata</u> | (SCSP, NA) |
| Green Frog | <u>Rana clamitans</u> | (NA, SCSP, BSP) |
| Northern Leopard Frog | <u>Rana pipiens</u> | (SCSP, NA) |
| Mink Frog | <u>Rana septentrionalis</u> | (NA) |
| Wood Frog | <u>Rana sylvatica</u> | (SCSP, NA) |

Mammals

| | | |
|--------------------------------|--|---------------------|
| Masked Shrew | <u>Sorex cinereus</u> | (SCSP, BSP, MM) |
| Water Shrew | <u>Sorex palustris</u> | (MM, NA) |
| Arctic Shrew | <u>Sorex arcticus</u> | (MM) |
| Short-tailed Shrew | <u>Blarina brevicauda</u> | (MM) |
| Eastern Mole | <u>Scalopus aquaticus</u> | (BSP) |
| Star-nosed Mole | <u>Condylura cristata</u> | (MM) |
| Little Brown Myotis | <u>Myotis lucifugus</u> | (BSP) |
| Big Brown Bat | <u>Eptesicus fuscus</u> | (BSP, MM) |
| Red Bat | <u>Lasiurus borealis</u> | (MM) |
| Eastern Cottontail | <u>Sylvilagus floridanus</u> | (SCSP, BSP, MM) |
| Snowshoe Hare | <u>Lepus americanus</u> | (SCSP, BSP, NA, MM) |
| Eastern Chipmunk | <u>Tamias striatus</u> | (MM) |
| Least Chipmunk | <u>Eutamias minimus</u> | (SCSP) |
| Woodchuck | <u>Marmota monax</u> | (SCSP, MM) |
| Thirteen-lined Ground Squirrel | <u>Spermophilus tridecemlineatus</u> | (SCSP, MM) |
| Franklin's Ground Squirrel | <u>Spermophilus franklinii</u> | (MM) |
| Gray Squirrel | <u>Sciurus carolinensis</u> | (SCSP, MM) |
| Fox Squirrel | <u>Sciurus niger</u> | (SCSP, MM) |
| Red Squirrel | <u>Tamiasciurus hudsonicus</u> | (SCSP, BSP, MM) |
| Northern Flying Squirrel | <u>Claucomys sabrinus</u> | (SCSP, MM) |
| Plains Pocket Gopher | <u>Geomys bursarius</u> | (MM) |
| Beaver | <u>Castor canadensis</u> | (SCSP, BSP, MM) |
| Woodland Deer Mouse | <u>Peromyscus maniculatus gracilis</u> | (SCSP, BSP, MM) |
| White-footed Mouse | <u>Peromyscus leucopus</u> | (SCSP, MM) |
| Southern Red-backed Vole | <u>Clethrionomys gapperi</u> | (SCSP, MM) |
| Meadow Vole | <u>Microtus pennsylvanicus</u> | (SCSP, BSP, MM) |
| Muskrat | <u>Ondatra zibethicus</u> | (SCSP, BSP, NA, MM) |
| Southern Bog Lemming | <u>Synaptomys cooperi</u> | (MM) |
| Meadow Jumping Mouse | <u>Zapus hudsonius</u> | (SCSP) |
| Woodland Jumping Mouse | <u>Mapaeozapus insignis</u> | (MM) |
| Porcupine | <u>Erethizon dorsatum</u> | (SCSP, MM) |
| Coyote | <u>Canis latrans</u> | (SCSP, BSP, NA, MM) |
| Gray Wolf | <u>Canis lupus</u> | (SCSP, NA) |
| Red Fox | <u>Vulpes vulpes</u> | (SCSP, BSP, MM) |
| Gray Fox | <u>Urocyon cinereoargenteus</u> | (BSP, MM) |
| Black Bear | <u>Ursus americanus</u> | (SCSP, BSP, NA, MM) |
| Raccoon | <u>Procyon lotor</u> | (SCSP, BSP, MM) |
| Fisher | <u>Martes pennanti</u> | (SCSP, MM) |
| Short-tailed Weasel | <u>Mustela erminea</u> | (MM) |
| Least Weasel | <u>Mustela nivalis</u> | (SCSP, MM) |
| Long-tailed Weasel | <u>Mustela frenata</u> | (SCSP) |
| Mink | <u>Mustela vison</u> | (BSP, MM) |
| Badger | <u>Taxidea taxus</u> | (MM) |
| Spotted Skunk | <u>Spilogale putorius</u> | (MM) |
| Striped Skunk | <u>Mephitis mephitis</u> | (SCSP, MM) |
| River Otter | <u>Lutra canadensis</u> | (SCSP, BSP, MM) |
| Lynx | <u>Lynx canadensis</u> | (MM) |
| Bobcat | <u>Lynx rufus</u> | (SCSP, NA, MM) |
| White-tailed Deer | <u>Odocoileus virginianus</u> | (SCSP, BSP, NA, MM) |
| Moose | <u>Alces alces</u> | (MM) |

Birds

Status Codes

- R - Regular, a species that occurs somewhere in the area during at least one season each year.
C - Casual, a species that is expected to occur in the area every 3-5 years but not every year.
I - Irregular winter visitor.
N - Nesting in the area.
M - Migrant or winter visitor, but not nesting in the area.
UK - Status unknown.

| | |
|--------------------------------|------------------------------|
| Common Loon - RN | Swainson's Hawk - CM |
| Red-necked Grebe - RM | Rough-legged Hawk - RM |
| Horned Grebe - RM | Golden Eagle - RM |
| Pied-billed Grebe - RN | Bald Eagle - RN |
| White Pelican - CM | Marsh Hawk - RN |
| Double-crested Cormorant - RM | Osprey - RN |
| Great Blue Heron - RN | Peregrine Falcon - RM |
| Green Heron - RN | Merlin - RM |
| Black-crowned Night Heron - RM | American Kestrel - RN |
| Yellow-crowned Night Heron - A | Ruffed Grouse - RN |
| Least Bittern - CN | Sharp-tailed Grouse - RN |
| American Bittern - RN | Greater Prairie Chicken - UK |
| Whistling Swan - RM | Bobwhite - UK |
| Canada Goose - RN | Ring-necked Pheasant - RN |
| Snow Goose - RM | Sandhill Crane - RN |
| Mallard - RN | Virginia Rail - RN |
| Black Duck - RN | Sora - RN |
| Gadwall - RM | American Coot - RN |
| Green-winged Teal - RN | Semipalmated Plover - RM |
| Blue Winged Teal - RN | Killdeer - RN |
| American Wigeon - RM | Ruddy Turnstone - RM |
| Northern Shoveler - RM | American Woodcock - RN |
| Wood Duck - RN | Common Snipe - RN |
| Redhead - RM | Upland Sandpiper - RM |
| Ring-necked Duck - RN | Spotted Sandpiper - RN |
| Canvasback - RM | Solitary Sandpiper - RM |
| Greater Scaup - RM | Willet - CM |
| Lesser Scaup - RM | Greater Yellowlegs - RM |
| White-winged Scoter - CM | Lesser Yellowlegs - RM |
| Common Goldeneye - RM | Short-billed Dowitcher - CM |
| Bufflehead - RM | Long-billed Dowitcher - CM |
| Ruddy Duck - RM | Pectoral Sandpiper - RM |
| Hooded Merganser - RM | Marbled Godwit - A |
| Common Merganser - RM | White-rumped Sandpiper - RM |
| Red-breasted Merganser - RM | Least Sandpiper - RM |
| Turkey Vulture - RM | Dunlin - RM |
| Goshawk - RN | Wilson's Phalarope - RM |
| Sharp-shinned Hawk - RN | Northern Phalarope - CM |
| Cooper's Hawk - RN | Herring Gull - RM |
| Red-tailed Hawk - RN | Ring-billed Gull - RM |
| Red-shouldered Hawk - RN | Bonaparte's Gull - RM |
| Broad-winged Hawk - RN | |

Birds continued

Forster's Tern - CM
Common Tern - CM
Caspian Tern - CM
Black Tern - RM
Rock Dove - RN
Mourning Dove - RN
Yellow-billed Cuckoo - RN
Black-billed Cuckoo - RN
Screech Owl - RN
Great horned Owl - RN
Snowy Owl - RM
Hawk Owl - CM
Barred Owl - RN
Great Grey Owl - CN
Long-eared Owl - RN
Short-eared Owl - RM
Boreal Owl - I
Saw-whet Owl - RM
Whip-poor-will - RN
Common Nighthawk - RN
Chimney Swift - RN
Ruby-throated Hummingbird - RN
Belted Kingfisher - RN
Common Flicker - RN
Pileated Woodpecker - RN
Red-bellied Woodpecker - RN
Red-headed Woodpecker - RN
Yellow-bellied Sapsucker - RN
Hairy Woodpecker - RN
Downy Woodpecker - RN
Black-backed Three-toed Woodpecker - RN
Eastern Kingbird - RN
Great Crested Flycatcher - RN
Eastern Phoebe - RN
Yellow-bellied Flycatcher - RM
Alder Flycatcher - RN
Least Flycatcher - RN
Eastern Wood Peewee - RN
Olive-sided Flycatcher - RN
Horned Lark - RN
Tree Swallow - RN
Bank Swallow - RN
Rough-winged Swallow - CM
Barn Swallow - RN
Cliff Swallow - RN
Purple Martin - RN
Gray Jay - RN
Blue Jay - RN
Common Raven - RN
Common Crow - RN
Black-capped Chickadee - RN
Boreal Chickadee - RN
White-breasted Nuthatch - RN
Red-breasted Nuthatch - RN
Brown Creeper - RN
House Wren - RN
Winter Wren - RN
Marsh Wren - RN
Sedge Wren - RN
Mockingbird - A
Gray Catbird - RN
Brown Thrasher - RN
American Robin - RN
Varied Thrush - I
Wood Thrush - RN
Hermit Thrush - RN
Swainson's Thrush - RN
Gray-cheeked Thrush - RM
Veery - RN
Eastern Bluebird - RN
Golden-crowned Kinglet - RM
Ruby-crowned Kinglet - RM
Water Pipit - CM
Bohemian Waxwing - CM
Cedar Waxwing - RN
Northern Shrike - RM
Loggerhead Shrike - RM
Starling - RN
Yellow-throated Vireo - RN
Solitary Vireo - RM
Red-eyed Vireo - RN
Philadelphia Vireo - RM
Warbling Vireo - RN
Black and White Warbler - RN
Prothonotary Warbler - CM
Golden-winged Warbler - RN
Tennessee Warbler - RM
Orange-crowned Warbler - RM
Nashville Warbler - RN
Northern Parula - RN
Yellow Warbler - RN
Magnolia Warbler - RN
Cape May Warbler - RM
Black-throated Blue Warbler - RN
Yellow-rumped Warbler - RN
Black-throated Green Warbler - RN
Blackburnian Warbler - RN
Yellow-throated Warbler - CM
Chestnut-sided Warbler - RN
Bay-breasted Warbler - RM
Blackpoll Warbler - RM
Pine Warbler - RN

Birds continued

| | |
|------------------------------|-----------------------------|
| Palm Warbler - RM | Purple Finch - RN |
| Ovenbird - RN | Pine Grosbeak - RM |
| Northern Waterthrush - RN | Gray-crowned Rosy Finch - A |
| Louisiana Waterthrush - CM | Hoary Redpoll - I |
| Connecticut Warbler - RM | Common Redpoll - RM |
| Mourning Warbler - RN | Pine Siskin - RM |
| Common Yellowthroat - RN | American Goldfinch - RN |
| Wilson's Warbler - RM | Red Crossbill - RM |
| Canada Warbler - RN | White-winged Crossbill - RM |
| American Redstart - RN | Rufous-sided Towhee - RN |
| House Sparrow - RN | Savannah Sparrow - RN |
| Bobolink - RN | Grasshopper Sparrow - RN |
| Eastern Meadowlark - RN | LeConte's Sparrow - RN |
| Western Meadowlark - RN | Vesper Sparrow - RN |
| Yellow-headed Blackbird - RM | Dark-eyed Junco - RN |
| Red-winged Blackbird - RN | Tree Sparrow - RM |
| Northern Oriole - RN | Chipping Sparrow - RN |
| Rusty Blackbird - RM | Clay-colored Sparrow - RN |
| Brewer's Blackbird - RN | Field Sparrow - RN |
| Common Grackle - RN | Harris' Sparrow - CM |
| Brown-headed Cowbird - RN | White-crowned Sparrow - RM |
| Scarlet Tanager - RN | White-throated Sparrow - RN |
| Western Tanager - CM | Fox Sparrow - RM |
| Cardinal - CN | Lincoln's Sparrow - RM |
| Rose-breasted Grosbeak - RN | Swamp Sparrow - RN |
| Indigo Bunting - RN | Song Sparrow - RN |
| Dickcissel - RM | Lapland Longspur - RM |
| Evening Grosbeak - RM | Snow Bunting - RM |

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APPENDIX B

Description of Principal Game, Endangered, Threatened, and
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Major Game Species

White-tailed Deer

The white-tailed deer is the primary big game animal in the Moose Lake Area today. In presettlement times deer were scarce in the pine forests. They occurred mainly in the hardwood forests along the prairie edge, in the wooded river bottoms, and in prairie groves. Deer populations increased dramatically and became common throughout the Moose Lake Area following logging, fires, and settlement.

In the late 1960's, deer populations declined due to forest maturation, a series of hard winters and possibly over-harvest. As a result, the deer hunting season was closed in 1971. Deer populations increased again in the late 1970's due to harvest limitations on antlerless deer and several mild winters.

Deer densities vary throughout the Moose Lake Area depending on habitat. The area lies within three Deer Management Units. Deer census information is based on these units.

The Itasca Southeast unit includes most of Carlton County and the northeastern quarter of Pine County. The average spring population per square mile as estimated by pellet counts has ranged from a low of 6.6 in 1976 to a high of 18.1 in 1981. The population dropped to 10.8 following the severe winter of 1981-82 but increased to 15.4 by 1983.

The Mille Lacs East unit includes the southwestern edge of Carlton County, the remainder of Pine County except south of Highway 70, and all but the southern edge of Kanabec County. Spring populations here were at a low of 7.0 deer per square mile in 1976, peaked at 16.5 in 1979, and reached 15.8 by 1983.

The southern end of Kanabec County and Pine County south of Highway 70 is in the Big Woods East unit. Spring deer populations in this unit have grown from 2.3 in 1977 to 5.5 in 1982.

The recurrence of severe winters like 1981-82 and 1983-84, plus the slowdown in timber harvests because of the recent recession, may cause deer populations to stabilize near their present levels. The spring population goals for Itasca Southeast and Mille Lacs East are 22 deer per square mile, so in 1983 the population was at 68 percent and 73 percent of the goals, respectively. The goal for Big Woods East is 5.9 so the population was at 93 percent of the goal in 1982.

The firearms deer harvest in the Moose Lake Area has increased from a low of 1,262 in 1976 to a high of 6,354 in 1981. From 1976 to 1982, the firearms harvest averaged 1.4 deer per square mile of habitat, with a low of 0.4 in 1976 and a high of 2.5 in 1981. The archery deer harvest has steadily increased from 4 in 1976 to 268 in 1982.

White-tailed deer populations are limited by habitat quality and periodic severe winters. Forest disturbances, such as timber harvest and fire,

remove mature timber and create succulent new growth of vegetation which provides prime food for deer. Deer need a forest that has substantial amounts of young hardwoods, brushland and grassy openings.

An optimum forest cover for deer would be 45 percent intolerant hardwoods (aspen, birch and oak), 15 percent hardwood saplings, 5 percent grassy openings and upland brush, 15 percent winter cover (white cedar or jack pine) and no more than 20 percent northern hardwoods, balsam fir or conifer plantations. These cover types, well interspersed, would produce a spring population of 30+ deer per square mile in the Moose Lake Area following good winters. Presently spring deer population density is about 15 per square mile following good winters.

Black Bear

The black bear was a resident of the early pine forests, but occurred in small numbers. The bear was held in awe by the Indians and prized by early pioneers for its meat, fat, and hide. As the land became more settled, the bear came to be considered a nuisance animal because of its power and strength and its tendency to occasionally prey on livestock, carrion, and garbage around settlements.

For many years the bear was considered a "varmint." People habitually killed any bear they saw near their farms and homes. Most hunters thought that bear meat was inedible. A bounty was placed on bear between 1945 and 1965. The bear was left unprotected until 1971 when it was finally established as a big game animal.

Initially interest in bear hunting was low and only 1 bear was registered in the Moose Lake Area in 1971. However, the registration process was new and the deer season was closed that year. Since then sportsman interest in bear hunting has steadily grown. In 1983 there were 5.2 applications per available license. Harvest of bear in the Moose Lake Area increased from 15 in 1972 to 100 in 1978. In 1979 the length of the bear hunting season was restricted to a special early fall season and only 48 animals were taken. By 1981 the harvest had increased to 109. At that time there was concern that over-harvest might be occurring. This resulted in the establishment of a limited permit system for licensing hunters which decreased the harvest to 31 in 1982 and 83 in 1983.

The bear population in the forested portions of the Moose Lake Area is estimated to average about 8-12 animals per township. Optimum bear habitat occurs in mixed deciduous forests. The mast found in oak stands and the fruits, berries, buds and grasses found in forest openings and sapling stands are especially important to bears.

Bears sometimes cause property damage by breaking into cabins and hunting shacks, usually tearing up the interior and eating any food they can find. Bear depredations also occur in bee hives, oats, corn, oak trees and apple orchards. Though usually shy and elusive, bears do rarely attack and injure people. For these reasons there is public opposition to high bear numbers. Bears can be shot when doing damage and the shooting of nuisance bears still forms a significant part of the total mortality.

Moose

Moose were common prior to logging and settlement, but they are no longer considered a game species in the Moose Lake Area. A small population of moose, probably not exceeding 12 animals, exists in the northeast part of Pine County. From time to time moose are seen in southern Carlton County. These appear to be young, transient animals and no permanent, resident populations have become established. The brainworm, carried by deer, which is lethal to moose, and the amount of civilization and farming makes it impractical to manage moose as a game animal in the Moose Lake Area.

Beaver

The lush fur of the beaver lured the first white men to Minnesota and led to the exploration of the state by trappers and voyageurs. Beaver were almost extinct by the end of the fur trade era in the early 1800's. Beaver trapping was completely prohibited in 1909, and between 1919 and 1939 beaver could be taken only by special permit. As populations recovered and fur value rose, a season was opened in 1939. Annual seasons have been held most years since then, although portions of the Moose Lake Area have been closed several times when beaver populations were low.

Beaver occur throughout the Moose Lake Area. They are most abundant along heavily wooded streams and lakeshores where aspen occurs within 300 feet of the water's edge.

Beaver are censused by aerial counts made after leaf fall along designated routes. Three beaver routes are flown in the Moose Lake Area. Between 1974 and 1983 beaver populations have been stable. The number of live beaver colonies per route mile has averaged 0.67 and has ranged from a low of 0.51 in 1982 to a high of 0.82 in 1980.

Beaver harvests are controlled by pelt prices. In the fall and winter of 1979-80 the average price per pelt hit \$32.74, higher than it had been for many years. In the Moose Lake Area that year, an estimated 1,880 beaver were taken by 160 trappers. In contrast, in the fall and winter of 1982-83 the average price per pelt fell to a 13 year low of \$10.69 and only 940 beaver were harvested by 175 trappers.

Since beaver populations have remained high, there is currently no limit on the number of beaver each trapper can take. The season is long, running from late October through April. Unless fur prices increase, the demand for beaver will remain low and the annual harvest will not approach the available surplus of beaver.

High beaver populations can cause problems. Beaver plug ditches and culverts, cut ornamental trees and flood roads, timber and farmland. Conservation Officers spend a considerable amount of their time and money from the Game and Fish Fund removing nuisance beaver. Private individuals are permitted to remove or destroy beaver that are causing damage to their property.

The beaver is also one of nature's best wildlife managers. Beaver cuttings produce browse areas, and beaver ponds create wetland habitat for mink, muskrat, otter and waterfowl, and provide openings that benefit deer, bear, grouse and many other forms of wildlife.

Management needs for beaver involve strict control of harvests when populations are low, and the maintenance of diverse aspen forests next to water areas. This type of aspen management also benefits deer, bear and grouse.

Porcupine

The porcupine is a large woodland rodent that inhabits all of the Moose Lake Area. Porcupines are solitary animals often found in tree tops during winter feeding on the bark of pines and tamarack. Their feeding activity is damaging to coniferous trees.

Porcupines have a low reproductive rate, giving birth to only one young per year. Because of their protective quills, they also have a low mortality rate. However, they are often shot by foresters and landowners because of the damage they can do to plantations.

Although edible, porcupines are not a game species. Porcupines are not censused, but they may occur at densities of about one per forty acres in coniferous forests. They benefit other wildlife species by creating snags and helping maintain forest diversity.

Snowshoe Hare

This species inhabits spruce swamps, alder thickets, and adjacent woodlands throughout the area. Although no direct data is available, population cycles in the Moose Lake Area have most likely followed statewide trends with a population high in 1980 and a low at present. Data indicates that approximately 1,500 hunters harvested about 5,000 hares in 1982. The hare is an important food source for species such as the bobcat, coyote, and great horned owl. Primary management for hare is aspen harvest providing a variety of age classes.

Bobcat

In general the bobcat uses the same habitat as the snowshoe hare: spruce swamps, alder thickets, and adjacent uplands. Harvest by both hunting and trapping from 1978 to 1982 totaled 244 animals with the greatest take occurring in 1979 at 68 animals. Population trends on a county basis are not available. In general, management that benefits snowshoe hare will benefit bobcats.

Coyote

The coyote is a totally unprotected species and is found throughout the Moose Lake Area, inhabiting virtually all habitat types in varying densities. No population or trend figures are available on a county basis. 1982 data indicate that 386 hunters and trappers took 648 coyotes in the

Moose Lake Area. Coyote hunting with dogs is very popular in this area among both local and metropolitan hunters. Management needs include maintenance of a diversity of timber age classes.

Raccoon

The raccoon inhabits lowland forest areas near wetlands, streams, and lakes throughout the Moose Lake Area. No data is available on populations on a county basis but it is likely that local populations have followed statewide trends. 1982 harvest data indicate approximately 450 hunters and trappers took about 1,300 raccoon. Management needs are continued wetland protection and den tree protection during timber harvests.

Red and Gray Fox

Red fox are more numerous than gray fox in the Moose Lake Area, particularly in the agricultural and semi-agricultural habitats. No population data is available on a county basis. Combined harvest figures for 1983 hunting and trapping indicate 298 red fox taken by 91 individuals.

Otter

Otter occur throughout the forested portions of the Moose Lake Area, but they are not abundant. No census data are available. Between 1979 and 1982 trappers registered an average of 49 otter per year in the Moose Lake Area, with a high of 76 in 1980 and a low of 27 in 1982.

Otter are closely associated with lakes, streams, and especially beaver ponds. They do not survive in heavily populated areas. Management needs include restricting trappers to a low level of harvest, protection of streamside environments from soil erosion and water pollution, and the maintenance of good beaver populations.

Mink

Mink inhabit wetlands and forests close to streams and lakes throughout the area. Lakeshore and streamfront development can have adverse effects on mink habitat. No census information is available but harvest data for 1982 indicate 154 trappers took 536 mink. Protection of wetlands and maintenance of diverse habitat are management needs for mink.

Muskrat

Musk rats inhabit wetlands, streams, and suitable lakes throughout the area. Muskrat habitat in certain lakes has been affected because of shoreline development. There is no population data on a county basis available in this area and harvest data is limited so trends cannot be established. However, data for 1982 indicates 4,457 muskrats taken by 181 trappers. Management needs include continued protection of wetlands.

Gray and Fox Squirrels

Gray and fox squirrels occur in hardwood stands throughout the area with fox squirrels more abundant in the southern part of the area than the north, but overall less abundant than gray squirrels. Approximately 4,000

hunters harvested about 23,000 squirrels in 1982. Population trends are difficult to predict because of these species' dependence on mast crops. Squirrels near agricultural lands have benefited from increased corn production. Management needs include maintenance of oak stands and the protection of den trees.

Cottontail Rabbit

The cottontail rabbit is more an inhabitant of brushy field edges in agricultural land than of forest. Information obtained during the August roadside counts indicates that populations started to increase in 1976 and peaked in 1978 and 1981 following mild winters. However, population trends cannot definitely be established because the species appears to be weather dependent. 1982 harvest figures indicate that approximately 1,200 hunters took about 3,500 cottontails in the Moose Lake Area. A management need is maintenance of brushy edges along openings and fields.

Ruffed Grouse

The ruffed grouse is the major small game species in the Moose Lake Area. Grouse are eagerly sought by hunters and sales of small game licenses rise and fall with grouse populations.

Based on mail surveys of hunters, an estimated 27,915 grouse were harvested by 10,238 hunters in the Moose Lake Area in 1982, a year that the grouse population was low. This harvest figure would be from two to three times higher in a high grouse population year.

Grouse populations fluctuate from extreme scarcity to extreme abundance, roughly on a 10-year cycle. The most recent peak occurred in 1978-1980. Research has not yet determined exactly what causes these cycles. In good habitat, fall grouse populations can reach 150 to 200 birds per section at the peak of their cycle, but fall to 15 or 20 birds per section at the low in their cycle.

The ruffed grouse is a hardwoods-brushland species that is highly dependent upon aspen. Grouse need three age classes of aspen: saplings for brood rearing cover, young pole-sized stands for drumming sites and nest cover, and mature timber for winter food supplies of male aspen buds. The maintenance of high density grouse populations requires that the three age classes of aspen be well interspersed in small blocks of 5-10 acres.

The quality of grouse habitat depreciates if there are any numbers of tall pines present which provide cover for hawks and owls, the primary predators of grouse. Accumulation of slash and ground litter is also detrimental because it provides protection for mammalian predators. These accumulations can best be removed with prescribed burning.

The chief management needs for ruffed grouse are to maintain or increase the quantity of the hardwoods type in the forest and to manage for a diverse age-class structure.

Sharp-tailed Grouse

Sharptails became abundant in the late 1800's and early 1900's in the open country created by logging, fires and farm settlements. They were a popular game bird and thousands were harvested. The birds remained numerous until the early 1940's.

As rural people moved to the cities, hundreds of small pastures and fields were abandoned. The farms they left gradually reverted to brush and trees. This reforestation process accelerated when forestry programs resulted in quick suppression of grass and brush fires and the planting of many old fields to spruce and pine.

Sharptail populations have declined to the point that only scattered, small flocks remain. Their density is estimated at 0.1 to 1.0 adult males per square mile. In 1982, 1,195 sharptails were harvested in the Moose Lake Area by 1,181 hunters.

The sharptail populations are located mostly on private lands in habitats that contain a mixture of hay fields, oat stubble, wet meadows, brushland and bogs. For high sharptail populations, the habitat structure needed is 35% grassland, 25% brushland, 18% aspen-birch, 15% cropland and 7% wet meadow-marshland. Sharptails do not tolerate tall brush or trees over 20 feet high within 1/8 mile of their spring dancing grounds.

The sharptail's habitat, which is a transition between prairie and forest, also provides good habitat for deer, ruffed grouse, waterfowl, several furbearer species and numerous nongame wildlife species. This important habitat type is critically threatened by "clean" farming practices on private lands and by intensive forest management on public lands.

Management practices include prescribed burning of wet meadows and brushlands to prevent their conversion to trees. Bog areas should be protected from over-development for peat mining or for agriculture. Sharptails are censused by spring dancing ground counts. The location and census of dancing grounds is presently incomplete.

Ring-necked Pheasant

The pheasant occurs primarily in southern Pine and Kanabec counties on agricultural land. This area is the northern fringe of pheasant range and populations are dependent to a great degree on winter severity. Populations were high from 1960 to 1963, when censuses showed an average of 168 birds/100 miles. Due to adverse conditions populations were at a low level until 1977 and then peaked in 1981 at 213 birds/100 miles. Poor nesting and wintering conditions have depressed the populations since 1981. Management should include plantings of winter cover and winter food in agricultural areas.

American Woodcock

The woodcock is common in the Moose Lake Area, which is located on one of the main migration routes for woodcock to and from wintering areas in Louisiana. No population or trend data is available on a county basis. Harvest data indicates that approximately 3,200 woodcock hunters bagged

about 17,000 birds in the Moose Lake Area in 1982. Habitat management needs for this species include timber harvests that maintain a variety of age classes in close proximity to openings and maintenance of forest openings as singing grounds.

Waterfowl

The 2,805 acres of type 3, 4, and 5 wetlands and smaller wetlands, including beaver dams, found in the area do not provide the habitat base needed to produce numerous waterfowl. However, ducks are produced--primarily mallards, blue-winged teal, and wood ducks in the marshes, beaver dams, and streams. There is also some production on the marginal habitat of fish lakes. Canada goose production is present but not widespread, and is generally associated with the semi-agricultural areas.

In 1982 approximately 13,650 ducks and 450 geese were bagged by 1,800 hunters. Most of the harvest consists of local birds with the exception of diving ducks which use northern lakes during migration.

Management needs include continued protection of wetlands, management of water levels where feasible, retention of nesting cavity trees, artificial nest box placement and development of grassland nesting cover.

Endangered and Threatened Species

Little intensive survey work directed specifically at the nongame wildlife resource has been conducted either recently or historically within the Moose Lake Area. Consequently, much of what follows is based on recent but limited studies, old records, state park inventories and an assessment of what is likely to occur in the area. Table B.1 summarizes known occurrences of threatened and special concern wildlife species in the area. Species status sheets listing the distribution, habitat, and management recommendations for each of the following endangered, threatened, and special concern species are available from the Natural Heritage Program.

Peregrine Falcon (Falco peregrinus)

Endangered (federal and state). Although this falcon no longer nests in the area, it is a regular migrant in the St. Croix River Valley. It is unlikely that forest management activities would affect this species.

Bald Eagle (Haliaeetus leucocephalus)

Threatened (federal and state). Two active eagle territories are currently known within the Moose Lake Area, One in Pine County and one in Kanabec County. There are also frequent summer reports of the species in the area, especially along the St. Croix River Valley. The bald eagle is increasing in numbers and expanding its range in Minnesota, reoccupying areas that it formerly occupied in the early 1900's. Portions of Pine, Kanabec and Carlton counties may provide nesting habitat, especially if selected red and white pines within one quarter mile of water areas are allowed to mature to nest-tree size. Forestry activities near eagle nests should observe a buffer zone and seasonal constraints as outlined in the Forestry/Wildlife Habitat Guidelines.

Table B.1. Known occurrences in the Moose Lake Area of Threatened or Special Concern wildlife species and colonial waterbird nesting sites.

| Species | County | Area of Occurrence | Legal Description | Threatened | Special Concern | Comments |
|-----------------------|---------|--------------------------|--|------------|-----------------|--|
| American Bittern | Pine | Chengwatana State Forest | --- | | X | |
| Great Blue Heron | Pine | Nemadji State Forest | T44N R16W - Sec 34 | | | 80-100 nests (1984) |
| Great Blue Heron | Pine | Ditchett | T45N R17W - Sec 1 | | | 14 nests (1984) |
| Great Blue Heron | Pine | Lower Tamarack River | T43N R17W - Sec 3 | | | 3 nests (1984) |
| Great Blue Heron | Pine | Kettle River 1 | SW NW 23 T41N R20W SW $\frac{1}{2}$ SW $\frac{1}{2}$ - Sec 23 | | | 17 nests |
| Great Blue Heron | Pine | Kettle River 2 | SW 26 T41N R20W SW $\frac{1}{2}$ Sec 26 | | | 12 pairs size unknown |
| Great Blue Heron | Kanabec | Hillman | T41N R24W | | | |
| Sandhill Crane | Kanabec | Pomroy Township | T41N R22W | | X | |
| Sandhill Crane | Kanabec | Whited Township | T40N R23W | | X | |
| Sandhill Crane | Kanabec | Kroschel Township | T42N R22W | | X | |
| Sandhill Crane | Pine | Sandstone Township | T42N R19W | | X | |
| Sandhill Crane | Pine | Danforth Township | T42N R18W | | X | |
| Sandhill Crane | Pine | Clover Township | T41N R18W | | X | |
| Sandhill Crane | Pine | Wilma Township | T42N R17W | | X | |
| Sandhill Crane | Pine | Pine City Township | T38N R20W - Sec 20 | | X | |
| Sandhill Crane | Pine | Ogema Township | T41N R16W - Sec 16 | | X | |
| Sandhill Crane | Pine | Arma Township | T42N R16W - Sec 16 | | X | |
| Osprey | Pine | St. Croix State Forest | T41N R17W - Sec 24 | | X | |
| Louisiana Waterthrush | Pine | St. Croix State Park | T40N R17W - Sec 33 | | X | |
| Louisiana Waterthrush | Pine | St. Croix State Forest | T41N R16W - Sec 7 | | X | |
| Louisiana Waterthrush | Pine | Kettle River SNA | T41N R20W - Sec 23 | | X | |
| Louisiana Waterthrush | Pine | Nemadji State Forest | T44N R16W - Sec 28 | | X | |
| Wood Turtle | Pine | Hay Creek | T42N R16W | X | | |
| Wood Turtle | Pine | St. Croix State Park | T40N R18W | X | | |
| Wood Turtle | Pine | Upper Tamarack River | T42N R16W - Sec 25 | X | | |
| Blanding's Turtle | Pine | Bear Creek | --- | X | | |
| Blanding's Turtle | Pine | Pine City | NE 27 T39N R21W | X | | |
| Blanding's Turtle | Pine | St. Croix State Park | NW 33 T41N R17W | X | | |
| Blanding's Turtle | Pine | St. Croix State Park | NE 19 T40N R19W (1984) | X | | |
| Blanding's Turtle | Pine | Munch Township | NW 13 T40N R20W (1984) | X | | |
| Bat Cave | Pine | Banning State Park | NW 10 T42N R20W | | | Winter hibernacula for Keen's Myotis, Little Brown Bat, and Big Brown Bat |
| Bald Eagle Nest | Pine | St. Croix State Forest | | X | | |
| Bald Eagle Nest | Kanabec | | | X | | |
| Timber Wolf | Pine | Nemadji State Forest | | X | | |

Timber Wolf

Threatened (federal and state). The timber wolf population is low in the Moose Lake Area. One or two wolf packs are resident in the Nemadji State Forest. Individuals from these packs, or from packs located to the north in St. Louis County, may range into other parts of the Moose Lake Area on occasion. Most of the information regarding wolves in the Nemadji State Forest is the result of research being done in Wisconsin, as these wolves move back and forth across the state line. Management should include maintenance of remote habitat in the Nemadji State Forest and provision of viable prey densities, especially deer.

Loggerhead Shrike (Lanius ludovicianus)

Threatened (state). This species has undergone a dramatic decline in the last 15 years. It was formerly considered a regular breeding species in the St. Croix River Valley and surrounding counties. It is now considered a rare migrant. Survey work needs to be conducted to determine if this species still occurs in the Moose Lake Area. The shrike's preferred habitat is open country, farmsteads, and shelterbelts.

Wood Turtle (Clemmys insculpta)

Threatened (state). There are three records of this species from Pine County between 1936 and 1977 (Table 1). The Wood Turtle is semi-terrestrial, preferring small, fast-moving streams in relatively undisturbed areas of deciduous and coniferous forests. It seems that much available habitat for this turtle still remains in east-central Minnesota, especially in the Moose Lake Area. Survey work needs to be done to determine the distribution and abundance of this species in Pine County and surrounding areas.

Blandings Turtle (Emydoidea blandingii)

Threatened (state). There are also five records of this turtle available for Pine County from 1937 to 1984 (Table B.1). This species is a marsh inhabitant requiring large expanses of marsh and floating sedges with adjacent elevated sand dunes for nesting. Survey work is also needed on this turtle to determine its occurrence and abundance.

Species of Special Concern

American Bittern (Botaurus lentiginosus)

This inconspicuous marsh bird is considered a regular nester in the Moose Lake Area. It has declined in numbers statewide in recent years.

Red-shouldered Hawk (Buteo lineatus)

Although this species has never been common in Minnesota in historical times, it has declined markedly since the 1940's. The decline is attributed largely to the conversion of expansive forested bottomlands into transitional habitats dotted with large pastures and clearings. The species is considered a regular nester in the St. Croix River Valley but it is on the northern edge of its range in Pine and southern Carlton counties.

Osprey (Pandion haliaetus)

Nesting has been documented in Pine County with one active nest on the south boundary of St. Croix State Forest (Table 1). Much of the Moose Lake Area contains habitat suitable for ospreys and it is likely that there are other active territories not yet documented.

Sandhill Crane (Grus canadensis)

Although it formerly occupied much of the western and central portions of the state, the sandhill crane's range is now considerably reduced and limited to portions of extreme northwest Minnesota and east-central Minnesota. Much of the Moose Lake Area lies within the center of the east-central population. Numerous summer reports are available from Pine and Kanabec counties with confirmed breeding in Pine County (Table B.1).

Upland Sandpiper (Bartramia longicauda)

Green and Janssen (1975) considered the upland sandpiper "very scarce" in Pine County. Whether it currently occurs in the county or not has not been well-documented. Preferred habitat is grasslands and low grass meadows.

Wilson's Phalarope (Phalaropus tricolor)

In 1971 and 1972 this species was found nesting in rice paddies in Aitkin County. Records from Crex Meadow (Burnett Co., WI) indicated it nested there in 1972 and 1974 (Faanes 1981). No records are available for Pine, Kanabec, or Carlton counties. Mike Link, Director of Northwoods Audubon, has reported this species in Pine County. Preferred habitat is shallow water of ponds or lakes interspersed with wet-meadow vegetation.

Short-eared Owl (Asio flammeus)

The short-eared owl was a common and widespread summer resident in the first half of this century when it occurred widely and was frequently observed throughout much of the state. It is now uncommon to rare in the Moose Lake Area.

Louisiana Waterthrush (Seiurus motacilla)

This is another species whose range and abundance has declined dramatically in Minnesota in the last 50 years. Recent reports have documented this species' occurrence in Pine County (Table B.1).

Snapping Turtle (Chelydra serpentina)

The snapping turtle has been reported in both Pine and Carlton counties. There is concern for this species regarding the effects of commercial harvest on local populations and of PCB and mercury contamination on turtle consumers. The preferred habitat of this turtle is slow-moving, quiet water with muddy bottoms.

Fox Snake (Elaphe vulpine)

The fox snake has been reported in Pine County. It is associated with woody rock bluffs along larger streams and adjacent moist lowlands. There is a lack of information on this species.

Eastern Hognose Snake (Heterodon platyrhinos)

This snake has also been reported in Pine County. It occurs in deciduous forest, mixed deciduous and coniferous forest, sandy regions and river valleys. There is a lack of information on this species as well.

Western Hognose Snake (Heterodon nasicus)

This close relative of the Eastern Hognose has also been reported in Pine County, but it is much more rare. Preferred habitat includes grassland, prairie and mixed forest-prairie.

Colonial Waterbird Nesting Sites

Six small Great Blue Heron colonies have been identified in the Moose Lake Area, five in Pine County and one in Kanabec County (Table B.1). Because of the general inaccessibility of these colonies, most have not been inventoried recently. It is possible that other small colonies may be present and/or that some of these sites may no longer be active. The Great Blue Heron is not a state listed species but is included here because its colonial nesting habits make it vulnerable to disturbance.

Bat Caves

Recent survey work has identified Robinson's Ice Cave within Banning State Park as an active winter hibernacula for three bat species: the little brown bat (Myotis lucifugus), the big brown bat (Eptesicus fuscus), and Keen's myotis (Myotis keeni). The latter is officially listed as a species of special concern in Minnesota. In general, bat caves are a feature of special interest in the state.

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APPENDIX C

Evaluation of Unique Plants and Plant
Communities in the Moose Lake Area

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Introduction

The Natural Heritage Program, a unit within the Section of Wildlife, Department of Natural Resources, has compiled the most complete single source of existing data on Minnesota's rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features. While this information is comprehensive, it cannot be considered a substitute for an on-site survey. A review of our data-base indicates that within the Moose Lake Forestry Area (i.e., all of Pine and Kanabec counties and the southern townships of Carlton County) there are a number of significant occurrences of rare plants, animals and plant communities.

We would recommend that an on-site biological survey is needed if a thorough evaluation is to be completed. There has been very little inventory work conducted for these type of resources in this area of the state. Those inventories that have been conducted have been restricted to a few parcels of land (i.e., the Kettle River SNA and a proposed natural area within St. Croix State Park). As a result, much of the attached comments are based on these recent but limited inventories, old historical records and/or upon our assessment of what may likely occur in the area.

Plant Communities

The Natural Heritage Program gathers statewide data on the location and status of natural communities which have been little modified by man's activities. Occurrences of natural communities which have maintained (or regained) their presettlement features have been greatly reduced in extent and now represent only a small fraction of the Minnesota landscape. To date, twenty-two natural community types have been identified as ecologically sensitive, i.e., high quality occurrences of the community type are now rare and are in jeopardy of being destroyed or degraded. These community types, called elements, are ranked by the NHP according to their relative rarity and endangerment throughout their range. Elements are ranked as follows:

- Critically endangered throughout range
- Endangered throughout range
- Critically state endangered
- State endangered
- State threatened
- Possibly in peril

The Moose Lake Forestry Area occurs within a region where five major vegetation types occurred abundantly. The original vegetation was a mosaic of Aspen-Birch Forest, White and Red Pine Forest, Northern Hardwood-Conifer Forest, Bog and Swamp. Floodplain Forest and Jack Pine Forest were minor components. The White and Red Pine Forest and the Northern Hardwood-Conifer Forest have suffered the greatest alteration - old growth stands of these forest communities are now rare in this region.

Although White and Red Pine stands have been greatly reduced in original extent, these forests are still fairly well represented in managed areas in other parts of Minnesota. As such, White and Red Pine stands are not considered endangered or threatened, but are given special concern in the southern part of their original range. The Northern Hardwood-Conifer Forest is considered threatened throughout the state and old growth stands have a high priority for protection. The remaining community types: Aspen-Birch Forest, Bog, Swamp, Floodplain Forest, and Jack Pine Forest have suffered much less alteration and high quality stands are still fairly widespread on the Minnesota landscape. Although none of these vegetation types are considered endangered or threatened in the state, exemplary stands should receive special concern.

The Moose Lake Forestry Area has not received a complete plant community survey, in part because the majority of the vegetation types here are not considered endangered. Inventory efforts in this region should concentrate on old growth stands of white and Red Pine Forest and Northern Hardwood-Conifer Forest.

In review of the study area, five occurrences of natural community types were found in our data base. In a number of cases too little information is available on the sites to determine if they are of high enough natural quality to be considered ecologically sensitive. Each occurrence is discussed below.

Pine County/Kettle River SNA/T41N R20W parts of Secs 10, 15, 22

The Kettle River SNA contains two natural community elements: Floodplain Forest and Red Pine Forest. The Red Pine stand is approximately 30 acres in size and occurs over Sandstone bedrock with deep vertical joints. The forest is a young-mature stand of post-fire origin. The Red Pine form an all-age stand that is quite unusual as pine ordinarily does not reproduce itself without fire. The edaphic conditions are so severe here as to prevent the establishment of more shade-tolerant deciduous trees. The understory is sparse, lichens, feather mosses and Vaccinium are the predominant species present.

The Floodplain forest (approx, 195 acres) occurs along the Kettle River and has been slightly disturbed by selective logging in the 1960's. The stand still however maintains much of its original structure and composition. The dominant trees are Silver Maple, Black Ash, American Elm, Green Ash, and Bur Oak. The understory is characterized by Matteuccia struthiopteris, Laportea canadensis, Pilea pumila, Leersia spp. and Impatiens.

Pine County/St. Croix State Park Natural Area/T41N R17W parts of Sec 32, 33, 34

The St. Croix State Park Natural Area contains 2 natural community elements: Floodplain Forest and Deciduous Swamp. The Floodplain forest is approximately 560 acres in size and borders the St. Croix River that frequently floods in early summer and spring. The floodplain forests are dominated by Acer sacharinum with lesser amounts of Black Ash, and American Elm. The understory is characterized by Polygonum punctatum, Laportea

canadensis and Lycopus uniflorus. These forests are excellent examples of undisturbed, pre-settlement type Floodplain Forests.

The Deciduous Swamp communities like the Floodplain Forests represent relatively undisturbed pre-settlement quality plant communities. There are two major plant community types found within the Deciduous Swamp: Black Ash Swamp and Black Ash-Yellow Birch Swamp. The Black Ash Swamp is almost a pure stand of Black Ash in wet organic soils with a sedge dominated groundcover. The Black Ash-Yellow Birch community has equal proportions of Black Ash and Yellow Birch. The wet, hummocky moss-covered groundlayer is characterized by numerous fern species - Osmunda cinnamomea, Matteuccia and Dryopteris spinulosa.

Pine County/Kerrick Bog/T45N R18W Sec 35, 26

Kerrick Bog was reported by V. Conway in 1949 to be an excellent undisturbed example of Forested Bog. The bog (approx 300 acres) surrounds Lake Margaret on the west and southwest sides. A survey and update for this area is needed. Forested Bogs are considered "apparently secure", but exemplary occurrences are deserving of special concern.

Pine County/Northern Hardwoods/T43N R20W parts of W 1/2 Sec 13

An undisturbed stand of Northern Hardwood-Conifer Forest has been reported along Log Drive Creek adjacent to Banning State Park. This community type is considered threatened in the state and is given a high priority for protection. A survey update is needed to verify this occurrence.

Pine County/White and Red Pine Forest/T45N R19W Sec 21

This Red and White Pine Stand was reported in 1980 as a 50 acre site containing 150 year old pines. The site is just southeast of Sturgeon Lake. A field survey update is needed to verify the significance of this occurrence. Red and White Pine Stands are considered "apparently secure", but old growth stands in the southern portion of the "pineries" are deserving of special concern.

Pine County/Black Lake Potential Scientific and Natural Area T45N, R16W, Sec. Portions 25, 24 and T45N, R15W, Sec. Portions 18, 19, 30

Black Lake is a softwater bog lake surrounded by sedge meadows, shrub-carr swamps and northern coniferous forest. The lake is located on the Minnesota-Wisconsin border. The State of Wisconsin is exploring the designation of public lands surrounding this lake as a State Scientific Area and has approached the Minnesota SNA Program about designating the Minnesota side as an SNA.

The site is a vast, inaccessible, undisturbed wetland complex located on an end moraine. The land surrounding the 80 acre lake is primarily muskeg. This lake is the headwaters of the Black River in Wisconsin. The open bog is dominated by leatherleaf with scattered patches of bog rosemary. Black Spruce are normally scattered and stunted but occasionally grow into a dense stand of full-sized trees.

Boundaries for the proposed interstate natural area will be decided when Wisconsin DNR completes its designation process. This would be the first interstate natural area in the nation.

Plants

As a region of the state, the Moose Lake Forestry Area has received only casual attention by botanists. Until recently there has been very little floristic data available for this region. Since 1980 there has been three intensive, but limited, floristic surveys. This recent research, coupled with the meager historical data available, is summarized below.

1. Decodon verticillatus (Water-willow)

This species has been designated Special Concern, (see attached status report), and has been documented at one location in the Moose Lake Area in 1977. Pine County. T43N R21W NE 1/4 NE 1/4 Sec 20 on the shore of Upper Pine Lake.

2. Polygonum arifolium (Halberd-leaved tearthumb)

This species has been designated Special Concern (see attached status report), and has been documented at one location in the Moose Lake Area in 1980. That one location is a bottom land forest in St. Croix State Park. It is possibly more widespread in the region, where it may occur in swamps and forested bogs. The location of the known population is: Pine County, T40N R17W, NW 1/4 SW 1/4 Sec 4.

3. Tsuga canadensis (Eastern Hemlock)

This is a major forest tree in eastern North America, but is a very rare species in Minnesota, and is listed as Special Concern (see status report). Most of the records available are sight records from foresters and have not been confirmed in recent years. It is likely that few additional trees exist in the Nemadji State Forest, but a thorough survey has not been conducted. The following are the only known occurrences in the region:

Pine County T43N R21W, SW 1/4 NE 1/4 sec 8 - 1939
T45N R16W, SW 1/4 NE 1/4 sec 30 - 1974
T41N R17W, exact location unknown.

Kanabec County T42N R24W, section 21.

APPENDIX D

Moose Lake Area
Forest Resource Management Compartments

STATE FOREST COMPARTMENTS

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| 39. | 09 | 341 | 16 - 46 - 20 | D-58 |
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Note: Features that qualify a compartment for prime forest land designation are marked with an asterisk in the compartment highlights section of forest resource management compartment forms. See the Land Management Plan (Chapter 3) for further discussion of prime forest lands.

COMPARTMENT ID: 1. Chengwatana State Forest - Snake River Campground MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|--------------------|--|-----------------|--------------|
| 344 Hinckley | 58 Pine | 36 | 39N | 20W |
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> | | |
| 42* | AA. School Trust | 12. Chengwatana State Forest | | |

*estimated acreage.

COMPARTMENT HIGHLIGHTS

This compartment includes type sequence numbers 12, 13, 14 and 16 in 36-39-20. These stands comprise the Snake River Campground and surrounding area.

Access: Legal access via State Forest Road 336 off of County Road 118.

*Cover Type: Northern hardwoods 52%, jack pine 48%.

Fire: Potential fire risk because of campground in jack pine stand.

Fish and Wildlife: Warm water game and warm water feeder streams.

Minerals and Soils: Metallic potential class D. Geomorphic region 62.

Ownership/Land Use: Classified retain for multiple use/recreation. Surrounded by state forest land.

*Recreation: Campground facilities include 26 campsites, 2 hand pumps and 4 vault toilets. The Minnesota-Wisconsin Boundary Trail crosses compartment. The Redhorse Ski Touring Trail also follows the southern boundary of the compartment. The Snake River is a designated Canoe and Boating Route and is a priority river for study as a possible Wild, Scenic or Recreational River. The National Park Service maintains a canoe access and picnic area at the confluence of the Snake and the St. Croix Wild and Scenic River.

*Water: The Snake River is a protected water.

Other: There have been vandalism and enforcement problems in the past.

RESOURCE MANAGEMENT GUIDELINES

Access: Construct gate where MN-WI Boundary Trail meets campground access road. Correct erosion problems on access road.

Fire: Close access road and restrict campfires during periods of high risk.

Law Enforcement: Maintain regular patrols by Forest Officer.

Recreation: Define campsite parking spurs with posts. Construct fish cleaning house with well. The campground will no longer serve as the trailhead for the Redhorse Ski Touring Trail. See Appendix G for details.

Timber: Manage to maintain aesthetics and forest cover in campground. Inspect for and remove hazard trees annually.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 2. Chengwatana State Forest - MANAGEMENT CATEGORY:
General Management

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|--|-----------------|--------------|
| 344 Hinckley | 58 Pine | 25, 26, 35, 36 and parts of 14, 22, 23, 24 and 27 | 40N | 20W |
| | | 1-2, 11-15, 22-26, and 35-36 | 39N | 20W |
| | | 6, 7, 18, 19 and parts of | 39N | 19W |
| | | 4, 5, 8, 17, 20, 29, 30 and 31 | | |
| | | 23, 27, 28 and parts of 12, 13, 24-26 and 32-35 | 38N | 20W |
| | | Parts of 6 and 7 | 38N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|------------------------------------|--|
| 16,348 | LF. 50/50 (12,365) | 12. Chengwatana State Forest |
| | AA. School Trust (1,238) | |
| | LC. Gift (2,434) | |
| | LG. Purchase (271) | |
| | BA. Indemnity School Trust (40) | |

COMPARTMENT HIGHLIGHTS

This compartment includes all Division of Forestry administered lands within the statutory boundary of the Chengwatana State Forest in Pine County except for the Snake River Campground Compartment.

Access: CSAH's 8, 10 and 14 lead to the west edge of the forest. County roads 104, 118 and 128 and township roads provide additional access. Internal access is via Chengwatana State Forest Road and class 5 winter access roads.

*Cover Type: Aspen 52%, lowland grass 23%, lowland brush 10%, northern hardwoods 5%, lowland hardwoods 3%, ash 2%, red pine 1%.

Fire: Large inaccessible marshes pose potential risk.

Fish and Wildlife: Warmwater game fish and warmwater feeder streams. Large marshes provide habitat for sandhill cranes and bitterns.

Forest Pests: Hardwood stands periodically support outbreaks of forest tent caterpillar and large aspen tortrix. Poor growth aspen stands contain high levels of white rot, canker diseases, and poplar borer damage. All hardwood stands could be susceptible to gypsy moth defoliation if the pest spreads north.

Minerals and Soils: Metallic potential class D. Geomorphic region 62, 61.

Ownership/Land Use: State lands either not classified or classified for various combinations of multiple use, recreation, and wildlife. The majority of the surrounding land on the west side is privately owned. There is county land bordering the forest on the northwest portion (T40-R20). St. Croix State Park and the St. Croix River are adjacent on the east side. The state land is divided into two non-contiguous portions with very little state land between STH 70 and County Road 118. The southern portion of the forest includes the 600 acre Rock WMA and a strip of land along the St. Croix River. The statutory boundary of the Chengwatana extends into townships 37-20 and 36-20 in Chisago County and connects

with St. Croix Wild River State Park. There are existing cabin leases in 6-39-19 (lease #144-42-95) and 7-39-19 (lease #144-42-96). There are approximately 10 miles of St. Croix river frontage within the compartment. The Upper St. Croix Resource Management Plan established a 400 foot wide maximum preservation zone along the river. The National Park Service administers most of the land in this zone. A limited development zone extends 1/4 mile back from the river (about 900 feet beyond the maximum preservation zone). There are also about 3 miles of State Wild and Scenic River frontage on the Kettle. The Wild and Scenic River Land Use District is mapped and described in Chapter 6105 of Minnesota Rules 1983. Land use restrictions for the land use district are also included in Chapter 6105.

*Recreation: Recreational trails include the Minnesota/Wisconsin Boundary Trail, the Redhorse Creek Hiking and Ski Touring Trail, and state forest snowmobile trails that connect with local grants-in-aid trails. The Kettle, St. Croix and Snake rivers are designated canoe and boating routes. See Snake River Campground compartment for description of camping facilities. There is potential for canoe campsites on the St. Croix and Kettle rivers. There is potential for a campground at 24,26,34-38-20 near the St. Croix.

*Water: Protected waters include the St. Croix River, Kettle River, Snake River, Stevens Creek, Redhorse Creek, Cedar Creek, Unnamed Creeks flowing into St. Croix in 26-38-20, Long Meadow Lake in Rock WMA, Unnamed lakes in 30 and 31-39-19, 25 and 26-39-20, 23 and 26-38-20, 13 and 24-39-20 and Unnamed wetlands in 23-38-20.

RESOURCE MANAGEMENT GUIDELINES

Access: Maintain existing permanent state forest road. Develop additional class 5 roads as needed for management purposes. Close state forest roads when conditions warrant by constructing gates at the following locations: (1) on the Chengwatana State Forest Road in 15-39-20, (2) at the timber access trail at end of Chengwatana Forest Road extension, and (3) on the road east from Beroun where it enters state land or where it forks in 36-40-20.

Forest Pest Management: Conduct annual aerial survey to map hardwood defoliation and ground checks to identify pests, rate damage, and quantify growth loss and mortality. Target severely damaged stands for harvest or conversion. Continue annual gypsy moth trapping and prioritize high value stands for foliage protection.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply. Potential exists to create wildlife impoundments.

Land Administration: Review existing land classifications and modify if necessary. Explore possibility of land exchanges with Pine County and Bureau of Indian Affairs to consolidate ownership in the northern portion of the forest. Correct errors in DNR land record in 14 and 23-40-20 to reflect fact that the Kettle River forms the forest boundary. Submit amendment to include the word "road" in statutory description of the forest boundary in 32-38-20. Develop a plan to adjust management unit boundaries in the southern portion of the forest. The Division of Fish and Wildlife (Rock WMA), the Trails and Waterways Unit (MN/WI Boundary Trail), the Division of Parks and Recreation (St. Croix Wild River State Park), the Moose Lake and Cambridge areas of the Division of Forestry, and the National Park Service should be involved in the plan. Acquire approximately 198 acres of land owned by Northern States Power Company (NSP) along the St. Croix River north of STH 70. NSP has donated a considerable acreage of land along the river in the past. This additional land would provide a nearly continuous connection of the northern and southern portions of the state forest.

Recreation: A 5.75 mile trail will be developed off the end of the Chengwatana State Forest Road. It will be for 2- and 3-wheeler use in the summer and snowmobile use in the winter. The access to the Redhorse Creek Trail will be moved from the Snake River Campground area to the end of the Chengwatana Forest Road. A portion of the Redhorse Creek Trail will be deleted to avoid the Minn.-Wisc. Boundary Trail. See Recreation Sub-Area Plan (Appendix G) for details on designated trail uses.

Timber: Timber management will be modified to limit aesthetic impacts along the St. Croix, Kettle and Snake rivers. The vegetative cutting provisions of the rules relating to wild, scenic and recreational rivers (Chapter 6105) shall apply in the Kettle River land use district. Timber management along the Minnesota/Wisconsin Boundary Trail shall be in accordance with the "Policy on Timber Harvest and Extractive Operations on State Lands Adjacent to Recreational Trails" (Circular Letter 3501). Standard management guidelines apply in other portions of the compartment.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 3. D.A.R. State Forest

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 16 | 43N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 360 | AA. School Trust | 15. D.A.R. State Forest |

COMPARTMENT HIGHLIGHTS

Access: Legal access via State Trunk Hwy. 23 which bisects compartment.

Cover Type: Birch 48%, red pine 23%, aspen 14%, road 6%, non-permanent water 6%, lowland grass 4%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class B. Possible peat - 38 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/access. Surrounded by private land. The compartment is bisected by Minnesota State Hwy. 23 and railroad tracks. Power line lease #144-62-1342.

*Recreation: D.A.R. State Forest campground and day use area with 6 campsites, 5 picnic sites, toilets, and well.

*Water: Protected water - Bear Creek and unnamed lake.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife guidelines apply.

Recreation: Define and post boundaries of campground and day use area for enforcement purposes. The boundaries should roughly coincide with the aspen stand (type sequence #1) in which the campground is located. Repair campground road and define parking areas. Replace pit toilets with vault toilets.

Timber: Manage stand with campground for continuous forest cover and aesthetics. Gradually convert stand from aspen to more tolerant hardwoods and conifers. Inspect for and remove hazard trees annually. Standard guidelines apply on remainder of area.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 4. Fond du Lac State Forest - MANAGEMENT CATEGORY:
LUP 40

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 13 | 47N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|---------------------------------|--|
| 40 | LN. Land Utilization Program | 18. Fond Du Lac State Forest |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

*Cover Type: White spruce 43%, birch 20%, balsam fir 13%. White spruce is plantation.

Minerals and Soils: Metallic potential class C. Mineral ownership uncertain. Geomorphic region 59.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by private land. Powerline crosses compartment (lease #144-62-1342).

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Check restrictions on sale or exchange of LUP land. If land must be retained delete from Fond Du Lac State Forest and add to Admin. and Scattered State Forest. If LUP land can be sold or exchanged delete from state forest and dispose.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 5. General C.C. Andrews
State Forest -
Dago Lake Day Use Area

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|--|-----------------|--------------|
| 341 Moose Lake | 58 Pine | Part of 30 and 29 Cover Type #13 and 23 in section 30 plus Dago Lake | 45N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|---|--|
| 117* | LG. Purchased (10 acres) Dago Lake is meandered. | 20. General C.C. Andrews State Forest |

*Estimated acreage. Land acreage 10; compartment also includes 107 acre Dago Lake.

COMPARTMENT HIGHLIGHTS

This compartment is the Day Use Area on the south shore of Dago Lake.

Access: Legal access via road from south side of section 30 to Dago Lake.

*Cover Type: Red pine 3%, upland grass 5%, water 92%. Dago Lake not given type # in section 30 but it is part of compartment.

*Fish and Wildlife: Dago Lake has been used as fisheries rearing pond since 1977. Lake used by diver ducks in fall.

Minerals and Soils: Metallic potential class B. Geomorphic region 57.

Ownership/Land Use: Classified retain for multiple use/wildlife. The owner of the remainder of Lot 3 and Lot 7 has expressed interest in selling this land to the state. Remainder of surrounding land is state owned.

*Recreation: Grass area on shore of lake used as parking/picnic/trail staging area.

*Water: Protected basins - Dago Lake and unnamed lake east of Dago Lake.

RESOURCE MANAGEMENT GUIDELINES

Access: Improve road and add to state forest road inventory.

Fish and Wildlife: Continue fish rearing use of Dago Lake.

Land Administration: Acquire adjacent land from willing seller. Change recommended use classification to recreation/wildlife.

Law Enforcement: Continue recreation area patrol. Increased enforcement at this area has relocated parties to McCormick Lake which is on private land.

Recreation: Develop parking lot, picnic area and toilets. See Moose Lake Recreational Sub-Area Plan (Appendix G) for details.

Timber: Manage to enhance aesthetics. Use longer rotations to provide larger trees and continuous forest cover. Inspect for and remove hazard trees annually.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 6. General C.C. Andrews
State Forest -
General Andrews Nursery

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|--------------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | Parts of 25 and 26 | 45N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 350* | LG. Purchased | 20. General C.C. Andrews State Forest |

*Estimated acreage.

COMPARTMENT HIGHLIGHTS

This compartment consists of the General Andrews Nursery including seed beds plus a 330 foot buffer zone, administrative facilities, gravel pit, disposal areas, residence, and Willow River Correction Camp lease site.

Access: Legal access from CSAH 61 via nursery entrance road.

*Cover Type: Nursery seed beds, windbreaks, seed orchards, building sites.

Fish and Wildlife: Deer browsing on seedlings and windbreaks is a problem.

Fire: Fire tower not used. Declare surplus and remove.

Forest Pests: High value windbreaks and seedbeds present unique pest management situation. The nursery is susceptible to periodic tussock moth and budworm outbreaks.

Minerals and Soils: Geomorphic region 57.

Ownership/Land Use: Classified retain for multiple use. The Willow River Correction Camp is located on a 15.1 acre lease (#144-15-4) primarily north of the entrance road in section 26 (the portion of the lease south of the road is the former septic system. It is now part of a seed bed and should be removed from the lease). There is private land to the east and north of the seed beds in section 25.

*Recreation: Self-guided interpretive nursery tour has been developed.

RESOURCE MANAGEMENT GUIDELINES

Access: Continue restricted access policy to protect nursery.

Fish and Wildlife: Special hunts or other action may be needed to limit deer damage to seedlings and windbreaks. Possibly change windbreak species composition.

Forest Pest Management: Survey and control of insects and diseases in seed beds will be responsibility of nursery personnel and pest specialists. Pest control in the adjacent buffer zone will be joint responsibility of nursery, Moose Lake Area, and pest management personnel.

Land Administration: Delete the portion of the Correction Camp lease covering the area south of the entrance road. Delineate compartment boundaries on Area and District aerial photos.

Timber: Complete Phase II inventory in section 26 to show types adjacent to nursery. Submit alterations to change timber status of stands within 330 feet of seed beds from normal to limited.

Policy on timber sales adjacent to General Andrews Nursery:

With the need to provide continuous windbreaks in and adjacent to the General Andrews Nursery seedbeds, the following management practices for timber cutting shall apply.

1. Cutting adjacent to Nursery (330' or closer) for timber management purposes. The Nursery is defined as including all windbreaks, seedbeds and interior roads.
 - A. Where no viable windbreak exists, 75' maximum width strip of timber will be removed closest to the Nursery.
 - B. Cut area will receive site preparation if necessary.
 - C. Cut area will be planted in following windbreak configuration:
 - 1st row: caragana or other shrub, 1' spacing.
 - 2nd and 3rd rows: spruce, colorado, white or norway, 8' spacing.
 - 4th and 5th rows: norway pine, 10' spacing.
 - D. Rows will be 10' apart.
 - E. When caragana and one conifer species has reached a minimum height of 5', the remaining timber stand outside the planting can be harvested.
2. Cutting interior windbreaks.
 - A. Interior windbreaks shall be the responsibility of the Nursery Supervisor. Commercial harvesting will be the joint responsibility of Nursery Superintendent and Moose Lake Area.
 - B. Regeneration will be similar to B through E under Item #1.
3. Supervision, labor and materials.
 - A. All cutting within 330' of General Andrews Nursery will require prior approval of Nursery Supervisor.
 - B. The Nursery will provide planting stock and if desired; hydraulic spade, along with herbicides that are in Nursery use.
 - C. The Moose Lake Area will provide supervision of actual sale and site preparation including equipment and labor.
 - D. Primary responsibility of actual reforestation will belong to Moose Lake Area.

PROPOSED DISPOSITION

Retain in state forest

COMPARTMENT ID: 7. General C.C. Andrews
State Forest -
Separate Section

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 36 | 45N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 640 | AA. School Trust | 20. General C.C. Andrews State Forest |

COMPARTMENT HIGHLIGHTS

Access: Legal access via dead end road crossing compartment from south to north.

Cover Type: Muskeg 34%, red pine 32%, aspen 17%, jack pine 10%, lowland black spruce 7%.

Fish and Wildlife: Possible great gray owl habitat.

Forest Protection: Potential high fire hazard area because of contiguous conifer types.

Minerals and Soils: Metallic potential class B. Possible peat on lowland types 310 acres, depth unknown. Geomorphic region 57.

Ownership/Land Use: Classified retain for multiple use/wildlife. Major block of county land adjacent on east side of compartment. Two 10 acre parcels of county land adjacent on north side classified retain for multiple use. GIA snowmobile trail lease #144-15-140.

Recreation: GIA snowmobile trail crosses parcel.

RESOURCE MANAGEMENT GUIDELINES

Access: Construct gate on access road at south side of compartment.

Fish and Wildlife Habitat: Forestry/Wildlife Guidelines apply.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 8. General C.C. Andrews
State Forest -
Willow River Campground

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|---|-----------------|--------------|
| 341 Moose Lake | 58 Pine | Parts of 1 and 2 Sec. 1 Type # 1 and 4 Sec. 2 Type # 3, 4, 5, 6 | 44N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 132* | LF. 50/50 | 20. General C.C. Andrews State Forest |

*Acreage from Phase II cover types.

COMPARTMENT HIGHLIGHTS

This compartment consists of the Willow River Campground and Day Use Area, Stanton Lake, and surrounding land.

Access: Legal access through Village of Willow River to I-35 frontage road to state forest road in campground.

*Cover Type: Red pine 42%, Lake 39%, Marsh 12%, lowland brush 7%. The stand the campground is located in is typed as red pine but actually consists of red pine, white pine, jack pine, and black spruce plantations.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Forest Pests: White pine plantations have been used for federal and state research on the effectiveness of branch pruning and direct canker treatments for blister rust control.

Fish and Wildlife: Wildlife is managing Stanton Lake for wild rice for waterfowl and furbearers. Possible loon nesting habitat.

Minerals and Soils: Metallic potential class B. Geomorphic region 57.

Ownership/Land Use: Classified retain for multiple use/wildlife. Owner of 0.9 acre triangular tract between campground and freeway in SWNW of Section 1 is willing to sell to state. Remainder of adjacent land is state owned. There are private lands on south side of lake.

*Recreation: Willow River Campground has 32 campsites, toilets, wells, and a water access site. The Minnesota-Wisconsin Boundary Trail-West Addition passes through the village of Willow River.

*Water: Protected basin-Stanton Lake, Protected watercourse-Willow River.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Wildlife will continue to manage Stanton Lake for wild rice for waterfowl and furbearers.

Forest Pest Management: Maintain white pine stands for continuing blister rust control studies and annually monitor red and jack pine stands for budworm and tussock moth build-up.

Land Administration. Change recommended use classification to recreation/conservation. Acquire adjacent portion of SWNW section 1 from willing seller.

Law Enforcement: Continue scheduled campground patrols.

Recreation: Develop 3 walk-in campsites and a small group camp, replace toilets, construct fish cleaning house, and upgrade campsites and water access site as outlined in Willow River Campground Rehabilitation Plan (MN DNR-Forestry, 1983). Possibly develop trail connection between campground and Minnesota-Wisconsin Boundary Trail-West Addition and develop beach (see Appendix G).

Timber: Manage to enhance aesthetics and water quality. Change timber status of affected stands from normal to limited. Inspect for and remove hazard trees annually.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 9. General C.C. Andrews
State Forest -
General Management

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|--|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 5 and 6 | 44N | 19W |
| | | 1 and 2 (except Willow River Campground Compartment) | 44N | 20W |
| | | 19, 30 and 31 (except Dago Lake Compartment) | 45N | 19W |
| | | 13, 23, 24, 25, 26, 35 and 36 (except General Andrews Nursery Compartment) | 45N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--|--|
| 4,081* | AA/AB School Trust (667 ac.) LF. 50/50 (1,521 ac.) LG. Purchased (1,893 ac.) | 20. General C.C. Andrews State Forest |

*Estimated acreage.

COMPARTMENT HIGHLIGHTS

This compartment consists of all state land in the General C.C. Andrews State Forest except the nursery, campground, day use area, and the non-contiguous section 36-45-19.

Access: Legal access to lands west of the freeway is from CSAH 46 on the north, Dago Lake Road (sections 25, 26 and 36), CSAH 61 (section 2), and internal state forest roads and firebreaks. Legal access to lands east of the freeway is via Dago Lake Road, township roads (sections 5 and 6), the township road going south from CSAH 46 (section 19), and internal roads and firebreaks. The land east of the freeway in section 1 is cut off by the freeway and the Willow River. Lot 4 35-45-20, on the Kettle River has no legal land access.

*Cover Type: Jack pine 46%, red pine 33%, lowland brush 3%, marsh 3%, upland brush 2%. The following stands are seed orchards: Type #1 in 19-45-19 (red pine), Type #17 in 25-45-20 (caragana) and Type #2 in 25-45-20 (red cedar). Types 11 and 12 in 24-45-20 are sources of peat used in the nursery. Type #25 in 5-44-19 is former source of moss used by nursery to pack seedlings.

Fire: Unbroken conifer types in this compartment are fire hazard.

Fish and Wildlife: Warm-water gamefish and warmwater feeder streams.

Forest Pests: This compartment is site of periodic jack pine budworm and pine tussock moth outbreaks because of large areas of even age jack pine on poor sites.

Minerals and Soils: Metallic potential class B. Scattered peat areas. Peat in 24-45-20 mined for soil conditioner in nursery beds. Geomorphic region 57.

Ownership/Land Use: Majority of land in compartment is classified retain for multiple use/wildlife. Remainder is not classified or is classified multiple use only. SESW 13-45-20 is within corporate limits of Sturgeon Lake. SESE 23-45-20 is surrounded by private land and has only one corner in common with the rest of the compartment. Lot 4 35-45-20, containing 0.17 acres on the Kettle River, is

surrounded by private land and is not adjacent to the rest of the compartment. DOT maintains a freeway rest area adjacent to the compartment in 25-45-20. The Division of Waters administers 5.81 acres at the dam on the Willow River (2-44-20). The owner of Lots 3 and 7 in 30-45-19 is willing seller. Most of the land surrounding the compartment is privately owned. The area has considerable residential development. There are leases for snowmobile trails (144-15-126), gravel (144-16-347), and utilities (144-62-1308, 144-62-1312, 144-62-1355) in this compartment.

*Recreation: Roads, firebreaks, and trails in this compartment are used extensively by snowmobiles, dirt bikes, three wheelers, and horses. The unit trail head is located at the dam site in 2-44-20. The trail is currently routed over the freeway on the Dago Lake Road bridge. The unit trail connects to the MN/WI Boundary Trail-West Addition and to local GIA snowmobile trails. There have been problems with parties and drownings at the dam site on the Willow River. The Village of Willow River has proposed further recreational development at the dam site. General Andrews Nursery personnel are currently responsible for maintaining the dam site facilities. Blueberry pickers use this compartment extensively. There is also fairly heavy deer and waterfowl hunting pressure.

*Water: Protected waters include Willow River, Kettle River, Stanton Lake (reservoir), Dago Lake and unnamed lake east of Dago Lake.

RESOURCE MANAGEMENT GUIDELINES

Access: Upgrade and add portions of existing roads to State Forest Road Inventory as proposed in State Forest Road Plan (MN DNR-Forestry, 1982). Obtain an easement where existing road crosses private land in 2-44-20 because topography makes it impossible to relocate road. Obtain easement from end of township road going south from CSAH 46 to state land in SE 1/4 19-45-19 and develop class 3 or 4 road. Obtain management access to isolated parcel east of freeway in 1-44-20 and develop class 4 road along freeway fence. Acquire legal access across 35-45-20 and develop class 3 or 4 road to provide through route in south part of forest.

Fire: Break up fire prone conifer types by establishing east-west strips of oak type. Also reinforce natural firebreaks such as the Willow River through appropriate vegetative management. This should also reduce insect and disease problems and improve wildlife habitat by increasing cover type diversity.

Fish and Wildlife: Manage proposed oak fire breaks for mast production. Determine feasibility of using former nursery peat excavation sites as wildlife ponds.

Forest Pest Management: Monitor tussock moth and budworm populations on an annual basis. Manage jack pine on a 40 year rotation to reduce susceptibility to these defoliators. Limit new red and jack pine plantations to 40 acres and diversify with spruce, larch, hardwoods, and white pine where possible.

Land Administration: Determine who owns the parcel with the trailer on the west side of Dago Lake. Administer sections 5 and 6-44-19 as part of Moose Lake District.

Law Enforcement: Institute a patrol with Conservation Officer and Forest Officer to enforce regulations outside of campgrounds and day use areas (e.g., at Willow River dam site and on state and private lands near McCormick Lake).

Recreation: Determine if unit trail can continue to be routed over freeway on Dago Lake Road bridge. Explore a cooperative project with the Village of Willow River to further develop recreation facilities at the dam site. Sign unit trails for snowmobile, three wheeler, horse, and dirt bike use. Develop link to GIA trail to Moose Lake from north boundary of the state forest. Develop a loop trail for horse riders that connects with the existing horse trail along the MN-WI Boundary Trail - West Addition (Hinckley Fire Trail). See Appendix G for details on trail development.

Timber: Standard guidelines apply except reduce rotation age for jack pine to 40 years. Management activities affecting stands with seed orchards must be approved by nursery and/or tree improvement personnel. Reserve adequate peat lands from active management to meet nursery needs. Establish oak types in selected areas for fire, pest, and wildlife purposes.

PROPOSED DISPOSITION

Retain in state forest.

Land Administration: Determine implications of placing trust fund land in a "non-income producing" compartment. Exchange trust status to land in another income producing compartment if necessary. Develop cooperative management agreement with Wisconsin to ensure compatible management of the entire wetland complex. Change administrator code to SNA and change land classification on DNR land ownership records when SNA is dedicated. The Division of Forestry will continue to conduct most management activities as outlined in a cooperative agreement with the SNA program.

Recreation: No developed recreation facilities permitted. Continue to allow waterfowl and other hunting and fishing activities.

Timber: Alter Phase II inventory timber status to reflect prohibition of logging in compartment.

PROPOSED DISPOSITION

Establish SNA as secondary unit within the Nemadji State Forest.

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|--|-----------------|--------------|
| 342 Nickerson | 58 Pine | 22, 23, 26, 27, 28, 33 and | 45N | 16W |
| 343 Eaglehead | | parts of 13, 14, 15, 24 25, 34, 35 and 36 4, 9, 10, 15, 16 and parts of 3 | 44N | 16W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--|--|
| 10,240 | LF. 50/50 (9,320 ac.) AA. School Trust (760 ac.) CB. Swamp Trust Exchange (120 ac.) BA. Indemnity School Trust (40 ac.) | 35. Nemadji State Forest |

COMPARTMENT HIGHLIGHTS

This compartment consists of a remote portion of the Nemadji State Forest west of the Soo Line R.R. Grade. This compartment will be managed to provide habitat for deer and wildlife species requiring remote conditions with low levels of human activity; timber; and dispersed recreation opportunities.

Access: Access to this compartment is via the Net Lake, Park Trail, and Beldon state forest road system of class 5 roads. The Soo Line R.R. grade adjacent to this compartment is proposed for abandonment. Development of a state forest road is a possible use of the grade with a connection to the Harlis State Forest Road in Carlton County.

*Cover Type: A number of large virgin white pines remain in this compartment. The cover type composition has not been recalculated for the new boundaries of this compartment.

*Fish and Wildlife: This compartment contains moose, bobcat, marten, fisher, wolf, and possibly occasional lynx and great gray owl. These species are at the extreme southern edge of their present range in Minnesota. Reasons for their existence include a remote location and relatively undisturbed natural resource base.

Forest Pest: Remnant white pines are subject to blister rust infection and periodic defoliation by introduced pine sawfly.

Minerals and Soils: Metallic potential class D. Peat probable in lowland types, depth unknown. Geomorphic region 61.

Ownership/Land Use: The compartment is surrounded by state lands within the Nemadji State Forest which contain some permanent forest roads. The Soo Line Railroad track has not been used for several years and will probably be abandoned. Most land in the compartment is classified retain for multiple use management.

*Recreation: A state forest snowmobile trail that has not been groomed for the past 3 years because of wet terrain passes through the compartment. This trail is formed a loop off of the Minnesota/Wisconsin Boundary Trail. One of the alternative trail alignments proposed for the Minnesota-Wisconsin Boundary Trail would use state forest roads and the Soo Line Railroad grade adjacent to this compartment.

RESOURCE MANAGEMENT GUIDELINES

Access: Maintain current low levels of motorized access to compartment to retain wildlife and solitude values. Analyze alternative uses of Soo Line R.R. grade if abandoned and acquired. No new permanent roads will be developed within this compartment. Temporary roads to permit winter logging and reforestation may be developed. All new temporary roads will be class 5 or lower standards and will be gated or otherwise closed where they leave existing roads or at the compartment boundary.

Fish and Wildlife: Manage to maintain species requiring remote, relatively undisturbed habitat. Maintain white cedar type where it occurs.

Forest Pest Management: Conduct periodic survey of remnant white pines to monitor rust infections and plan foliage protection if high sawfly populations persist for more than 2 years. Use genetically improved white pine stock to reestablish the species in targeted areas.

Land Administration: Acquire approximately 14 miles of Soo Line right of way within Nemadji State Forest if abandoned to prevent fragmentation of ownership. Analyze feasibility of alternative uses of the right-of-way, including road or trail development.

Recreation: The remote location and wet terrain make this compartment suitable for dispersed recreation activities. Hunting and trapping will remain the most frequent activities occurring in the compartment. Snowmobiling and off road vehicle use will be allowed on existing trails and roads but the trails will not be maintained or groomed because of wet conditions, limited use, and availability of alternate trails within the Nemadji State Forest. New class 5 roads developed in conjunction with winter logging activities will be gated or otherwise closed to limit disturbance of wildlife and non-motorized users by motorized vehicles and prevent soil erosion.

Timber: Restrict harvesting operations to winter only. Maintain remnant white pines.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 12. Nemadji State Forest -
Gafvert Campground

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|-------------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | Parts of 1 and 12 | 45N | 17W |
| | 09 Carlton | Part of 6 | 45N | 16W |
| | | Part of 36 | 46N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|---|--|
| 750.86* | LF. 50/50 (710.86 ac.) AA. School Trust (40 ac.) | 35. Nemadji State Forest |

*Acreage of land and Cranberry Lake (43 ac.) only. The compartment also contains Pickerel Lake (57 ac.) which is meandered.

COMPARTMENT HIGHLIGHTS

This compartment consists of Gafvert Campground and Day Use Area, Pickerel Lake, Cranberry Lake and surrounding lands. This includes all state land in section 1 (Lot 4 is private land); Lots 1 and 2 in section 12; the NWSW and SWSW of section 12; and SESW of section 36.

Access: Legal access to the campground is via a branch of the Net Lake State Forest Road. The right of way lease (#144-16-113) along the west side of section 1 is open to public use. The interior of section 1 is accessible by logging trails.

*Cover Type: Birch 23%, aspen 22%, lowland black spruce 19%, lowland brush 10%, marsh 4%.

Fish and Wildlife: Lakes in compartment provide waterfowl habitat. Net River is a designated trout stream.

Fire: Higher levels of use result in higher risk of fire than elsewhere in forest.

Minerals and Soils: Metallic potential class D. Peat possible on lowland types - 320 acres. Geomorphic regions 61 and 60.

Ownership/Land Use: Classified retain for multiple use. There are private lands on Net and Pickerel Lakes that are adjacent to this compartment.

*Recreation: Gafvert Campground has 9 campsites, a beach and picnic area, and a water access site. The Minn.-Wisc. Boundary Trail and state forest trails cross the compartment. Soil compaction in the campground area is causing loss of some birch trees. The 1977 National Christmas Tree came from the stand between Pickerel and Cranberry Lake.

*Water: Protected waters are Pickerel Lake, Cranberry Lake, and the Net River.

RESOURCE MANAGEMENT GUIDELINES

Forest Protection: Inform campground users of fire danger by posting appropriate fire prevention materials and through personal contact during patrols.

Fish and Wildlife: Post "loon nesting area" sign at water access. Erect wood duck houses. Protect trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control.

Land Administration: Lot 1 in section 2 consisting of 59.25 acres with shoreline on Net Lake is available for sale. The NWNW of 12-45-17 with shoreline on Pickerel Lake is for sale. An acquisition fact sheet has been submitted to the regional office. Consider acquiring these parcels and adding to compartment. ~~Change recommended use classification to recreation/multiple use.~~

Law Enforcement: Continue scheduled campground patrol by Forest Officer, maintain coordination with County Sheriff, and use Greenview personnel for enforcement and maintenance.

Recreation: Rehabilitate campground, develop a self-guiding nature trail, and improve the water access as outlined in the recreation appendix of this plan. Designate and sign the birch stand (type sequence #4) as a recreation sub-area for enforcement purposes.

Timber: Manage the birch stands (cover type sequence #4 and 6 in section 1), the shorelines of protected waters, and the area crossed by the nature trail to enhance aesthetics and to provide interpretive sites along the trail. Change the timber status of affected stands from normal to limited on inventory records. Inspect for and remove hazard trees annually. Modify silvicultural practices to protect trout stream and aesthetics.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 13. Nemadji State Forest -
Grouse Management Area

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|--|-----------------|--------------|
| 342 Nickerson | 58 Pine | 23, 24, 25, 26 and N $\frac{1}{2}$ of 35 SW $\frac{1}{4}$ of 19 | 45N 45N | 17W 16W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 3,027.54 | LF. 50/50 | 35. Nemadji State Forest |

COMPARTMENT HIGHLIGHTS

*This compartment is managed to increase ruffed grouse populations for hunting and field dog trials.

Access: Legal access via Net Lake State Forest Road.

*Cover Type: Aspen 35%, northern hardwoods 29%, lowland brush 17%, birch 5%, marsh 5%, oak 2%.

Minerals and Soils: Metallic potential class D. Possible peat on lowland types covering 253 noncontiguous acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by state forest land except on southwest portion of compartment. There is one hunting cabin lease (#144-42-79) in section 23.

*Recreation: Minn./Wisc. Boundary Trail runs north-south through sections 24 and 25. A multiple use state forest trail crosses section 23. A limited amount of horseback riding and hiking occur on compartment trails. The Grouse Dog Association has requested use of this compartment for field dog trials.

*Water: Protected waters include an unnamed lake in section 25.

RESOURCE MANAGEMENT GUIDELINES

Access: Upgrade Ruffed Grouse Road (part of Net Lake State Forest Road) from class 5 to class 4 and provide turnouts and parking area. Develop additional class 5 roads for timber management and eventual use as hunter walking trails. Prohibit use of ORV's on hunter walking trails in compartment. Construct gate on Ruffed Grouse Road in 19-45-16.

Fish and Wildlife: Primary goal is to increase upland game populations, especially ruffed grouse, using commercial timber harvests.

Land Administration: Change recommended use classification to wildlife/multiple use.

Law Enforcement: May require additional effort to enforce wildlife hunting regulations.

Recreation: Maintain existing trails. Develop additional non-motorized trails for hunting and field dog trials.

Timber: Modify standard timber management practices to meet wildlife goal (e.g., reduce rotation age, use smaller clearcuts). Consider regenerating selected stands without harvest if timber demand is insufficient to meet habitat management needs. Winter logging is preferable to maximize aspen sprouting.

PROPOSED DISPOSITION

Retain in state forest.

include the Beldon - 6 miles, the Net Lake - 20 miles, the Park Trail - 12 miles, and the Harlis/Holyoke - 3 miles. The remaining roads are class 5. These were constructed basically for timber hauling. A 4.4 mile segment of the Park Trail forest road is scheduled for reconstruction from class 4 to 3 because it is winding, unsafe and needs right of way clearing to ensure drying. Access to the southern and southwestern portions of the compartment along the boundaries of the state forest is inadequate. It is constrained by private property. Additional class 5 roads are necessary to access certain portions of this compartment.

*Cover Type: Aspen 30%, northern hardwoods 17%, lowland brush 13%, birch 7%, stagnant spruce 3%, balsam fir 2%, tamarack 2%, lowland grass 3%, marsh 2%, muskeg 2%, Red pine 1%, nonpermanent water 1%, oak 1%.

*Fish and Wildlife: Wolf, moose, bobcat and possibly occasional lynx and great grey owl occur in this compartment. These species are at the extreme southern edge of their range in Minnesota. The Nemadji East Compartment has management prescriptions designed to preserve a core habitat area necessary for these species. Three Great Blue Heron colonies occur in the compartment at the SESE of section 36 - T45 R17, SE 1/4 of section 34 - T44 R16 and at the SW 1/4 of section 2 - T43 R17. Net River, Little Net River, State Line Creek and Larson Creek are designated trout streams.

Forest Pests: Aspen and northern hardwood stands periodically support outbreaks of forest tent caterpillar and other defoliators. Poor growth aspen stands contain high levels of white rot, canker diseases and poplar borer damage. Birch stands are subject to birch decline.

Minerals and Soils: Metallic potential class D and B. Possible peat on 24,370 acres. Geomorphic regions 61 and 60.

Ownership/Land Use: Most of the land in this compartment is classified retain for conservation purposes. This compartment contains the majority of state owned lands in the Nemadji State Forest. Lands excluded are in the Nemadji East, Black Lake, Gafvert Campground and Grouse Management Compartments. Five thousand twenty acres of private land and 1,060 acres of county land which are within the boundaries of Nemadji State Forest are intermixed with lands in this compartment. Lands which are outside of the state forest boundaries but which are adjacent to lands in this compartment include approximately 1,700 acres of state land, and 7,000 acres of county land. There are 48 hunting cabin leases in this compartment. The leases are located in 15 sections with between 1 and 6 leases per section.

*Recreation: An extensive trail system, most of which is available for winter use only (snowmobiling) because of wet terrain, is contained in this compartment. The Minnesota-Wisconsin Boundary Trail bisects this compartment from north to south. The trail system in general needs to be widened and straightened to meet trail standards. Potential for small trail campsites exists at Round and Mud lakes in Carlton County and at Delong Lake in Pine County.

*Water: Protected waters are the Lower Tamarack River and one tributary, Keene Creek, Little McDermott Creek, McDermott Creek and two tributaries, Hay Creek, Larsons Creek, Willow River, Net River and one tributary, Little Net River and two tributaries, Section 36 Creek and one tributary, State Line Creek, Mud Lake, Unnamed Lake in Section 23 T46 R16, Net Lake, Delong Lake, Unnamed Lake in Section 15 T45 R16, Unnamed Lake in Section 25 T45 R17, Unnamed Lake in Section 20 T45 R16, Unnamed Lake in Section 31 T45 R15, Unnamed Lake in Section 8 T44 R17, Unnamed Lake in Sections 12 and 13 T43 R17. Protected wetlands are: Unnamed section 32 T44 R17, Unnamed section 34 T45 R17.

RESOURCE MANAGEMENT GUIDELINES

Access: Improve access to the southern portion of the forest by: (1) acquiring access and developing a class 4 road between 20 and 21-43-17 to serve state and county land in 16 and 17-43-17, (2) develop class 5 winter road between 33 and 34-44-17 to access land in 3 and 4-43-17 or develop class 5 winter road north from CSAH 32 between sections 21 and 22, 15 and 16, 9 and 10, and 3 and 4 of 43-17, (3) provide winter access to state land in 16-43-16 from old township road between 21 and 22-43-16, and (4) acquire legal access across SESE 13-43-17 and SWSW 18-43-16 to county land in those sections and state land in 6 and 7-43-16. All of the above access proposals involve old township roads. Check to see if roads have been abandoned and/or get permission to improve the roads. Reconstruct 4.4 mile segment of the Park Trail. Acquire Soo Line Railroad grade upon abandonment and possibly construct about 14 miles of class 3 and 4 road on the grade. Develop temporary class 5 roads as needed. Construct gates that can be closed to protect roads during wet periods or to limit access at the following locations: (1) Aspen Trail in 11-44-17, (2) Spruce Trail in 13-44-17, (3) trail off Harlis road in 26-46-16, (4) Round Lake Trail in 27-46-16, (5) Bald Eagle Trail in 17-45-16, (6) Lost Trail in 4-45-16, (7) access trail in 18-44-16, (8) access trail in 26-44-16, and (9) access trail in 32-44-16.

Fish and Wildlife: Modify timber cutting near heron colonies. Maintain beaver ponds in vicinity of heron colony. Forestry-Wildlife habitat management guidelines apply. Protect trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control.

Forest Pest Management: Conduct annual aerial survey to map hardwood defoliation and ground checks to identify pests, rate damage and quantify growth loss and mortality. Target severely damaged stands for harvest or conversion.

Land Administration: Develop land exchange plans with Carlton and Pine counties to consolidate state and county management units. Acquire certain county lands within and adjacent to compartment by land exchange.

Recreation: Modify timber harvesting near Round, Mud and DeLong lakes for possible future recreation development. Improve and maintain trails as detailed in Recreation Sub-Area Plan (Appendix G).

Timber: Standard guidelines apply, except as noted. Management along the Minnesota-Wisconsin Boundary Trail shall be in accordance with the "Policy on Timber Harvest and Extractive Operations on State Lands Adjacent to Recreational Trails" (Circular Letter 3501). Modify silvicultural practices to protect trout streams, warm-water streams, and aesthetics.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 15. Rum River State Forest - Mille Lacs WMA MANAGEMENT CATEGORY:

| | | | | |
|------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 345 Mora | 33 Kanabec | 16 | 40N | 25W |

| | | |
|----------------|--------------------|---|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 640 | AA. School Trust | 43. Rum River State Forest and ML. Mille Lacs WMA |

COMPARTMENT HIGHLIGHTS

Access: Legal access through Mille Lacs WMA and to SE corner via township road.

*Cover Type: Aspen 84%, marsh 7%, northern hardwoods 5%, oak 3%. Aspen being cut in small blocks for wildlife.

*Fish and Wildlife: Grouse management area.

Minerals and Soils: Metallic potential class E. Geomorphic region 10c.

Ownership/Land Use: Classified retain for multiple use/wildlife. Mille Lacs WMA adjacent on north, west and south. 160 acres of county land on north 1/2 of east side. Private land on south 1/2 of east side.

*Water: Protected water, unnamed lake (33-96)

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry-Wildlife habitat management guidelines apply.

Land Administration: This compartment is within the boundaries of both the Rum River State Forest and Mille Lacs WMA. Administrative control remains with the Division of Forestry because of the policy restrictions on placing trust fund land in "non-income producing" management units. The Division of Forestry will consider transferring administrative control of this trust land to wildlife in return for non-trust land administered by the Division of Fish and Wildlife.

Timber: Standard guidelines modified to reflect wildlife emphasis.

PROPOSED DISPOSITION

Retain in state forest.

RESOURCE MANAGEMENT GUIDELINES

Access: Upgrade 4.3 miles of the Kanabec State Forest Road from class 4 to class 3. Construct gates on Kanabec Forest Road in 7-39-25.

Fish and Wildlife: Maintain waterfowl impoundments and deer yards. Remove beaver dams as necessary. Forestry/Wildlife habitat management guidelines apply.

Forest Pest Management: Conduct annual aerial survey to map hardwood defoliation and ground checks to identify pests, rate damage, and quantify growth loss and mortality. Target severely damaged stands for harvest or conversion. Continue annual gypsy moth trapping and prioritize high value stands for foliage protection.

Land Administration: Acquire private inholding in NWSW 31-40-25 if owner is willing to sell. The State Forest Boundary Realignment Plan (MN DNR, Forestry, 1983) states that state forest boundaries should not cross administrative area boundaries. There have not been any major problems caused by the fact that the Rum River State Forest lies in two areas. If necessary the Kanabec County portion of the forest could be removed from the Rum River and made the Groundhouse River State Forest. If it becomes desirable to shift workloads between areas the area boundaries could be changed so that the entire forest is in one area.

Recreation: Upgrade 9 miles of snowmobile trail and expand parking lot. Close 6 miles of trail which are located on the Kanabec State Forest Road. Continue to permit use by organized groups for field dog trials. See Appendix G for details.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 17. St. Croix State Forest -
Boulder Campground

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | Part of 7 | 41N | 16W |
| | | Part of 12 | 41N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40* | L.F. 50/50 | 44. St. Croix State Forest |

*Estimated land acreage, compartment also includes the 81 acre Rock Lake which is meandered.

COMPARTMENT HIGHLIGHTS

The Boulder Campground and Day Use Area compartment includes Rock Lake and those portions of the northern hardwood stand (type sequence #9) in Lots 1 and 2 and the NESW of section 7.

Access: Legal access via Tamarack State Forest Road.

*Cover Type: Northern Hardwoods 100% of land area.

Fish and Wildlife: Rock Lake was chemically reclaimed in 1976 and stocked with walleye in 1977.

Minerals and Soils: Metallic potential class D. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/recreation. Completely surrounded by state forest land.

*Recreation: Boulder Campground and Day Use Area facilities include 16 vehicle campsites, 3 walk-in tent campsites, 8 picnic sites, water access, 2 toilets, and a well with hand pump. Minnesota/Wisconsin Boundary Trail passes east of the compartment near the Tamarack State Forest Road.

*Water: Rock Lake is protected water.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Manage Rock Lake as walleye-yellow perch fishery.

Law Enforcement: Continue scheduled patrol of campground by Forest Officer.

Recreation: Define campsite parking areas with posts; develop beach; construct fish cleaning house with well; construct dock so that campers can leave boats in water during their stay at the campground. Post sub-area boundaries for enforcement purposes.

Timber: Submit an inventory alteration to create a separate stand for the campground and day use area. Manage to maintain aesthetics and create an uneven aged stand. Inspect for and remove hazard trees annually.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 18. St. Croix State Forest - MANAGEMENT CATEGORY:
Tamarack River Horse Camp

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | Part of 5 | 41N | 16W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 15* | L.F. 50/50 | 44. St. Croix State Forest |

*Estimated acreage.

COMPARTMENT HIGHLIGHTS

The Tamarack River Horse Camp compartment includes the land east of the Tamarack State Forest Road and west of the Tamarack River in the SENE of section 5.

Access: Legal access via Tamarack State Forest Road.

*Cover Type: White pine 60%, aspen 40%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class D. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/recreation. Completely surrounded by state forest land.

*Recreation: Existing facilities include parking lot, corral, primitive group campsites and picnic sites, council ring, and vault toilets. A 9 mile hiking and horseback riding trail follows the Tamarack River. The Minnesota/Wisconsin Boundary Trail is about 1/4 mile west of the campground.

*Water: The Tamarack River is a protected watercourse.

RESOURCE MANAGEMENT GUIDELINES

Law Enforcement: Continue regular patrols by Forest Officer.

Recreation: Expand parking lot to accommodate more vehicles and horse trailers. Develop a campground loop with 6 individual campsites. Talk to Minn. Horse Council and other groups about campground design. Drill a well and install a hand pump.

Timber: Change timber status of types 17 and 18 to limited to reflect presence of campground. Manage to maintain aesthetics. Inspect for and remove hazard trees annually.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 19. St. Croix State Forest
General Management

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|--------------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 1-11 and 15-22 | 41N | 16W |
| | | 1, 2, 11-16 and 22 | 41N | 17W |
| | | 31 | 42N | 15W |
| | | 15-22 and 27-36 | 42N | 16W |
| | | 13-36 | 42N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|------------------------|--|
| 27,063* | LF. 50/50 21,648 | 44. St. Croix State Forest |
| | AA. School Trust 2,772 | |
| | EA. Univ. Trust 1,200 | |
| | LC. Gift 1,070 | |
| | CA/CB. Swamp Trust 367 | |
| | LG. Purchased 6 | |

*Includes 25,993 acres of Division administered land and 1,070 acres of Dept. administered land.

COMPARTMENT HIGHLIGHTS

This compartment includes all Division of Forestry (and Dept. of Natural Resources - Admin. Code 19) administered land within the statutory boundaries of the St. Croix State Forest except for the Boulder and Tamarack Campground compartments.

Access: Highways providing access to this compartment include STH 48; CSAH 24, 25 and 30; County Roads 137, 141 and 173; township roads; and the Tamarack and St. Croix State Forest Roads. The Tamarack forest road should be upgraded from class 4 to 3 to provide more efficient and safer access. Several class 5 state forest roads and logging trails provide additional seasonal access. Areas without legal access include parts of sections 16, 20, 21 and 29 in T42N, R16W east of Hay Creek and 36-42-16. Acquisition of the Soo Line R.R. grade when it is abandoned would consolidate ownership and provide better access to the eastern portion of the forest.

*Cover Type: Aspen 47%, northern hardwoods 21%, lowland brush 7%, oak 5%, lowland grass 4%, birch 2%, lowland hardwoods 2%, red pine 2%, tamarack 2%, ash 2%. There is a seed orchard located in 25-42-17. Eastern Hemlock, a rare tree in Minnesota, is reported to occur in T41N, R17W, although the exact location is unknown.

*Fish and Wildlife: Sandhill cranes are known to occur in several sections in townships 42-17, 42-16 and 41-16. The Louisiana Waterthrush has been reported in 7-41-6. Bald Eagles and Osprey have been sited. An eagle nest has been established near Graces Lake. Wood turtles have been reported in Hay Creek and the Tamarack River. Bang's Brook and portions of Crystal Creek and Albrecht's Creek (McMullen Creek) are designated trout streams.

Forest Pests: Hardwood stands periodically support outbreaks of forest tent caterpillar and large aspen tortrix. Poor growth aspen stands contain high levels of white rot, canker diseases, and poplar borer damage. All hardwood stands could be susceptible to gypsy moth defoliation if the pest spreads north.

Minerals and Soils: Metallic potential class D. Geomorphic regions 61 and 62.

Ownership/Land Use: State land within the forest has various classifications for recommended use. Several parcels have not been classified. The existing statutory boundary includes approximately 42,105 acres. The DNR administers 27,118 of these acres. There are approx. 1,505 acres of county administered tax-forfeited land, 240 acres of Bureau of Indian Affairs land, _____ acres of National Park Service land, and 80 acres of township land within the boundary. The SESE of 21-42-16 was withdrawn from the forest by Laws 1967, Chapter 81 and returned to Pine County for use as a gravel pit. The remainder of the land in the forest is privately owned. Existing leases include utility line leases in 14-41-17 and 16, 28, 32, 33-42-17, a gravel lease in 22-41-17, a right of way lease in 26-42-17, a maple sugar lease in 33-42-17, and a combination cattle crossing/pasture lease in 16-42-16. There are approximately 10 miles of river frontage on the St. Croix, most of which are administered by either the DNR or the National Park Service. The Upper St. Croix Resource Management Plan established a 400 foot wide maximum preservation zone along the river and a limited development zone extending 1/4 mile back from the river (about 900 feet beyond the maximum preservation zone). A hazardous waste disposal site in 20-42-17 was recently identified and is being monitored.

*Recreation: Recreational trails include 19.3 miles of the Minn/Wisc Boundary Trail, the St. Croix State Forest snowmobile trail, and the Tamarack River Trail for hiking and horseback riding. Water access sites are provided at Graces Lake, Rock Lake, and the St. Croix River. The St. Croix is both a National Scenic River and a designated Canoe and Boating Route. See Rock Lake and Tamarack River campground compartments for description of camping facilities. There is potential for canoe campsites on the Snake and St. Croix rivers.

*Water: Protected waters include St. Croix River, Crystal Creek, Mallard Lake, Lower Tamarack River, Upper Tamarack River, Billys Lake, Rock Lake, Keene Lake, Twelve Lake, Sutton Lake, Bangs Brook and tributary, Lena Lake, Stevens Lake, Graces Lake, Tamarack Lake, Little Tamarack Lake, East Fork Crooked Creek, Crooked Lake, Dollar Lake, Keene Creek, McDermott Creek, Hay Creek, Hay Creek Flowage and Albrechts Creek.

RESOURCE MANAGEMENT GUIDELINES

Access: Upgrade 5.1 miles of Tamarack State Forest Road from class 4 to 3. Identify old township right of ways leading south from County Road 141 to state land. If necessary modify cattle crossing/pasture lease in 16-42-16 to ensure public access to state land. When gravel is depleted in SESE 21-42-16 acquire land from county to ensure continued access to land east of Hay Creek. Explore obtaining legal land access to 36-42-16. Construct gates on: (1) Wilma Road in 16-42-17, (2) St. Croix Trail in 4-41-16, (3) access trail in 31-42-16, (4) trail in 30-42-16, and (5) Basswood Trail in 29-42-17. Acquire Soo Line Railroad right-of-way and possibly construct class 3 or 4 road.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply. A permanent structure may be needed to replace the beaver dam at the outlet of Grace's Lake to maintain the existing water level. Protect stream habitat through watershed management, erosion control, modified timber harvest and modified pest control. Follow guidelines in Grace's Lake Bald Eagle Management Plan (MN DNR - Wildlife, 1984).

Forest Pest Management: Conduct annual aerial survey to map hardwood defoliation and ground checks to identify pests, rate damage and quantify growth loss and mortality. Target severely damaged stands for harvest or conversion. Continue annual gypsy moth trapping and prioritize high value stands for foliage protection.

Land Administration: Acquire approximately 5 miles of Soo Line right of way within forest when it is abandoned. Propose boundary changes to remove major areas of private and county land on north and west sides. Explore exchanges with county to consolidate ownership (e.g., SESE 27-42-17, 22 and 27-42-16).

Recreation: See Appendix G for trail development proposals. Little Tamarack Lake, Graces Lake, Hay Creek Flowage, and the St. Croix River have potential for future campground development.

Timber: Limited management within the maximum preservation zone along the St. Croix. Management along the Minnesota/Wisconsin Boundary Trail shall be in accordance with the "Policy on Timber Harvest and Extractive Operations on State Lands Adjacent to Recreational Trails" (Circular Letter 3501). The seed orchard will be managed in cooperation with nursery and tree improvement personnel. Standard guidelines apply in other portions of the compartment. Modify silvicultural practices to protect trout streams, warm-water streams, eagle nest area, and aesthetics.

COMPARTMENT ID: 20. Snake River State Forest - MANAGEMENT CATEGORY:
General Management

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|---|-----------------|--------------|
| 345 Mora | 33 Kanabec | Part of 6 | 41N | 22W |
| | | 6, 7, 18 and parts of 19, 30 and 31 | 42N | 22W |
| | | 1 and 2 | 41N | 23W |
| | | 1, 13, 24, 25, 26, 36 and parts of 12 and 14 | 42N | 23W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|---------------------------------------|--|
| 7,884.73* | LF. 50/50 - 7,496.71 ac. | 56. Snake River State Forest |
| | AA. School Trust - 282.02 ac. | |
| | LG. Purchased - 40.00 ac. | |
| | AB. School Trust Exchange - 66.00 ac. | |

*Includes 66 acres not currently coded as part of state forest.

COMPARTMENT HIGHLIGHTS

This compartment consists of all Division of Forestry administered land within the statutory boundary of the Snake River State Forest.

Access: Legal access is provided by the Chesley Brook State Forest Road, County Roads 82 and 84, and township roads. There is no legal road access to either the north or south boundaries of the forest.

*Cover Type: Aspen 72%, marsh 5%, northern hardwoods 4%, oak 4%.

*Fish and Wildlife: Deer yards in sections 6, 7, 18 and 19 of T42N, R22W and sections 1, 12, 13 and 24 of T42N, R23W. There may be trout in Chesley Brook. The Division of Fish and Wildlife constructed a Gabion basket on Chesley Brook (7-42-22) to create an impoundment, but no impoundment exists at present. Wood duck boxes have been placed along Chesley Brook. Warmwater gamefish and warmwater feeder streams.

Forest Pests: Hardwood stands periodically support outbreaks of forest tent caterpillar and large aspen tortrix. Poor growth aspen stands contain high levels of white rot, canker diseases, and poplar borer damage. All hardwood stands could be susceptible to gypsy moth defoliation if the pest spreads north.

Minerals and Soils: Metallic potential class B. Small areas of peat possible on lowland types. Geomorphic regions 61 and 14.

Ownership/Land Use: Land classified retain for multiple use, recreation or aesthetics, and wildlife. Forty-three acres not classified. The parts of lots 1 (34 acres) and 2 (32 acres) in 2-41-23 south of the Snake River are miscoded as being outside of the state forest in the land ownership record. The Bean Dam WMA project boundary includes 1,216 acres in 13 and 24-42-23 and 18 and 19-42-22. However the Division of Fish and Wildlife only administers 200 acres in section 24. Kanabec County has a fee ownership inholding in 26-42-23. There are county tax-forfeited lands adjacent to the forest on the west (5, 8, 16, 17, 20, 21, 22, 27, 28-42-22), south (12-41-23), and north (31-43-22 and 36-43-23). The portion of the forest in 30-42-22 is separated from the rest of the state land by private inholdings. There is an agricultural lease (#144-3-1171) in 18-42-22.

Recreation: The Snake River is a Canoe and Boating Route and is a priority river for study as a possible addition to the state wild and scenic river system. The forest receives heavy use for hunting and hiking and minimal ORV and horseback use. There is an undeveloped area near the Bean Dam WMA that is used for camping. The 7.9 mile Chesley Brook Snowmobile Trail has been discontinued for lack of use.

*Water: Protected waters are Chesley Brook, Snake River, an unnamed tributary to the Snake River, Peace Lake and four unnamed lakes.

RESOURCE MANAGEMENT GUIDELINES

Access: Obtain legal access to southern portion of forest by obtaining 1/2 mile of easement from end of township road on south side of 6-41-22 to the southeast corner of 1-41-23 and construct class 5 road. Develop system of class 5 roads from this access point to serve southern portion of the forest. Upgrade, improve and reroute certain existing roads in northern portion of forest. Check legal status of all existing access roads in the compartment. Construct gate north of Chesley Brook Road on trail leading into fuelwood area in 1-42-23.

Fish and Wildlife: Manage deer yards. Explore possibility of developing waterfowl impoundment along Chesley Brook. Manage both State Forest and WMA under existing Forestry-Wildlife policy and guidelines.

Forest Pest Management: Conduct annual aerial survey to map hardwppd defoliation and ground checks to identify pests, rate damage, and quantify growth loss and mortality. Target severely damaged stands for harvest or conversion. Continue annual gypsy moth trapping and prioritize high value stands for foliage protection.

Land Administration: Correct coding of Lots 1 and 2 in 2-41-23 to include in forest and update land use classification where necessary. Retain Bean Dam WMA as a secondary unit within the state forest. The project boundary for Bean Dam WMA should be redrawn to reflect existing ownership and management under the Forestry-Wildlife policy. Explore acquisition of 350-400 acres east of the Snake River in 23-42-23 from willing seller who used to have a permit for a bridge across the river.

Recreation: Potential for development of canoe campsites and hiking trails. See Appendix G for details.

Timber: Maintain aesthetic resources along Snake River. Standard guidelines apply.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 21. Area Headquarters

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 29 | 46N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------------------------|--|
| 7 | LH. Transfer of Custodial Control | 01. Admin. and Scattered State Forest |

COMPARTMENT HIGHLIGHTS

Moose Lake Area Headquarters Site. This compartment is not listed in the statutory description of Admin. and Scattered State Forest.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Correct statutory description of Admin. and Scattered State Forest to include this compartment.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 22. Former Area Headquarters MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 20 | 46N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 0.25 | LG. Purchased | 01. Admin. and Scattered State Forest |

COMPARTMENT HIGHLIGHTS

Former area office site. Village property given to state with stipulation that the land would revert to village if not used as administrative site. When the area headquarters was relocated the state sold the building to the village.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Delete from active ownership record.

PROPOSED DISPOSITION

Already sold to Village of Moose Lake.

COMPARTMENT ID: 23. Moose Lake Fire Tower

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 24 | 46N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 1.70 | LG. Purchased | 01. Admin. and Scattered State Forest |

COMPARTMENT HIGHLIGHTS

Forest Protection: Stairway type fire tower in good repair. Tower is manned during severe fire seasons.

Ownership/Land Use: This parcel is not listed in the statutory description of Admin. and Scattered State Forest.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Add to statutory description of Admin. and Scattered State Forest.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 24. Nickerson District
Headquarters and Tower

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | 8 | 45N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|---|--|
| 5 | LG. Purchased (4 acres) LF. 50/50 (1 acre) | 35. Nemadji State Forest |

COMPARTMENT HIGHLIGHTS

This compartment consists of the Nickerson District Headquarters site located south of Nickerson on STH 23.

Ownership/Land Use: This compartment is coded as part of the Nemadji State Forest in the DNR Land Ownership/Classification Report even though it is not within the statutory boundary of the Nemadji. Existing facilities include an office-warehouse, residence, storage shed, outhouse, and fire tower. The tower is used during severe fire weather. It also is used by tourists during the summer.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Change code in land ownership report from 35-Nemadji to 01-Admin. and Scattered. Add compartment to the statutory description of Admin. and Scattered State Forest.

Maintenance and Administration: Declare residence surplus and dispose. See program chapter of this plan for details on improvements to other buildings.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 25. Askov Fire Tower

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 3 | 43N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 2.50 | LG. Purchased | 01. Admin. and Scattered State Forest |

COMPARTMENT HIGHLIGHTS

*Forest Protection: Tower gets some use each year.

Ownership/Land Use: Not listed in statutory description of Admin. and Scattered State Forest.

RESOURCE MANAGEMENT GUIDELINES

Access: Determine status of road to tower. DNR has been maintaining the road.

Land Administration: Add to statutory description of Admin. and Scattered State Forest.

Maintenance and Administration: Treat tower stairs with preservative.

Other: Dept. of Transportation is putting radio repeater on this site.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 26. Eaglehead District
Headquarters

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 8 | 42N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 1.40 | L.F. 50/50 | 01. Admin. and Scattered State Forest |

COMPARTMENT HIGHLIGHTS

Ownership/Land Use: This site is not listed in the statutory description of Admin. and Scattered State Forest. Existing buildings on this site include an office/warehouse, residence, storage building and pit toilet.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Add this site to the statutory description of Admin. and Scattered State Forest land.

Maintenance and Administration: Improvements needed on several buildings; see the program chapter of this plan for details.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 27. Eaglehead Fire Tower Site MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 10 | 42N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 1.00 | LG. Purchased | 01. Admin. and Scattered State Forest |

COMPARTMENT HIGHLIGHTS

Eaglehead Fire Tower site. Tower not used since switch to aerial detection. Site has been vandalized.

Site is not listed in statutory description of Admin. and Scattered State Forest.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Explore other tower uses, leases, etc. or sell as surplus land. Sell tower with land.

PROPOSED DISPOSITION

Declare surplus and dispose.

COMPARTMENT ID: 28. Hinckley District
Headquarters

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|----------------|-----------------|--------------|
| 344 Hinckley | 58 Pine | 25 | 41N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 2.27 | LG. Purchased | 01. Admin. and Scattered State Forest |

COMPARTMENT HIGHLIGHTS

Hinckley District headquarters site.

Ownership/Land Use: This site is not included in the statutory description of Admin. and Scattered State Forest. Existing office-warehouse building in need of major repairs. There is a proposal to consolidate all DNR offices in Hinckley at a new site.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: When new DNR facility is available declare surplus and dispose.

Maintenance and Administration: See program section of this plan for possible improvements. Determine which improvements are needed on an interim basis.

PROPOSED DISPOSITION

Undedicated pending move to new facility, then dispose.

COMPARTMENT ID: 29. Mora District Headquarters MANAGEMENT CATEGORY:

| | | | | |
|------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 345 Mora | 33 Kanabec | 11 | 39N | 24W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 2 | LG. Purchased | 01. Admin. and Scattered State Forest |

COMPARTMENT HIGHLIGHTS

Mora District headquarters site.
Not included in the statutory description of Admin. and Scattered State Forest.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Add to statutory description of Admin. and Scattered State Forest.

PROPOSED DISPOSITION

Retain in state forest.

COMPARTMENT ID: 30. Woodland Fire Tower

MANAGEMENT CATEGORY:

| | | | | |
|------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 345 Mora | 33 Kanabec | 17 | 42N | 23W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 1.10 | LG. Purchased | 01. Admin. & Scattered State Forest |

COMPARTMENT HIGHLIGHTS

Woodland Fire Tower Site. Tower no longer used.
Not listed in statutory description of Admin. & Scattered State Forest.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Explore other possible tower uses, leases, etc. or declare tower and land surplus and dispose.

PROPOSED DISPOSITION

Delete from state forest and dispose.

COMPARTMENT ID: 31

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16 | 46N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 354.39 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south edge of compartment from CSAH 8. Old township road provides access from NW.

Cover Type: Lowland Brush 69%, Aspen 29%. Moderate to high S.I. for aspen stands.

Fish and Wildlife: Potential waterfowl and sharp-tail habitat. Nemadji Creek is a designated trout stream.

Minerals and Soils: Metallic potential class B. Peat approx. 250 acres based on lowland brush cover type. Geomorphic regions 59 and 53.

Ownership/Land Use: Carlton County has listed the adjacent 160 acres in this section as possible exchange to state. County land not classified. State land classified retain for multiple use and wildlife. Railroad track crosses state and county land.

Recreation: GIA snowmobile trail in north part of compartment.

*Water: Protected water-Nemadji Creek.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Potential for waterfowl impoundment and/or sharp-tail management. Protect trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control.

Land Administration: Acquire adjacent county land by exchange. Determine if owner of SENE Section 16 is willing to sell or exchange with the state. This 40 would facilitate development of a waterfowl impoundment. Add compartment to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply on aspen type. Review lowland brush management proposals with wildlife. Modify silvicultural practices to protect trout stream and aesthetics.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 32

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 09 Carlton | 36 | 46N | 18W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 320 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side of compartment from CSAH 48 and to west side from township road.

*Cover Type: Northern hardwoods 29%, Balsam fir 28%, Aspen 23%.

Fish and Wildlife: North Fork Nemadji River is a designated trout stream.

Minerals and Soils: Metallic potential class B. Peat-small acreage. Geomorphic region 60.

Ownership/Land Use: 80 acres of tax-forfeited land adjacent in section 25 classified multiple use/wildlife dispose by sale. Only access to county land is from south across state land. State land classified as retain for multiple use and wildlife.

*Water: Protected-North Fork Nemadji River.

RESOURCE MANAGEMENT GUIDELINES

Access: Construct gate on timber access trail.

Fish and Wildlife: Forestry/Wildlife Guidelines apply. Protect trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control.

Land Administration: Propose exchange to acquire adjacent county land. Add compartment to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply. Modify silvicultural practices to protect trout stream and aesthetics.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 33

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16 | 47N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 160 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to north side via old township road through center of section 16.

Cover Type: Ash 35%, birch 26%, lowland grass 17%, lowland brush 16%.

*Fish and Wildlife: Probable deer yard in compartment.

Minerals and Soils: Metallic potential class B. Peat approx. 90 acres based on lowland cover types. Soil atlas shows non-acid peat in compartment. Geomorphic region 59.

Ownership/Land Use: State land classified retain for wildlife and access. Adjacent county land in sections 21 and 29 various classifications some retain, some dispose.

RESOURCE MANAGEMENT GUIDELINES

Custodial management only.

PROPOSED DISPOSITION

Retain in undedicated status.

COMPARTMENT ID: 34

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 09 Carlton | 36 | 46N | 19W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 280 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via old township road south from center of section 25.

*Cover Type: Northern hardwoods 74%.

Fish and Wildlife: Northern hardwoods valuable for cavity nesting birds.

Minerals and Soils: Metallic potential class B. Geomorphic region 60.

Ownership/Land Use: Completely surrounded by private land. State land classified retain for multiple use and wildlife.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Retain northern hardwood snags for cavity nesting birds. Forestry/Wildlife Guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 35

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16 | 47N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 560 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via CSAH 13 on east side, township road on part of north side.

*Cover Type: Aspen 49%, birch 17%, ash 15%.

Fish and Wildlife: 22 acre white cedar stand. Deer yard. Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class C. Possible peat deposits. Geomorphic region 58.

Ownership/Land Use: State land classified retain for multiple use/wildlife. Carlton County has listed the 40 acres within this compartment as a possible exchange to the state. County land classified dispose by sale for multiple use. Major block of county land to west of compartment. Miscellaneous lease #144-16-246 (maple sugar) affects compartment.

Recreation: GIA snowmobile trail along north side.

*Water: Protected water-West Fork Moose Horn River.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Retain white cedar stand for deer yard. Forestry/Wildlife Guidelines apply.

Land Administration: Obtain 40 acres of county inholding by exchange. Add to Admin. and Scattered State Forest and make necessary changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 36

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 34I Moose Lake | 09 Carlton | 2 | 46N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Aspen 100%.

Minerals and Soils: Metallic potential class C. No peat. Geomorphic region 58.

Ownership/Land Use: Classified dispose by sale for multiple use/wildlife.
Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Custodial management only.

PROPOSED DISPOSITION

Retain in undedicated status.

COMPARTMENT ID: 37

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|------------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16, Lots 5, 7, 8 | 46N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 111.68 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Two separate parcels along the Kettle River.

Access: No legal land access to lot 5 (SW). Legal access to west side of north parcel via township road.

Cover Type: Aspen 63%, upland brush 34%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

*Minerals and Soils: Metallic potential class C. Gravel in north parcel. Geomorphic region 58.

Ownership/Land Use: Lot 8 classified retain for multiple use/gravel. Lots 5 and 7 retain for multiple use/wildlife. Surrounded by private land. GIA snowmobile trail lease #144-15-141.

Recreation: GIA snowmobile trail crosses lot 8. Kettle River Canoe and Boating Route.

*Water: Protected water-Kettle River and Silver Creek.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife Guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 38

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 09 Carlton | 16, NESE, SESE | 46N | 20W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 80 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via township road.

Cover Type: Aspen 84%, lowland grass 16%.

Minerals and Soils: Metallic potential class C. Possible peat-lowland grass type, 14 acres. Gravel pits present. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Gravel lease #144-2-141. Surrounded by private land except for gravel pit in SWSW, Section 15 owned by county.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife Guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 39

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16, NENE | 46N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Upland brush 60%, aspen 40%.

Minerals and Soils: Metallic potential class C. Possible gravel. Geomorphic region 58.

Ownership/Land Use: Classified dispose by sale for multiple use/wildlife. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Determine if gravel is present in sufficient quantity for development. If so add to Admin. and Scattered State Forest and make appropriate changes in land record. If not retain for custodial management.

PROPOSED DISPOSITION

Retain in undedicated status.

COMPARTMENT ID: 40

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 09 Carlton | 36 | 46N | 20W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 278.94 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to SE corner via airport. Legal access to SW corner via township road.

Cover Type: Aspen 52%, northern hardwood 17%, birch 11%, ash 10%, industrial development 6%, water 9%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class B. Possible shallow peat on ash and lowland brush types. Geomorphic regions 59 and 57.

Ownership/Land Use: Classified retain for multiple use/wildlife. 31.56 acres county land in 31-46-19, remainder of surrounding land private. Soo Line RR, powerline corridor (lease #144-62-1342), and part of Moose Lake Airport on compartment. GIA snowmobile lease #144-15-125.

Recreation: GIA snowmobile trail crosses compartment.

*Water: Protected water-Moose Horn River.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife Guidelines for Northern Forests apply.

Land Administration: Possibly obtain SWNW of Section 31 (lot 6) by exchange from county (31.56 acres). Add to Admin. and Scattered State Forest and make appropriate changes in the land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 41

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 4 | 47N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via township road.

Cover Type: Lowland brush 63%, upland grass 37%.

Minerals and Soils: Metallic potential class C. Possible peat - lowland brush type - 25 acres. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by private land. Major block of county land 1/2 mile to east.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Offer to exchange to county. If not exchanged declare as surplus and offer for sale.

PROPOSED DISPOSITION

Undedicated pending disposal as surplus land or exchange to county.

COMPARTMENT ID: 42

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 6 | 47N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 109.31 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via CSAH 4 on north.

Cover Type: Stagnant spruce 67%, tamarack 31%.

Fish and Wildlife: Possible great gray owl habitat.

Minerals and Soils: Metallic potential class C. Peat on most of compartment, depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Adjacent to major block of county land in T47-R21. Private land to north, east, and south. Utility lease #144-62-1342 for powerline crossing compartment.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Field check for great gray owl nesting.

Land Administration: Exchange to county for addition to county memorial forest. Exchange to be approved by wildlife to protect possible great gray owl nesting habitat.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 43

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 34I Moose Lake | 09 Carlton | 10 | 47N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Lowland brush 100%.

Minerals and Soils: Metallic potential class C. Peat - possible on entire compartment - depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Major block of county land adjacent on east and south. Private land north and west.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Propose exchange to county.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 44

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 09 Carlton | 12 | 47N | 20W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Aspen 100%.

Minerals and Soils: Metallic potential class C. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Major block of county land adjacent on north, west, and east sides. GIA snowmobile trail lease #144-15-141 affects compartment.

Recreation: GIA snowmobile trail crosses compartment.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Propose exchange to county.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 45

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|---------------------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16, NENE, SENE, and Lot 1 | 47N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 122.80 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via CSAH 14 on north side.

Cover Type: Ash 79%, aspen 14%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class C. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County land adjacent to east in 15-47-21. State land across Kettle River. Private land to south and north. GIA snowmobile trail lease #144-15-141.

Recreation: GIA snowmobile trail on east edge.

*Water: Protected water-Kettle River.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife Guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land records.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 46

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|------------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16, Lots 5, 6, 7 | 47N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 130.45 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal land access.

Cover Type: Lowland brush 52%, aspen 30%, lowland hardwoods 8%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class C. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. State land across river. Mostly surrounded by private land.

*Water: Protected water-Kettle River and unnamed tributary to Kettle River.

RESOURCE MANAGEMENT GUIDELINES

Access: Acquire access to compartment from west or north across 1/4 mile of private land.

Fish and Wildlife: Forestry/Wildlife Guidelines for Northern Forests apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 47

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 22, SWNW | 47N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via CSAH 132 on west and north sides.

Cover Type: Ash 48%, birch 35%.

Minerals and Soils: Metallic potential class C. Possible peat - ash cover type - 19 acres - depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified dispose by sale for multiple use/wildlife. County 40 touches SE corner and connects with state land in SESW section 22. Private land on all 4 sides. GIA snowmobile trail lease #144-15-141 affects compartment.

Recreation: GIA snowmobile trail.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Offer to exchange to county. If not exchanged, declare surplus and offer for sale.

PROPOSED DISPOSITION

Undedicated pending sale or exchange to county.

COMPARTMENT ID: 48

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 22, SESW | 47N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via township road on south side.

Cover Type: Lowland brush 43%, stagnant spruce 33%, lowland black spruce 25%.

Minerals and Soils: Metallic potential class C. Peat probable on entire compartment - depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County 40 adjacent on north side, classified retain for multiple use. Private land on east, south, and west.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Offer to exchange to county. If not exchanged, declare surplus and offer for sale.

PROPOSED DISPOSITION

Undedicated pending sale or exchange to county.

COMPARTMENT ID: 49

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 28 | 47N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 39.85 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal land access. Access via Kettle River.

Cover Type: Birch 65%, upland brush 35%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class C. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by private land.

Recreation: Potential canoe campsite.

*Water: Protected water-Kettle River.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Exchange for other land on public water if possible.

Recreation: Determine if there is a need for a canoe campsite and if it is feasible to develop on this compartment.

PROPOSED DISPOSITION

Undedicated pending internal exchange or transfer of administrative control to Trails and Waterways Unit.

COMPARTMENT ID: 50

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 09 Carlton | 36 | 47N | 20W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 80 | AA. school Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

*Cover Type: Aspen 35%, ash 33%, birch 32%.

Fish and Wildlife: Deer yard. Black ash, 66 years old, suitable for cavity nesting birds.

Minerals and Soils: Metallic potential class C. Minerals vetoed proposed sale in past. Geomorphic region 58.

Ownership/Land Use: Classified dispose by sale for multiple use/wildlife. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Conduct field evaluation of wildlife use.

Land Administration: Declare surplus and offer for sale if approved by Wildlife and Minerals.

PROPOSED DISPOSITION

Undedicated pending disposal as surplus.

COMPARTMENT ID: 51

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 6, Lot 6 | 46N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 50.60 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Lowland brush 100%.

Fish and Wildlife: Potential sharp-tailed grouse habitat.

Minerals and Soils: Metallic potential class B. Peat - entire compartment - depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County land on north, east, west sides. County land is Memorial Forest.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Potential for sharp-tailed grouse management. Potential for waterfowl impoundment.

Land Administration: Exchange to county for inclusion in memorial forest if approved by wildlife.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 52

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 6, SWSE | 46N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Black spruce lowland 80%, stagnant spruce 20%.

Minerals and Soils: Metallic potential class B. Peat on entire compartment - depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by county memorial forest land.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Exchange to county for inclusion in memorial forest.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 53

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 8 | 46N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Lowland brush 75%, aspen 25%.

Fish and Wildlife: Potential sharp-tailed grouse habitat.

Minerals and Soils: Metallic potential class B. Peat - possible in lowland brush type - 30 acres. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County land adjacent on north, west, and south. County land in 7-46-21 is memorial forest.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Determine potential for sharp-tailed grouse management.

Land Administration: Exchange to county for inclusion in memorial forest if approved by Wildlife.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 54

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16 | 46N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 560 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to west side via township road from either north or south.

Cover Type: Lowland brush 59%, birch 23%, aspen 13%.

Fish and Wildlife: Possible waterfowl nesting habitat.

Minerals and Soils: Metallic potential class B. Peat - lowland types 363 acres - depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County lands adjacent on west, south, and east.

RESOURCE MANAGEMENT GUIDELINES

Access: Verify legal status of old township roads providing access to compartment.

Fish and Wildlife: Manage lowland areas for wildlife, especially waterfowl. Forestry/Wildlife Guidelines apply to forest types.

Land Administration: Acquire adjacent county land to south and east by exchange. Add to Admin. and Scattered State Forest.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 55

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 24 | 46N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 80 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access from township road on west side.

Cover Type: Lowland grass 54%, black spruce lowland 24%, stagnant spruce 13%.

Fish and Wildlife: Potential Sharp-tailed grouse habitat.

Minerals and Soils: Metallic potential class C. Peat - possible on lowland types - 72 acres - depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified dispose by sale for multiple use/wildlife. County land adjacent to north. Utility line r.o.w. crosses compartment (lease #144-62-1375).

Recreation: GIA snowmobile trail on west side.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Determine potential for sharp-tailed grouse management.

PROPOSED DISPOSITION

Retain in undedicated status.

COMPARTMENT ID: 56

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 32 | 46N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 480 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Marsh 71%, northern hardwoods 8%.

Fish and Wildlife: Potential sharp-tailed grouse habitat.

Minerals and Soils: Metallic potential class B. Peat - lowland types 417 acres, depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County lands adjacent in sections 29 and 31 have been proposed for exchange to state by county.

Recreation: GIA snowmobile trail on south edge.

RESOURCE MANAGEMENT GUIDELINES

Access: Acquire legal access across 1/4 mile of private land to NE part of tract.

Fish and Wildlife: Determine potential for sharp-tailed grouse management.

Land Administration: Acquire adjacent county land by exchange. Add to Admin. and Scattered State Forest.

Timber: Standard guidelines apply for northern hardwoods. Review lowland management proposals with wildlife.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 57

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 36 | 46N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 360 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access off CSAH 17 on west side.

*Cover Type: Aspen 82%, lowland brush 9%, northern hardwoods 8%. High site index aspen.

Minerals and Soils: Metallic potential class C. Possible peat - lowland brush 33 acres, depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. 80 acres of county land adjacent on north side, remainder surrounded by private land. Utility lease #144-62-1375 and GIA snowmobile trail lease #144-15-141 affect compartment.

Recreation: GIA snowmobile trail on south edge.

*Water: Protected water-Unnamed tributary to Split Rock River.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Potential for ruffed grouse management in future. Forestry/Wildlife Guidelines apply.

Land Administration: Explore acquisition of county land in section 25. Add to Admin. and Scattered State Forest.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 58

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|-----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 2, Lots 3 and 4 | 47N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 70.76 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access except across county land.

Cover Type: Aspen 56%, marsh 39%.

Minerals and Soils: Metallic potential class C. Peat - marsh 28 acres, depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County land adjacent on west and south in memorial forest. Powerline right-of-way lease #144-62-1342.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Exchange to county for inclusion in memorial forest.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 59

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 2, SWSW | 47N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | CA. Swamp Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access, except across county land.

Cover Type: Aspen 100%.

Minerals and Soils: Metallic potential class C. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County lands adjacent on all sides in memorial forest.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Exchange to county for inclusion in memorial forest.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 60

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 6 | 47N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------------|--|
| 40 | BA. Indemnity School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access except across county land.

Cover Type: Stagnant spruce 63%, lowland black-spruce 38%.

Minerals and Soils: Metallic potential class C. Peat - lowland types 40 acres, depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by county memorial forest.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Exchange to county for inclusion in memorial forest.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 61

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 16 | 47N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 480 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via CSAH 22 to NE corner. Access to most of compartment impeded by W branch of Kettle River.

Cover Type: Aspen 46%, birch 20%, lowland brush 14%, upland brush 15%. Site index 71 for aspen.

Fish and Wildlife: Five wildlife openings. Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class C. Peat - lowland types 75 acres, depth unknown. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. Adjacent county lands on west and north sides.

*Water: Protected water-West Branch of Kettle River.

RESOURCE MANAGEMENT GUIDELINES

Access: Acquire access to land south of river.

Fish and Wildlife: Proposal to burn upland brush in spring 1985.

Land Administration: Try to acquire adjacent county lands in sections 15 and 16 (80 acres) by exchange. Add to Admin. and Scattered State Forest.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 62

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 09 Carlton | 36 | 47N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 240 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Aspen 69%, lowland brush 30%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class C. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use/wildlife. County land adjacent in section 35.

*Water: Protected water-Dead Moose River.

RESOURCE MANAGEMENT GUIDELINES

Access: If retained obtain access.

Land Administration: Explore exchange to or from county for other land on public waters.

PROPOSED DISPOSITION

Undedicated pending exchange.

COMPARTMENT ID: 63

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 8 | 43N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------|--|
| 80 | BA. Indemnity School | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via township road to southwest corner of compartment.

*Cover Type: Birch 74%, Marsh 20%, Red pine 6%.

Minerals and Soils: Metallic potential class B. Possible peat in marsh cover type, 16 acres, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by private land. County land in sections 4, 5, and 9 not adjacent.

Recreation: MN/WI Boundary Trail-West Addition crosses section 8 but does not touch this compartment.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife Guidelines apply.

Land Administration: Propose as Admin. and Scattered State Forest. Make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 64

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 58 Pine | 36 | 43N | 20W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 160 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to southwest corner of compartment via old township road. Also from north along park boundary.

*Cover Type: Aspen 93%, R.R. grade 5%, Marsh 2%. Aspen S.I. 70.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Banning State Park adjacent on west side. Railroad tracks and powerline cross compartment (MP&L utility lease 144-62-1342). Private land on remaining 3 sides.

Recreation: Adjacent to state park.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines will apply if compartment becomes state forest.

Land Administration: Check as possible addition to Banning State Park. If not added to park designate compartment as Admin. and Scattered State Forest. Make appropriate changes in land ownership/classification and Phase II Inventory records.

Timber: If added to state park manage in cooperation with park manager. If not standard guidelines apply.

PROPOSED DISPOSITION

Add to Banning State Park or Admin. and Scattered State Forest.

COMPARTMENT ID: 65

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 8 | 44N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------|--|
| 104.42 | BA. Indemnity School | Undedicated |

COMPARTMENT HIGHLIGHTS

Has a common corner with land in section 16.

Access: Through forestry administered land in section 16. Not legal access.

*Cover Type: Aspen 78%, Lowland black spruce 8%, Stagnant spruce 12%. (20% oak inclusion in aspen).

Fish and Wildlife: Potential wood duck nesting habitat. Potential loon nesting habitat.

Minerals and Soils: Metallic potential class B. Peat possible on lowland types, 20 acres, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. County land in section 8 on opposite side of lake classified retain for access. Mark WMA 1/4 mile east in section 9. Section 16 has more state land. Camp on Clear Lake 1/2 mile away. Williams Pipeline crosses compartment (utility lease #144-62-1380).

*Water: Protected water-Fox Lake.

RESOURCE MANAGEMENT GUIDELINES

Access: Foot access via common corner with state land in section 16. Negotiate access for management purposes along section line between sections 8 and 17 (1/2 mile).

Fish and Wildlife: Potential for wood duck nesting boxes. Forestry/Wildlife Guidelines apply.

Land Administration: Propose as Admin. and Scattered State Forest and make appropriate changes in land records.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 66

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|-------------------------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 58 Pine | 16, Lot 2 SNNW, NNSW, SWSW | 44N | 20W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 143.94 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to west side and east side via township roads. Two roads cross compartment in east-west direction.

*Cover Type: Oak 60%, Aspen 37%.

Fish and Wildlife: Potential wood duck nesting habitat.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Lot 2 classified for multiple use/wildlife, remainder classified retain for agriculture/multiple use. Surrounded by private land except for state land in section 8 which has a common corner. Mark WMA 1/4 mile away. State land in SW corner of section 16 is 1/2 mile away. Resort across Clear Lake. Utility and pipeline right-of-way leases #144-16-17, 144-16-72, 144-16-442, and 144-62-1359 cross compartment.

*Water: Protected Water-Mud Lake and Clear Lake.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Potential for wood duck nesting boxes. Manage oak to increase mast production. Forestry/Wildlife habitat management guidelines apply.

Land Administration: Include in Admin. and Scattered State Forest and make appropriate changes in land records. Change recommended use classification to multiple use/wildlife.

Timber: Maintain aesthetic values on Clear Lake viewed from resort.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 67

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|-----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 16, Lot 3, NESE | 44N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 77.02 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

*Cover Type: Oak 70%, Lowland brush 18%, Aspen 10%.

Fish and Wildlife: Potential wood duck nesting habitat.

Minerals and Soils: Metallic potential class B. Possible peat lowland brush type. Ridge in sandy soil, possible sand and gravel. Geomorphic region 57.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by private land. Nearby public land in sections 8, 9, 16, and 20.

*Water: Protected water-Little Mud Lake.

RESOURCE MANAGEMENT GUIDELINES

Access: Negotiate for access from north (approx. 700 feet).

Fish and Wildlife: Potential for wood duck nesting boxes. Manage oak for mast production. Forestry/Wildlife Guidelines apply.

Land Administration: Include in Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 68

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 58 Pine | 20 | 44N | 20W |

| | | |
|----------------|----------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 160 | BA. Indemnity School | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via road #151 along west side of compartment.

*Cover Type: Aspen 28%, Northern Hardwoods 17%, Balsam fir 16%, Stagnant spruce 13%, Lowland black spruce 9%, Oak 9%.

Fish and Wildlife: Deer yard.

Minerals and Soils: Metallic potential class B. Possible peat on lowland types. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by private land. Utility lease #144-62-1359 affects compartment.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife Guidelines apply.

Land Administration: Include in Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 69

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 30 | 44N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------|--|
| 151.72 | BA. Indemnity School | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via CSAH 39.

*Cover Type: Aspen 40%, Marsh 23%, Oak 19%.

Fish and Wildlife: Potential rail and bittern habitat.

Minerals and Soils: Metallic potential class B. Peat possible on lowland types, 47 acres, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land which is mostly forested.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife Guidelines apply.

Land Administration: Propose for inclusion in Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 70

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 36 | 44N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to west side of compartment via township road.

Cover Type: Marsh 70%, Aspen 30%.

Fish and Wildlife: Inventory lists significant wildlife feature in marsh type. Field check by Area Wildlife Manager found only dry beaver pond.

Minerals and Soils: Metallic potential class B. Possible peat in marsh type, 29 acres, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Custodial management only.

PROPOSED DISPOSITION

Retain in undedicated status.

COMPARTMENT ID: 71

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|-----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 4, Lots 6 and 7 | 45N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 89 | LG. Purchased | Kettle River Scenic River |

COMPARTMENT HIGHLIGHTS

Discuss with Trails and Waterways regarding cooperative management guidelines and appropriate management unit designation.

COMPARTMENT ID: 72

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 58 Pine | 16 | 45N | 20W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 424.77 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to north side via CSAH 46. Small area south of river inaccessible.

*Cover Type: Aspen 86%, Northern hardwoods 12%, Marsh 2%.

Fish and Wildlife: Possible osprey breeding habitat. Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class B. Geomorphic region 59.

Ownership/Land Use: Classified retain for multiple use/wildlife. Lots 3, 4 and 5, and NWSE are acquired land on Kettle River administered by Trails and Waterways (coded to Parks and Recreation in land record). Most of this compartment falls within the Kettle River Wild and Scenic River land use district which is mapped and described in Chapter 6105 of Minnesota Rules 1983.

*Recreation: Headwaters canoe campsite on Trails and Waterways land along Kettle River. Kettle Wild and Scenic River and canoe route.

*Water: Protected water-Kettle River.

RESOURCE MANAGEMENT GUIDELINES

Access: Possibly limit access on old township road to former farm to management vehicles only.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Propose transfer of administrative control of Trails land to Forestry and add all all state land in section to Admin. and Scattered State Forest. Explore possibility of acquiring adjacent county land in section 17 by exchange. Make appropriate changes in land and Phase II records.

Recreation: Maintain canoe campground.

Timber: Wild and Scenic River vegetative cutting rules (Chapter 6105) apply along river. Standard guidelines apply elsewhere.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 73

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 16 | 43N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 80 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access. Possible access from south across Finlayson School Forest.

Cover Type: No inventory printout. Lowland grass and aspen.

Fish and Wildlife: Sandhill cranes and sharp-tailed grouse may be present on site, since sharp-tails occur in section 9.

Minerals and Soils: Metallic potential class B. Possible peat-lowland grass type. Geomorphic region 61.

Ownership/Land Use: Classified dispose by sale for agriculture/wildlife. 80 acres of tax forfeit land adjacent to south (Finlayson School District). Remainder of surrounding land private.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: See Land Administration.

Land Administration: Explore possibility of adding to Finlayson School Forest. If not wanted field check for sandhill crane and sharp-tailed grouse. If present, add to Admin. and Scattered State Forest with special management for sharp-tailed grouse.

PROPOSED DISPOSITION

Retain in undedicated status pending further analysis.

COMPARTMENT ID: 74

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 34 | 43N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------|--|
| 153.32 | BA. Indemnity School | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

*Cover Type: Aspen 73%, Birch 18%, lowland grass 8%.

Fish and Wildlife: Possible waterfowl nesting habitat. Potential loon nesting habitat.

Minerals and Soils: Metallic potential class B. Possible peat-lowland grass type, 12 acres, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. Adjacent county land on Elbow Lake. Remainder of surrounding land private.

*Water: Protected water-Elbow Lake and Grass Lake.

RESOURCE MANAGEMENT GUIDELINES

Access: Try to get public access from south through section 3-42-21. Cross 1/2 mile of private land. Would also provide access to county land.

Fish and Wildlife: Possible waterfowl development potential. Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest. Determine county plans for lakeshore. Make appropriate changes in land records.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 75

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 36 | 43N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 120 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to east side via CSAH 35.

Cover Type: Aspen 86%, lowland brush 14%.

Fish and Wildlife: Possible waterfowl nesting habitat. Potential loon, bittern, and rail nesting habitat.

Minerals and Soils: Metallic potential class B. Possible peat on lowland brush type, 17 acres, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/access to water. Surrounded by private land.

*Water: Protected water-Miller Lake.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Possible waterfowl development potential. Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest. Make appropriate changes in land records.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 76

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 58 Pine | 16 | 44N | 21W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 320 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to NW corner on section line between sections 8 and 9 may be hampered by Little Bremen Creek. Possible access to SW corner.

Cover Type: Timber 100% commercial hardwoods, Aspen 86%, lowland hardwoods 8%, Northern hardwoods 6%.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. 80 acres county land adjacent is classified provisional retain for multiple use.

*Water: Little Bremen Creek in NW 1/4 (protected waters).

RESOURCE MANAGEMENT GUIDELINES

Access: Check road records to see if public rights of way exist to compartment to either the NW or SW corners. Acquire access across SWSW 9-44-21.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply. If an access road is constructed and a bridge or culvert is needed for access, proper erosion control measures should be used to protect stream habitat.

Land Administration: Explore possibility of acquiring adjacent county land by exchange. Add to Admin. and Scattered State Forest and make appropriate changes in land record.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 77

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 36 | 44N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 160 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via township road.

*Cover Type: Northern hardwoods 58%, aspen 21%, lowland brush 11%, stagnant spruce 10%.

Minerals and Soils: Metallic potential class B. Possible peat on lowland types, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife Guidelines apply.

Land Administration: Propose for inclusion in state forest.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 78

MANAGEMENT CATEGORY:

| | | | | |
|----------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 341 Moose Lake | 58 Pine | 16 | 45N | 21W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 160 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to north side via CSAH 46.

*Cover Type: Northern hardwoods 68%, Aspen 9%, Cutover 7%, Birch 5%. Type Sequence #6 and 7 include a 20 acre seed orchard (white and black spruce).

Minerals and Soils: Metallic potential class B. Geomorphic region 58.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land. Surrounding land mostly forested.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply except in seed orchard.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Manage seed orchard in conjunction with nursery/tree improvement personnel. Standard guidelines apply on rest of compartment.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 79

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 341 Moose Lake | 58 Pine | 36 | 45N | 21W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 280 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access. Physical access to west side via powerline r.o.w.

*Cover Type: Northern hardwoods 70%, Oak 27%, lowland brush 3%.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. Adjacent 40 of county land on west side classified retain provisionally for multiple use. County land also adjacent on south (80 acres, not classified) and east (160 acres, provisional for multiple use).

RESOURCE MANAGEMENT GUIDELINES

Access: Negotiate for access. Possible winter access across SWNW 36-45-21 or S 1/2 SW 1/4 31-45-20.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Explore possibility of obtaining adjacent county land. Include in Administrative and Scattered State Forest.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 80

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 09 Carlton | 16 | 46N | 16W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Aspen 100%.

Fish and Wildlife: One wildlife opening.

Minerals and Soils: Metallic potential class B. Geomorphic region 53.

Ownership/Land Use: Classified dispose by sale for multiple use. Surrounded by developed private land. Nemadji State Forest boundary is 1/2 mile to the east of compartment.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Dispose by sale or exchange.

PROPOSED DISPOSITION

Undedicated pending sale or exchange.

COMPARTMENT ID: 81

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|--|-----------------|--------------|
| 342 Nickerson | 09 Carlton | 16, S $\frac{1}{2}$ of SE $\frac{1}{4}$ and N $\frac{1}{2}$ of NE $\frac{1}{4}$ | 47N | 16W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 160 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

This compartment consists of two non-contiguous 80 acre parcels.

Access: Legal access to south side of southern parcel via township road. No legal access to north parcel.

Cover Type: Aspen 59%, balsam fir 19%, lowland brush 18%, non-permanent water 3%.

*Fish and Wildlife: Deer wintering area. Mud Creek is a trout stream.

Minerals and Soils: Metallic potential class B. Geomorphic region 53.

Ownership/Land Use: Classified dispose by sale for multiple use/wildlife. The south parcel is surrounded by private land. There are 280 acres of county land adjacent to the north parcel in sections 9, 10, 15, and 16. The county has classified their land dispose by sale. Portions of both state and county land must be withdrawn from sale because of protected waters. County has proposed exchanging its lands to the state.

*Recreation: Proposed route of Minnesota/Wisconsin Boundary Trail.

*Water: Mud Creek and two unnamed tributaries on north parcel are protected waters.

RESOURCE MANAGEMENT GUIDELINES

Access: To fully manage north parcel it may be necessary to obtain access from both north and south because of creeks. Access from south parcel to county land in section 16 requires 1/4 mile easement across private land. Easements could be obtained in conjunction with Boundary Trail development.

Fish and Wildlife: Protect trout stream habitat through watershed management, eroision control, modified timber harvest and modified pest control.

Land Administration: Acquire adjacent county land by exchange. Add compartment to Admin. and Scattered State Forest. Make appropriate changes in land records.

Recreation: Coordinate management activities with development of Boundary Trail.

Timber: Modify timber management to protect soil, water, and aesthetic values.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 82

MANAGEMENT CATEGORY:

| | | | | |
|---------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 342 Nickerson | 09 Carlton | 36 | 47N | 16W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 640 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access. Possible access to certain parts of section across county land and via river.

*Cover Type: Balm of Gilead 64%, birch 22%, balsam fir 8%.

*Fish and Wildlife: Major deer wintering area. 1 wildlife opening. South Fork Nemadji River and Section 36 Creek are designated trout streams.

Minerals and Soils: Metallic potential class B. Geomorphic region 53.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by county memorial forest except on south and part of west side. The So. Fork Nemadji River cuts a valley with 150 foot relief through north part of compartment. Possible trespass on south side by agricultural development.

*Water: Protected watercourses - South Fork Nemadji River, Section 36 Creek, and two unnamed tributaries to Section 36 Creek. Streams in compartment flow through steep valleys with highly erodible clay soils.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Protect trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control.

Land Administration: Add to Admin. and Scattered State Forest.

Law Enforcement: Check trespass and take appropriate action.

Timber: Modify silvicultural practices to protect trout stream and aesthetics.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 83

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 09 Carlton | 7 | 46N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------------|--|
| 40 | LN. Land Utilization Prog. | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access. Cross county land by trails along section line.

Cover Type: Aspen 67%, balsam fir 18%, lowland black spruce 13%. Significant botanical feature indicated in lowland black spruce (type seq. #1).

Minerals and Soils: Metallic potential class B. Geomorphic region 53.

Ownership/Land Use: Classified retain for multiple use. County memorial forest on west and south sides. Private land on east side. Forest industry land on north. Part of Nemadji State Forest according to DNR landownership records, but not included in the statutory description of the Nemadji.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Check possibility of sale or exchange of LUP land with county. If possible, exchange to county for inclusion in memorial forest.

Timber: Field check significant botanical feature to determine exactly what it is. Record with Natural Heritage Program if appropriate.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 84

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 09 Carlton | 16 | 46N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 360 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to east side via CSAH 8.

Cover Type: Aspen 39%, birch 14%, lowland black spruce 7%, lowland brush 6%, ash 5%.

*Fish and Wildlife: Clear Creek is a designated trout stream.

Minerals and Soils: Metallic potential class B. Geomorphic region 53.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land.

*Water: Protected watercourses - Clear Creek.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Maintain trout habitat. Forestry/Wildlife Guidelines apply. Protect trout stream trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control.

Land Administration: Add to Administrative and Scattered State Forest and make appropriate changes in land record.

Timber: Modify silvicultural practices to protect trout stream. Standard guidelines apply on remainder of compartment.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 85

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 09 Carlton | 16 | 47N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 280 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via county road 105.

Cover Type: Red pine 56%, birch 24%, jack pine 2%, aspen 6%, white spruce 5%, lowland brush 6%. Significant botanical feature in white spruce (type #7). 100 foot relief along stream valley.

*Fish and Wildlife: Blackhoof Creek is designated trout stream with fisheries management areas on it. Heavy fishing use. Five wildlife openings on tract.

Forest Protection: Fire hazard due to conifer types and public use patterns.

Minerals and Soils: Metallic potential class B. Geomorphic region 59.

Ownership/Land Use: Classified retain for multiple use. 80 acres of Fisheries Management Area on east, and 40 acres on north. 80 acres tax-forfeited to north. 40 acres county fee land on east. Remainder of surrounding land is private.

Recreation: Littering problem related to fishing use.

*Water: Protected watercourses - Blackhoof Creek.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife:

Protect trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control. Forestry/Wildlife Guidelines apply on rest of compartment.

Forest Protection: Intensify fire detection efforts. Maintain water quality.

Land Administration: Explore potential of acquiring adjacent county lands by exchange. Add to Admin. and Scattered State Forest and make appropriate changes in land records.

Law Enforcement: Check for littering.

Recreation: Clean up litter.

Timber: Modify silvicultural practices to protect trout stream and aesthetics.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 86

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 09 Carlton | 36 | 47N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 560 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access. Walk-in access across county land.

*Cover Type: Aspen 56%, ash 25%, balsam fir 13%, upland grass 3%, white spruce 2%.

*Fish and Wildlife: Deer Yard, Two wildlife openings. North Fork Nemadji is a designated trout stream.

Minerals and Soils: Metallic potential class B. Geomorphic region 53.

Ownership/Land Use: Classified retain for multiple use/wildlife. County proposal to exchange 240 acres of tax-forfeited land in sections 35 and 36 to state. County land currently classified retain for multiple use. County memorial forest to east and southwest. Remainder of adjacent land is private.

*Water: Protected watercourses - North Fork Nemadji River, Skunk Creek. Steep slopes and highly erodible clay soils.

RESOURCE MANAGEMENT GUIDELINES

Access: Acquire legal access across county land by exchange.

Fish and Wildlife: Maintain habitat important for deer yard. Conduct field review of wildlife resources to provide input to land exchange proposal. Protect trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control.

Land Administration: Attempt to get tax-forfeited and undedicated land west of STH 23 in sections 31 and 32 of T47, R16 and sections 35 and 36 of T47, R17 in state forest by exchange. Add to Admin. and Scattered State Forest.

Timber: Modify silvicultural practices to protect trout stream and aesthetics.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 87. Cross Reference -
Nemadji - General Management

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | 10 | 44N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 80 | LF. 50/50 | 35. Nemadji State Forest |

COMPARTMENT HIGHLIGHTS

See compartment #14 Nemadji State Forest - General Management for management guidelines.

Ownership/Land Use: The DNR Ownership/Classification record indicates this compartment is part of the Nemadji State Forest. However it is not within the boundary shown on the 1977 county highway map. The statutory description of the boundary is unclear. It reads in part, "...the east one-third of township 44, range 17, the east one-half of the northeast quarter of section 10, and sections 20, 21, 22, 27, 28, 29, 32, 33 and 34;..." It is apparent that the intent of the DNR and county board was to have this parcel in the state forest.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Change statutory description of Nemadji State Forest (M.S. 89.021, Subd. 35) to read in part, "...the east one-third, the east one-half of the northeast quarter of section 10, and sections 20, 21, 22, 27, 28, 29, 32, 33 and 34 of township 44, range 17..."

COMPARTMENT ID: 88

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | 16 | 44N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 640 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to north side via county road 171. Class 5 road pioneered by Fish and Wildlife through Sec. 16 provides access to Sections 20 and 21.

*Cover Type: Aspen 75%, stagnant spruce 8%, lowland grass 5%, lowland brush 3%.

Fish and Wildlife: Class 5 road pioneered by Fish and Wildlife partly for eventual hunter walking trail after timber harvesting is completed in about 5 years.

Minerals and Soils: Metallic potential class D. Possible peat on lowland types 125 acres, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Nemadji state forest adjacent to south 280 acres of tax-forfeited land in sections 9 and 4, not classified or classified dispose by sale for multiple use. Also county tax-forfeited to east and west classified dispose by sale or provisional.

RESOURCE MANAGEMENT GUIDELINES

Access: Construct gate on Black Bear access trail.

Land Administration: If county still intends to dispose of adjacent parcels of tax-forfeited land, acquire for addition to Nemadji State Forest.

Other guidelines are the same as those for the adjacent compartment #14 Nemadji State Forest - General Management.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 89

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | 6 | 44N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------------|--|
| 40 | BA. Indemnity School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Stagnant spruce 100%.

Minerals and Soils: Metallic potential class B. Possible peat 40 acres.
Geomorphic region 61.

Ownership/Land Use: Classified dispose by sale for multiple use. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Custodial management only.

PROPOSED DISPOSITION

Retain in undedicated status.

COMPARTMENT ID: 90

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson. | 58 Pine | 16 | 44N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 360 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via State Trunk Hwy. 23.

*Cover Type: Aspen 59%, northern hardwoods 18%, oak 12%, lowland black spruce 5%, road 3%, lowland brush 2%.

*Fish and Wildlife: 8 year old shearing project for deer, adjacent to historic deer yard.

Minerals and Soils: Metallic potential class B. Possible peat - 26 acres on LB and BSL types. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land. Hwy. 23 and railroad track cross northwest corner of compartment. Utility leases #144-62-1342 and #144-62-1163 cross compartment.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Manage for deer browse by commercial cutting due to adjacent deer yard. Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 91

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | 36 | 44N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 640 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to NE corner via County Road 153. Range Line Trail provides access on E. Class 5 road pioneered by Fish and Wildlife provides access for 3/4 mile through middle.

Cover Type: Lowland Grass 13%, aspen 57%, lowland brush 13%, birch 16%, muskeg 1%.

Minerals and Soils: Metallic potential class D. Possible peat on lowland grass, lowland brush and muskeg types (160 acres). Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. County land on south section line and on SE, SW, and NW corner of compartment.

*Recreation: Range Line snowmobile trail follows east section line. Snowmobile trail from Nemadji State Forest joins range line trail at NE corner.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Forest Protection: Harvest overmature aspen to avoid I&D problems.

Land Administration: Exchange with county if possible. Otherwise add to Admin. and Scattered State Forest.

Recreation: Close snowmobile trail when MN/WI Boundary Trail is brought up to specifications.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Undedicated pending exchange with county.

COMPARTMENT ID: 92

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | 16 | 45N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 80 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to west and south sides via township road and county road 47, respectively. Access on east side via old logging road.

Cover Type: N. hardwoods 59%, lowland brush 20%, permanent water 13%, aspen 5%.

Fish and Wildlife: Duck hunting, fishing are recreation activities on lake.

Minerals and Soils: Metallic potential class B. Possible peat on lowland brush type.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land.

*Water: Protected waters in unnamed lake.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Provide waterfowl nesting structures. Forestry/Wildlife guidelines apply.

Land Administration: Add to Administrative and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 93

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | 36 | 45N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 440 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via county road 154 and to north side via township road on section line.

Cover Type: Stagnant spruce 46%, muskeg 11%, oak 16%, white spruce 8%, lowland brush 8%, tamarack 4%, marsh 5%, birch 3%.

Fish and Wildlife: Possible sharp-tailed grouse wintering area.

Minerals and Soils: Metallic potential class B. Peat on about 355 acres of marsh and lowlands. Interest in peat mining on this bog several decades ago. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. County land to the NE. Village of Kerrick corporate boundary adjacent on south ½ of west side.

*Recreation: Grants in Aid snowmobile trail along north section line. Range line snowmobile trail along east section line. Grants in aid cross country ski trail with Nemadji Sports Boosters (lease #144-15-213) crosses compartment.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Determine county plans for adjacent lands to the northeast. This compartment and the county lands might eventually be consolidated as part of the Nemadji State Forest.

Recreation: Continue lease for ski trail with Nemadji Sports Boosters. Close range line snowmobile trail when Minn.-Wisc. Boundary Trail is complete.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Undedicated pending exchange with county.

COMPARTMENT ID: 94

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 342 Nickerson | 58 Pine | 36 | 44N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 280 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via county road 149. Class 5 road provides access to interior.

Cover Type: Oak 40%, birch 18%, aspen 19%, lowland brush 19%.

Minerals and Soils: Metallic potential class B. Possible peat-marsh type, 5 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 95

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 16 | 43N | 16W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 640 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access from north through Nemadji State Forest. Township right of way to SE corner from south. Old township road along south boundary.

*Cover Type: Northern hardwoods 60%, lowland black spruce 9%, lowland brush 10%, stagnant spruce 9%, ash 6%, lowland hardwoods 3%, tamarack 5%.

Fish and Wildlife: Possible Great Gray Owl habitat.

Minerals and Soils: Metallic potential class D. Possible peat on lowland types, 214 acres, depth unknown. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Nemadji State Forest adjacent to north. Four sections of county tax-forfeit land to west classified retain for multiple use/wildlife. Private land on south and east sides.

RESOURCE MANAGEMENT GUIDELINES

Access: Complete work on township road right of way from south to compartment. End road about 1/2 mile up east compartment boundary. Construct hunter parking lot at end of road. Township to maintain road.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Nemadji State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 96

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 36 | 43N | 16W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 240 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to north side via CSAH 32.

Cover Type: Aspen 58%, lowland black spruce 16%, lowland brush 16%, ash 8%, non-permanent water 4%.

Minerals and Soils: Metallic potential class D. Possible peat on lowland types - 86 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. 320 acres of county tax-forfeited land to south classified dispose by sale for multiple use. Remainder of surrounding land is private.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Explore exchange with county - either acquire county land to south or trade state land to county. If retained make state forest.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Undedicated pending exchange.

COMPARTMENT ID: 97

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 16 | 43N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 320 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access through Nemadji State Forest. No developed access. Old township road along south of compartment not usable except in winter.

*Cover Type: Aspen 63%, lowland grass 31%, lowland brush 6%, birch 3%.

Fish and Wildlife: Potential sandhill crane habitat. Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class D. Possible peat on lowland types (123 acres). Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Large block of county tax-forfeited land to the west. Nemadji State Forest to the north. Private land on east and south.

*Water: Protected watercourse - Johnson Creek.

RESOURCE MANAGEMENT GUIDELINES

Management guidelines for this compartment are the same as for the Nemadji - General Management compartment (#14).

Land Administration: Add to Nemadji State Forest and make appropriate changes in land record.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 98

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 36 | 43N | 17W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 640 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Old township roads along north and east side.

Cover Type: Northern hardwoods 43%, lowland grass 17%, aspen 15%, lowland brush 10%, ash 8%, tamarack 5%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class D. Possible peat on lowland types - 205 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. In middle of large block of county land with various classifications. Private land to north and on east half of south side.

*Recreation: Minn./Wisc. Boundary Trail crosses SE corner and north side of compartment.

*Water: Protected water - McDermott Creek in SE corner of compartment.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Explore exchange to county.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 99

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 16 | 42N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 320 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Access via CSAH 30 on north section line. Access via CSAH 22 on northwest corner.

*Cover Type: Lowland brush 50%, birch 32%, aspen 15%, jack pine 3%. Jack pine (type sequence #2) has been converted to red pine seed orchard.

Fish and Wildlife: West Fork of Crooked Creek and Wolf Creek are designated trout streams.

Minerals and Soils: Metallic potential class D. Possible peat - 160 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land. SWSE is leased for pasture (lease #144-3-472). Telephone line lease #144-62-1359.

*Water: Protected waters - Wolf Creek and West Fork of Crooked Creek.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife guidelines apply except on seed orchard. Protect trout stream habitat through watershed management, erosion control, modified timber harvest and modified pest control.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in the land record. Maintain pasture lease.

Timber: Red pine seed orchard to be managed in cooperation with General Andrews Nursery. Modify silvicultural practices to protect trout stream and aesthetics.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 100

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 36 | 42N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 440 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to southeast corner via old township road.

Cover Type: Aspen 75%, lowland grass 9%, lowland brush 7%, tamarack 3%, northern hardwoods 3%, upland brush 2%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Fire: Several fires have burned in compartment within the last 10 years.

Minerals and Soils: Metallic potential class D. Possible peat on 87 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/agriculture. Surrounded by private land. Borders on St. Croix State Forest to east.

*Water: Protected waters - east fork of Crooked Creek.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife guidelines apply.

Land Administration: Exchange for other land on public water within a management unit. Possible sale as surplus if exception to public waters limitation is available.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Undedicated pending exchange or sale.

COMPARTMENT ID: 101

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 16 | 43N | 18W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 640 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to west side via county 146.

Cover Type: Aspen 42%, birch 30%, marsh 16%, lowland grass 11%, lowland brush 1%.

Minerals and Soils: Metallic potential class D. Possible peat on lowland types - 181 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. 240 acres of county tax-forfeited land to west (not classified). County tax-forfeited on north and east also. Private land to south.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Exchange to county.

PROPOSED DISPOSITION

Undedicated pending exchange to county.

COMPARTMENT ID: 102

MANAGEMENT CATEGORY:

| | | | | |
|---------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 343 Eaglehead | 58 Pine | 36 | 43N | 18W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 640 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Snowmobile trail on east section line is an old township road.

Cover Type: Aspen 32%, birch 22%, lowland brush 14%, stagnant spruce 19%, tamarack 13%, lowland grass 7%.

Minerals and Soils: Metallic potential class D. Possible peat on lowland types (290 acres). Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. County tax-forfeited land on north, east, and south. Private land to west. Pine County Game Refuge Unit 1 on east side.

*Recreation: Range Line snowmobile trail on east side of compartment.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Explore exchange with county.

PROPOSED DISPOSITION

Undedicated pending exchange with county.

COMPARTMENT ID: 103

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 16 | 42N | R19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 520 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Access on north section line via CSAH 30. Access on east section line via CSAH 21.

Cover Type: Aspen 53%, birch 17%, muskeg 13%, lowland grass 13%, lowland brush 3%.

*Fish and Wildlife: Deer yard.

Minerals and Soils: Metallic potential class B. Possible peat on 152 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land. Powerline and telephone line rights of way cross compartment (lease #144-62-1375 and 144-62-1359). 480 acres in sections 20 and 21 being given to state.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record. Accept gift land to south. Add to compartment.

Timber: Standard guidelines apply. Complete Phase II inventory on gift land when it becomes state property.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 104

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|--------------------|--|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 36 | 42N | 19W |
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> | | |
| 40 | AA. School Trust | Undedicated | | |

COMPARTMENT HIGHLIGHTS

Access: Legal access along east section line via township road.

Cover Type: Aspen 53%, lowland grass 47%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class D. Possible peat - 19 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land.

*Water: Protected waters - Little Sand Creek.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Exchange for another parcel with public water.

PROPOSED DISPOSITION

Undedicated pending exchange.

COMPARTMENT ID: 105

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|---------------|---------------|----------------|-----------------|--------------|
| 343 Eaglehead | 58 Pine | 36 | 43N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 640 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to northwest corner via township road. Old township road along west half of north boundary. Access to east part restricted by Sand Creek.

Cover Type: Aspen 68%, lowland brush 16%, lowland grass 7%, birch 6%, muskeg 3%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class B. Possible peat on 164 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use and recreation. 206.01 acres of county land adjacent to east in 31-43-18 and 6-42-18 classified dispose by sale for multiple use.

*Water: Protected water - Sand Creek.

RESOURCE MANAGEMENT GUIDELINES

Access: Obtain legal access to northeast corner. This will require construction of 1/4 mile of class 5 road.

Fish and Wildlife: Forestry/Wildlife guidelines apply.

Land Administration: Acquire adjacent county land by exchange. Add to Admin. and Scattered State Forest and make appropriate changes in land records.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 106

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|----------------|-----------------|--------------|
| 344 Hinckley | 58 Pine | 16 | 41N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 160 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to east side via CSAH 21. Western half may be inaccessible due to stream.

Cover Type: Aspen 78%, lowland grass 13%, lowland brush 9%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class D. Peat possible on 38 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. Surrounded by private land.

*Water: Protected water - Bear Creek.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 107

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|----------------|-----------------|--------------|
| 344 Hinckley | 58 Pine | 36 | 41N | 19W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 400 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via CSAH 136. Northeastern third may be inaccessible due to stream.

Cover Type: Aspen 34%, cutover area 29%, lowland brush 13%, northern hardwoods 12%, red pine 7%.

Fish and Wildlife: Wildlife opening in type #7. Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class D. Peat possible on 62 acres. Geomorphic region 62.

Ownership/Land Use: NE, NW, and SW quarters of NW quarter are provisional - retain until adequate information obtained on retention or disposal. Remainder classified retain for multiple use. Surrounded by private land. St. Croix State Park 1.5 miles to south.

*Water: Protected waters - Sand Creek and unnamed wetland.

RESOURCE MANAGEMENT GUIDELINES

Access: Acquire easement to access northeastern portion of compartment (1 mile).

Fish and Wildlife: Forestry/Wildlife guidelines apply.

Land Administration: Add to Administrative and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 108

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|----------------|-----------------|--------------|
| 344 Hinckley | 58 Pine | 16 | 40N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 400 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via township road to SW portion of compartment.

Cover Type: Aspen 50%, lowland brush 45%, ash 2%.

Minerals and Soils: Metallic potential class D. Possible peat on lowland brush type (185 acres). Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. County land to south (200 acres), east (360 acres), and north (160 acres). Remainder of surrounding land is private.

Recreation: GIA snowmobile trail connection between Hinckley and St. Croix State Park.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Possible exchange to county to consolidate ownerhsips.

PROPOSED DISPOSITION

Undedicated pending possible exchange to county.

COMPARTMENT ID: 109

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|----------------|-----------------|--------------|
| 344 Hinckley | 58 Pine | 4 | 41N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|---------------------------|--|
| 40 | AB. School Trust Exchange | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal land access. Parcel bisected by Kettle River.

Cover Type: Lowland brush 35%, ash 29%, northern hardwoods 21%, water 6%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Not classified. This parcel has a common corner with School District #2 land along the Kettle to the northeast. The portion east of the Kettle River is within the boundary of the Sandstone Game Refuge. There is county tax-forfeited land 1/4 mile north and Kettle Wild and Scenic River land 1/4 mile south. Adjacent land on all 4 sides is private. This compartment falls within the Kettle River land use district established in Chapter 6105 of Minnesota Rules 1983.

*Recreation: On Kettle River canoe route.

*Water: Protected water - Kettle River.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Explore exchange or transfer of administrative control to another DNR unit. Trust fund status and protected water may limit options.

Recreation: Possible site for canoe rest stop or campsite.

Timber: Vegetative cutting restrictions in wild and scenic river rules (Chapter 6105) apply.

PROPOSED DISPOSITION

Undedicated pending internal exchange or transfer of administrative control to Trails and Waterways Unit.

COMPARTMENT ID: 110

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|---------------------------|--|-----------------|--------------|
| 344 Hinckley | 58 Pine | 10 | 41N | 20W |
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> | | |
| 80 | AB. School Trust Exchange | Undedicated | | |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

*Cover Type: Aspen 52%, ash 48%.

*Fish and Wildlife: Deer yard.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Not classified for recommended use or disposition. Surrounded by private land on all four sides. Has a common corner with 40 acres of Kettle Wild and Scenic River land in section 9. The Kettle River Scientific and Natural Area is adjacent to the south. All but 10 acres of this compartment falls within the Kettle Wild and Scenic Land Use District as described and mapped in Chapter 6105 of Minnesota Rules 1983.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Evaluate compartment to see if it contains features that justify its addition to the Kettle River SNA. Transfer administrative control or exchange with another DNR division. Trust status may limit options.

PROPOSED DISPOSITION

Undedicated pending internal exchange or transfer of administrative control to Trails and Waterways Unit or SNA.

COMPARTMENT ID: 111

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|----------------|-----------------|--------------|
| 344 Hinckley | 58 Pine | 16 (NWNW) | 41N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Aspen 64%, muskeg 36%.

Minerals and Soils: Metallic potential class B. Possible peat in muskeg type - 15 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for wildlife. Surrounded by private land. Land to south is primarily agricultural and to the north is forest.

RESOURCE MANAGEMENT GUIDELINES

Custodial management only.

PROPOSED DISPOSITION

Retain in undedicated status.

COMPARTMENT ID: 112

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|----------------|--------------------|--|-----------------|--------------|
| 344 Hinckley | 58 Pine | 16 (NENE & SENE) | 41N | 20W |
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> | | |
| 80 | AA, School Trust | Undedicated | | |

COMPARTMENT HIGHLIGHTS

Access: No legal land access. Compartment is bisected by Kettle River.

Cover Type: Aspen, lowland hardwoods, northern hardwoods, lowland brush, water. (Area west of river not inventoried) Very steep bank (100+ feet relief) on west side of river.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Classified retain for recreation or aesthetics. Kettle River Scientific and Natural Area is adjacent on the east. Private land on other three sides. Land to southwest is cleared, remainder is forested. This compartment falls within the Kettle Wild and Scenic River land use district as described and mapped in Chapter 6105 of Minnesota Rules 1983.

*Recreation: On Kettle River canoe route.

*Water: Protected waters - Kettle River.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Transfer administrative control or exchange with another DNR division. Trust status may limit options. Pending official transfer the land east of the river should be managed in accordance with SNA policy and plan.

PROPOSED DISPOSITION

Undedicated pending internal exchange or transfer of administrative control to SNA and/or Trails and Waterways Unit.

COMPARTMENT ID: 113

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|----------------|-----------------|--------------|
| 344 Hinckley | 58 Pine | 36 | 42N | 20W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 520 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access via CSAH 20.

*Cover Type: Aspen 50%, marsh 40%, birch 6%, stagnant spruce 2%, upland brush 2%.

Fish and Wildlife: Adjoins Sandstone National Wildlife Refuge on SW corner. Potential for Sandhill Cranes, Sharptail Grouse.

Minerals and Soils: Metallic potential class B. Possible shallow peat in marsh type - 214 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use. 60 acres of county land adjacent to north classified retain for multiple use/wildlife. Remainder of surrounding land privately owned. Surrounding land primarily forested or marsh. Power line lease #144-62-1342, telephone line lease #144-63-1359, and Pine County Highway Department lease #133-23-140 affect compartment.

RESOURCE MANAGEMENT GUIDELINES

Access: Limited to winter currently, summer access would require private easement.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Explore acquisition of county land to north (60 ac.) by exchange. Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 114

MANAGEMENT CATEGORY:

| | | | | |
|--------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 344 Hinckley | 58 Pine | 4 | 42N | 21W |

| | | |
|----------------|----------------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 40 | BA. Indemnity School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to north side via CSAH 28.

Cover Type: Lowland brush 68%, northern hardwoods 22%, lowland grass 10%.

Minerals and Soils: Metallic potential class B. Probable peat on lowland brush type - 28 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for wildlife/recreation or aesthetics. Surrounded by private land. Telephone line lease #144-62-1359.

Water: Public ditch connecting Elbow and Grindstone Lakes crosses compartment.

RESOURCE MANAGEMENT GUIDELINES

Custodial management only.

PROPOSED DISPOSITION

Retain in undedicated status.

COMPARTMENT ID: 115

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|--------------|---------------|----------------|-----------------|--------------|
| 344 Hinckley | 58 Pine | 16 | 40N | 22W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 80 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via county road 131.

Cover Type: Aspen 100%. The aspen consists of alternating strips of recently cut and mature stands.

Fish and Wildlife: Strip cuts to maintain age diversity.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/agriculture (pasture or open). Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 116

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 16 | 41N | 22W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 280 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via CSAH 3. Drainage ditch in southeast corner may seasonally restrict access to portions of parcel.

Cover Type: Ash 40%, Lowland Grass 26%, Aspen 16%, Lowland Brush 14%, Birch 5%.

Fish and Wildlife: Deer concentration area adjacent to compartment on north.

Minerals and Soils: Metallic potential class B. High probability of peat deposits, 225 acres. Geomorphic region 61.

Ownership/Land Use: Classified provisional retain for multiple use/wildlife. Completely surrounded by private land. Surrounding land cover forest, agriculture, and marsh.

Water: Two ditches cross compartment but neither is on protected waters inventory.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply. Management actions should recognize adjacent deer yard.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 117

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 36 | 41N | 22W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 560 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Aspen 62%, lowland grass 36%, lowland brush 2%.

*Fish and Wildlife: Deer yard. Potential sharp-tailed grouse and sandhill crane habitat.

Minerals and Soils: Metallic potential class B. Possible peat on lowland types - 213 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Access: Obtain legal access from east. Will require easement and development of 1/2 to 3/4 mile of class 5 road for winter access.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply. Manage to maintain deer yard.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 118

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 36 | 42N | 22W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 160 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to north side via CSAH 29.

Cover Type: Aspen 48%, lowland grass 40%, lowland brush 12%

Fish and Wildlife: Possible sharp-tailed grouse and sandhill crane habitat. Deer yard adjacent to north in section 25.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. Surrounded by private land. 320 acres of county tax-forfeited land located ¼ mile north. Surrounding land cover is mixture of forest, marsh, agriculture.

Water: Ditch crosses NE corner. Ditch not included in protected waters inventory.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Administrative and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 119

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 36 | 38N | 23W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 40 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

Cover Type: Lowland brush 62%, northern hardwoods 38%.

Fish and Wildlife: Possible pheasant habitat.

Minerals and Soils: Metallic potential class D. Probable peat on lowland brush type - 26 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for wildlife. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Conduct field inventory of wildlife resources.

Land Administration: Depending on result of wildlife inventory either transfer administrative control to Division of Fish and Wildlife or declare surplus and dispose by exchange or sale.

PROPOSED DISPOSITION

Undedicated pending transfer of administrative control or disposal.

COMPARTMENT ID: 120

MANAGEMENT CATEGORY:

| | | | | |
|------------|---------------|----------------|-----------------|--------------|
| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
| 345 Mora | 33 Kanabec | 36 | 41N | 23W |

| | | |
|----------------|--------------------|--|
| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
| 360 | AA School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south via county road 74 and to west side via county road 72. Access to east via township road.

*Cover Type: Oak 43%, aspen 37%, northern hardwoods 9%, lowland brush 4%, marsh 4% muskeg 3%.

*Fish and Wildlife: Deer yard.

Minerals and Soils: Metallic potential class B. Possible peat in depressions - 38 acres. Geomorphic region 61.

*Ownership/Land Use: Classified retain for multiple use/wildlife. Pomroy fire tower located in NWNE. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply. Manage to maintain deer yard.

Forest Protection: Maintain fire tower for use during severe fire seasons.

Land Administration: Add to Administrative and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 121

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 16 | 42N | R23W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 560 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south side via county road 82. Northeast portion inaccessible due to Snake River. West and central portions accessible by logging trail.

*Cover Type: Aspen 55%, birch 14%, northern hardwoods 13%, ash 6%, lowland brush 5%, water 3%, lowland hardwoods 2%, marsh 2%.

Fish and Wildlife: Former deer yard. Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class B. Geomorphic regions 14 and 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. All of this compartment is in the boundary of the Hay-Snake WMA. 200 acres of county land to west, 240 acres to north coded as wildlife management area, county land on north and east side. Private land on east, south, and west sides.

Recreation: On Snake River canoe route.

*Water: Protected waters Hay Creek and Snake River.

RESOURCE MANAGEMENT GUIDELINES

Access: Obtain legal access to northeast portion. Requires 1/2 mile easement on private land and 1/2 mile easement on county land. Develop 1 mile class 5 road for winter access.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Adjust WMA project boundaries to exclude this trust fund land and to avoid overlapping unit boundaries. Add to Administrative and Scattered State Forest and make appropriate changes in land record.

Timber: Maintain aesthetic resources along Snake River. Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 122

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 6 | 41N | 24W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 43.60 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to SE corner via township road.

Cover Type: No Phase II data available, mixed lowland.

Minerals and Soils: Metallic potential class E. Geomorphic region 61.

Ownership/Land Use: Parcel was sold in 1982, returned in 1984, purchase price refunded. Surrounded by private land.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Declare surplus and offer for sale again.

PROPOSED DISPOSITION

Undedicated pending sale.

COMPARTMENT ID: 123

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 16 | 42N | 24W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 520 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access to south via STH 27 and to east and west via township roads.

Cover Type: Aspen 55%, marsh 26%, lowland brush 5%, non-permanent water 7%.

Fish and Wildlife: Potential sandhill crane habitat. Warmwater gamefish and warmwater feeder stream.

Minerals and Soils: Metallic potential class E. Probable peat on lowland types - 174 acres. Geomorphic regions 14 and 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. NE corner touches large block of county land. Private land on all 4 sides. Surrounding cover primarily forest and marsh with some cropland.

*Water: Protected water - Hay Creek.

RESOURCE MANAGEMENT GUIDELINES

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 124

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 36 | 42N | 24W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 160 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

*Cover Type: Northern hardwood 51%, birch 28%, non-permanent water 8%, oak 5%, aspen 5%.

Fish and Wildlife: Beaver present. Possible deer wintering area.

Minerals and Soils: Metallic potential class B. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/recreation or aesthetics. Surrounded by private land.

Recreation: Mora Vasaloppet Ski Trail passes through compartment.

RESOURCE MANAGEMENT GUIDELINES

Access: Obtain legal access from west across private land. Requires approx. 1/2 mile easement and development of class 5 road.

Fish and Wildlife: Forestry/Wildlife habitat management guidelines apply.

Land Administration: Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Recreation: Explore possibility of granting formal lease to ski club for Vasaloppet ski trail.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 125

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 8 | 39N | 25W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------|--|
| 80 | EA. University Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access through Rum River State Forest via logging trail.

*Cover Type: Northern hardwoods 64%, marsh 36%.

Fish and Wildlife: Warmwater gamefish and warmwater feeder streams.

Minerals and Soils: Metallic potential class B. Probable peat in marsh type - 29 acres. Geomorphic region 61.

Ownership/Land Use: Classified retain for multiple use/wildlife. Rum River State Forest is adjacent on west. Private land on north, east and south. SE 1/4 of section 8 is platted land.

*Water: Protected water - Groundhouse River.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Add to Rum River State Forest and make appropriate changes in land record.

Other guidelines are same as for Rum River State Forest General Management Compartment.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 126

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 23, 24, 26 | 39N | 25W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|----------------------|--|
| 400 | EA. University Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: No legal access.

*Cover Type: Aspen 71%, marsh 17%, tamarack 7%, muskeg 5%.

*Fish and Wildlife: Deer yard in Secs. 23, 24 and 26. Phase II has deer yard in type #1 of section 26. Heavy hunting use.

Minerals and Soils: Metallic potential class B. Possible peat on lowland types - 123 acres. Geomorphic region 61.

Ownership/Land Use: Sections 23 and 24 classified retain for wildlife/recreation or aesthetics. Section 26 classified dispose by sale for cultivation. Topographic map shows cleared land and fence in section 26. Plat book shows house in section 26.

RESOURCE MANAGEMENT GUIDELINES

Access: Obtain legal access from south or north across private land. Approx. 1/4 mile of easement and road development required.

Fish and Wildlife: Wetland will be created in NWSE 23 (type #4) by Soil Conserv. Service to replace Mora airport wetland. Manage for deer yard and waterfowl. Dam will be constructed.

Land Administration: Change classification of Sec. 23, 24 and 26 to retain for multiple use/wildlife. Add to Admin. and Scattered State Forest and make appropriate changes in land record.

Timber: Standard guidelines apply.

PROPOSED DISPOSITION

Add to state forest.

COMPARTMENT ID: 127

MANAGEMENT CATEGORY:

| <u>RAD</u> | <u>COUNTY</u> | <u>SECTION</u> | <u>TOWNSHIP</u> | <u>RANGE</u> |
|------------|---------------|----------------|-----------------|--------------|
| 345 Mora | 33 Kanabec | 36 | 40N | 25W |

| <u>ACREAGE</u> | <u>LAND STATUS</u> | <u>CURRENT MANAGEMENT UNIT DESIGNATION</u> |
|----------------|--------------------|--|
| 60 | AA. School Trust | Undedicated |

COMPARTMENT HIGHLIGHTS

Access: Legal access through Ann Lake WMA.

*Cover Type: Marsh and oak. Phase II lists Type #12 Mh - 76 acres and #13 oak - 66 acres. Entire forestry administered acreage is 60 acres.

Fish and Wildlife: Adjacent to Ann Lake WMA.

Minerals and Soils: Metallic potential class B. Geomorphic region 10c.

Ownership/Land Use: Classified retain for multiple use/recreation or aesthetics. Forestry administers only part of lots 3 and 4. Wildlife administers the remainder. Surrounded by Ann Lake WMA.

*Water: Protected water - Ann Lake.

RESOURCE MANAGEMENT GUIDELINES

Land Administration: Transfer administrative control to Division of Fish and Wildlife. Transfer trust status to other land or develop agreement allowing continued timber sales to satisfy trust requirements.

PROPOSED DISPOSITION

Add to wildlife management area.

APPENDIX E

Moose Lake Area
Timber Regulation Plan

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Note: Only a brief description of the process used to develop the Moose Lake Area Timber Regulation Plan is presented here. Complete Information can be reviewed at the Area office:

Moose Lake Area Forest Supervisor
Route 2, 701 So. Kenwood
Moose Lake, MN 55767
Phone (218) 485-4474

Introduction

The Timber Regulation Plan is developed using a computer based program designed to assist in making timber management decisions. This program is intended to assist foresters in developing timber management plans at the management unit level. Under this system the timber management planning process is divided into 8 steps. Each forest cover type for the management unit is processed separately through the first six steps, then all of the cover types are run as a group through the last two steps, completing the process. Note that the program was developed to automate some of the manual procedures traditionally used in timber management planning, namely retrieving stand inventory information and summarizing it in various ways. The steps in the program and the rationale required to use them are explained below.

Preparing the Data for the Management Unit

Before the program can be used, a data set must be prepared for the management unit; this data set should contain an individual descriptive record for each stand inventoried and should reflect all recent alterations to the inventory information. It is recommended that all users obtain a set of Phase II Inventory summary reports for review previous to starting timber management planning and to refer to while running the program.

Step 1: Enter Criteria to Select Stands for Regeneration Without Harvest

In this step the user selects a cover type to work with from those existing within the management unit. Now concentrating on the cover type selected, some of the stands are likely to be on poor sites, have low stocking, or have extensive insect or disease damage. It may be desirable to exclude these noncommercial stands from the calculations for allowable cut acreage. This step is used to identify such stands by setting stand selection criteria for site index, stocking, and percent damage. A summary report is printed showing the number of stands and acres that meet the criteria entered; the user is allowed to change the criteria if desired until a suitable group of stands has been identified for review in Step 2.

Step 2: Select Stands for Regeneration Without Harvest

The criteria entered in the previous step are used as guidelines for presenting individual stand records to the screen in this step. Information on stand location, age, site index, acreage, species composition, size and volume, damage, etc. is reviewed for each stand to determine a suitable stand prescription. The options available are: KEEP (leave in the clear cut base), RESERVE, manage as ALL-AGED, SALVAGE, or REGENERATE only. The prescription information entered by the user is stored by the program within the stand data records.

Step 3: Select Stands for All-Aged Management

If the current cover type is amenable to ALL-AGED management, this step may be used to designate some stands as ALL-AGED, thereby removing them from the clear cut base. At the start of this step reports are printed showing the acreage in each size class by stand density category; these are provided to assist the user in setting the stand selection criteria for ALL-AGED management, including minimum site index, stem densities, and basal areas. All stands meeting the criteria entered will be designated (or "selected") as ALL-AGED stands; the individual stand records are not presented to the screen for review.

Step 4: Select Stands for the First 10 Years Harvest

At this point the total available clear cut acreage for the cover type can be calculated because all of the noncommercial and non-even-aged stands have been identified; these are left out. The clear cut acreage is divided by the ROTATION AGE, and adjusted by the BALANCE FACTOR (both of which are entered by the user) to obtain annual and 10-year allowable cut figures. Next the individual stand records are presented to the screen and the user is allowed to choose the appropriate prescriptions. The prescription options are HARVEST, KEEP (do nothing this period), or manage as ALL-AGED. When enough HARVEST stands have been selected to meet the 10-year allowable cut acreage, the step may be terminated.

Step 5: Select Stands for Thinning

Although the timber harvest for the next 10 years has been determined for the current cover type, it may also be desirable to identify stands that will need THINNING during this period. In this step, stand selection criteria for minimum site index and stocking are entered by the user to provide general guidelines for designating stands as needing THINNING. Only stands within the clear cut base and not previously selected for harvest are eligible for thinning. As in Step 3, the individual stand records are not presented for review.

Step 6: Process Listing Reports

The previously completed steps would be useless without some means of identifying stands in the field as belonging to a particular category: REGENERATE only, SALVAGE AND REGENERATE, RESERVE, HARVEST AND REGENERATE, MANAGE as ALL-AGED, or THIN. This step provides a report for each of these categories (if needed) showing for each stand: stand number, legal description, site index, age, acreage, major species and volume, etc.

Step 7: Process Rotation Regulation Scheme

This step ties together the harvest plans for all of the cover types within the management unit. It shows how all of the cover types are interrelated, as well as showing future developments for the individual types. Two reports are generated for each cover type; the first presents information on the planned harvest for the first 10-year period, including the total and 10-year allowable cuts, the rotation age, the number of acres converted

to other cover types, etc. The second report contains each age-class for the present 10-year period, and each additional column showing a projection for an additional 10-year period.

Step 8: Print 10-Year Regeneration Needs

The final step outlines the field work that will be required to complete the management plan for the 10-year period. It generates a report of the total stand acreage found within each prescription category by cover type; reports of planned regeneration acreage, one for each cover type (broken down by regeneration method rather than species); and a summary of artificial regeneration needs showing acres to be planted and seeded to each regeneration species.

Applications

The final product of the Timber Regulation Program is a 10-year plan and that includes:

1. The forest regulation base and stands to be regenerated without harvest.
2. The clear cut base and stands to be regenerated following harvest.
3. The recommended regeneration treatments for acreage to be regenerated.
4. A regulation scheme for the rotation that, as far as practical, provides for approximately the same amount of acreage by 10-year age class after all of the stands included initially in the forest regulation base have been treated.
5. Determine the selective cut base and stands to be selectively cut or thinned.

The results and documentation form the area timber management plan.

APPENDIX F

Moose Lake Area
Fire Plan

Note: Only the table of contents from the Moose Lake Area Fire Plan is reproduced here. Copies of the entire plan are available from:

Moose Lake Area Forest Supervisor
Route 2, 701 So. Kenwood
Moose Lake, MN 55767
Phone (218) 485-4474

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APPENDIX G

Moose Lake Area
Recreational Sub-Area Plan

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INTRODUCTION

FOREST RECREATION PROGRAM

There are 172,403 acres of Division of Forestry administered land in the Moose Lake Area. The management of these lands is based on multiple-use principles. Multiple-use management does not imply the use of land for all purposes, but recognizes that site characteristics determine the ability of an area to support various uses. The intent is to balance uses based on their compatibility. Recreation is recognized as an appropriate use of state forest land under the definition of "forest resources" in the Forest Resource Management Act of 1982 (Laws of Minnesota, Chapter 511, subd. 8). The definition reads:

Forest Resources means those natural assets of forest lands including timber and other forest crops, recreation, fish and wildlife habitat, wilderness, rare and distinctive flora and fauna, air, water, soils and educational, aesthetic and historical values.

GOAL

The goal of the Division of Forestry Recreation Management Program is:

To fulfill the outdoor recreation potential of Minnesota forest lands by providing developed recreational areas (sub-areas) and opportunities for dispersed recreational activities that are compatible with other forest uses.

The goal, as stated above, is consistent with the forest management philosophy of multiple-use. In general, recreational development on Division of Forestry forest lands is to be at a level that has no significant effect on forest resources. When developed, facilities on forest lands should provide opportunities for contact with nature and require a minimum level of development and management. These policies generally limit Division of Forestry development to primitive, minimum impact campgrounds, day use areas and recreational trails. Recreation use of division lands requiring no developed facilities include hunting, berry picking, bird watching, nature photography and other forms of dispersed recreation.

PURPOSE

The purpose of this recreational planning effort is to provide for the planned and orderly development of recreation on Division of Forestry administered lands in the Moose Lake Area and at the same time satisfy the requirement of the Minnesota Outdoor Recreation Act of 1975 (M.S. 86A).

OUTDOOR RECREATION ACT

The Outdoor Recreation Act of 1975 (M.S. 86A) requires a plan to be prepared and establishes procedures for review and approval before new facilities or other development except for repairs or maintenance can take place.

The Outdoor Recreation Act recognizes the abundant opportunities for outdoor recreation and education provided by Minnesota's resources. It stresses the importance of Minnesota's outdoor recreational resources to the "...health, welfare and prosperity of the citizens of Minnesota..." The act establishes an outdoor recreational system to "1) preserve an accurate representation of Minnesota's natural and historical heritage for public understanding and enjoyment, and 2) provide an adequate supply of scenic, accessible and usable lands and waters to accommodate the outdoor recreational needs of Minnesota's citizens." The system includes natural state parks; recreational state parks; state trails; state scientific and natural areas; state wilderness areas; state forests and state forest sub-areas; state wildlife management areas; state water access sites; state rest areas; state wild, scenic and recreational rivers; and state historic sites.

The portion of the Outdoor Recreation Act of 1975 concerning state forests and state forest sub-areas (M.S. 86A.05, subd. 7) states that:

- a) A state forest, as established by section 89.021, shall be administered to accomplish the purposes set forth in that section, and a state forest sub-area shall be established to permit development and management of specialized outdoor recreation at locations and in a manner consistent with the primary purpose of the forest.
- b) No unit shall be authorized as a state forest sub-area unless it is located within a state forest and contains suitable natural resources to accommodate any of the following uses:
 - 1) Day use areas. Areas which permit recreational use of the forest in its natural state, not requiring an overnight stay, including but not limited to picnicking, fishing, swimming, boat launching, hiking, interpretation, and nature observation.
 - 2) Campground. Provide minimum facilities to accommodate overnight camping.
- c) Outdoor recreation sub-areas located within state forests shall be administered by the commissioner of natural resources in a manner which is consistent with the purposes of this subdivision.

In addition to forest sub-areas the Outdoor Recreation Act allows the following secondary units to be authorized wholly or partially within a state forest: natural state park; recreational state park; historic stie; wildlife management area; scientific and natural area; wilderness area; wild, scenic, and recreational river; trail; rest area; and water access site.

PLANNING REQUIREMENTS

The Outdoor Recreation Act establishes the following planning requirements:

1. Plan preparation by managing agency (DNR, Division of Forestry).
2. An announced 30 day review period for the public and at least one "public hearing."*
3. Review and approval by the State Planning Agency.

*The public hearing would be better described as a public information session. A public hearing as described in the Minnesota Administrative Procedures Act (MN Stat. Chap. 14) is not required.

MOOSE LAKE AREA RECREATION RESOURCES

AREA OVERVIEW

The Moose Lake Area lies between the two largest population centers in Minnesota, the Twin Cities metropolitan area and Duluth (see Figure G.1). Major access to the area is provided by Interstate Highway 35, with driving times ranging from one to two hours, depending on destination, from both population centers. The area itself is sparsely populated and its forested lands and water resources provide an excellent base for outdoor recreation.

The area's large public land base provides opportunities for dispersed recreation activity such as hunting and nature observation, as well as providing the land area necessary for trail networks.

The major recreational amenities in the area include the St. Croix, Kettle, and Snake rivers. The St. Croix is a National Wild and Scenic River administered by the National Park Service, the Kettle is a State Wild and Scenic River administered by the DNR, and all three rivers are state canoe and boating routes administered by the DNR. Lakes in the area also provide recreation opportunities. Major recreational amenities in counties surrounding the Moose Lake Area include the St. Louis and Rum rivers, Lake Superior and Lake Mille Lacs.

AREA RECREATION FACILITIES

The Moose Lake Area contains a number of well developed recreational facilities (see Table G.1). Most major public facilities are administered by the Minnesota Department of Natural Resources. The DNR, Division of Parks and Recreation administers the 31,482 acre St. Croix State Park, the 4,351 acre Banning State Park, and the 951 acre Moose Lake State Recreation Area. The DNR's Trails and Waterways Unit administers most area public water accesses, canoe and boating route rivers and campsites, the entire Minnesota-Wisconsin Boundary Trail, and many miles of grants-in-aid trail. The DNR, Division of Forestry administers 6 campgrounds, two day use areas, and has operational responsibility for 225.8 miles of trail.

Other major public recreation providers include the National Park Service, which administers the St. Croix National Wild and Scenic River; the Minnesota Department of Transportation, which provides highway rest areas; and local units of government, which provide county and municipal parks. The National Park Service is also the lead agency for the North Country National Scenic Trail which is proposed to pass through the Moose Lake Area.

Private sector recreation facilities include 18 campgrounds and 3 group camps with 825 and 467 sites, respectively. Private resorts are few. Major recreation facilities in counties surrounding the Moose Lake Area include Jay Cook, Wild River, Father Hennepin and Mille Lacs Kathio state parks and the Spirit Mountain Recreation Area which is administered by the city of Duluth.

FIGURE G.1

MOOSE LAKE AREA

STATE FORESTS AND CAMPGROUNDS

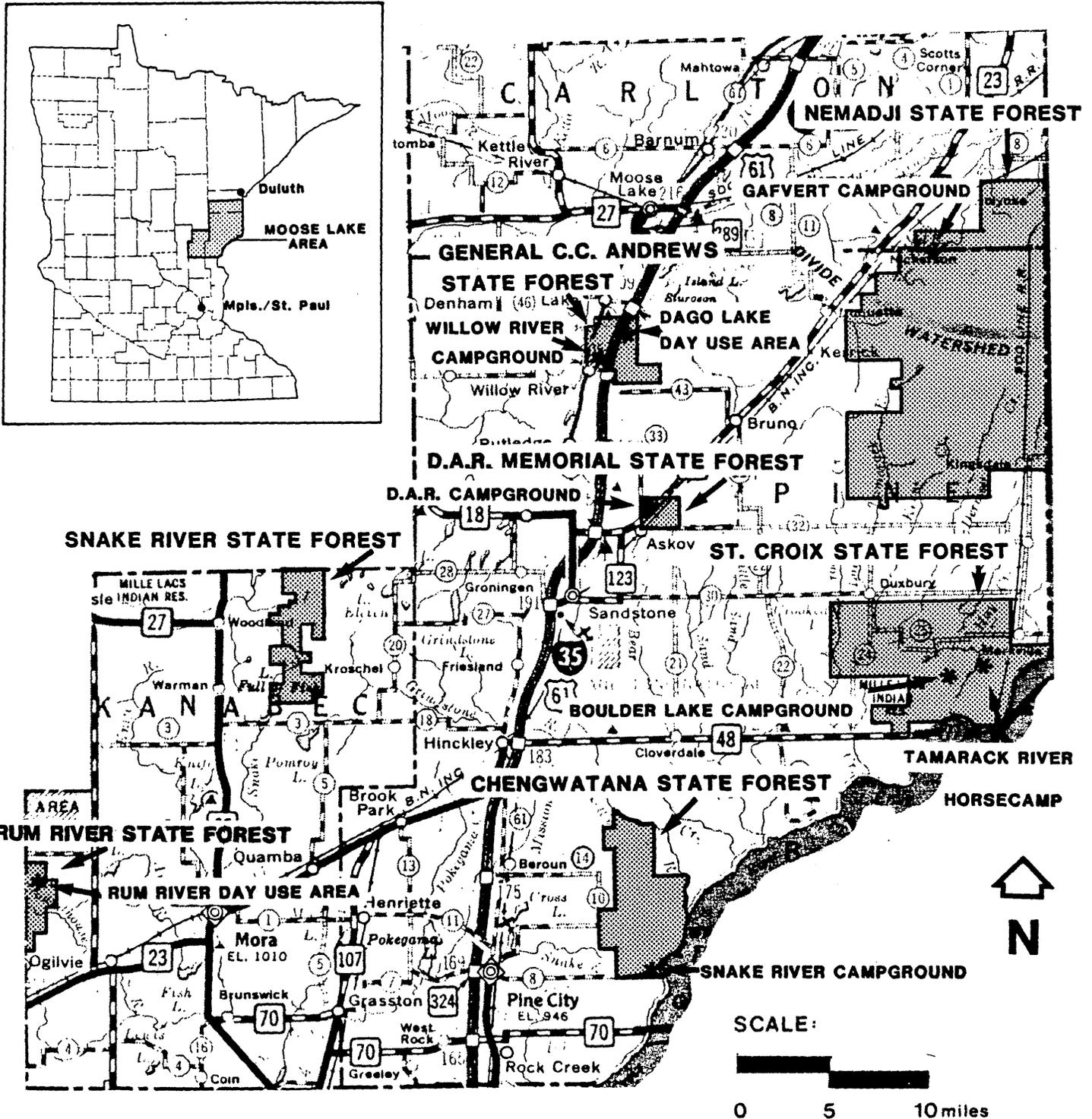


Table G.1. Summary of Moose Lake Area Recreation Facilities.

| Type of Facility | Carlton County* | Kanabec County | Pine County | Total |
|------------------------------|-----------------|----------------|-------------------|------------------|
| State Forests | 2 - 9,712 ac. | 2 - 11,176 ac. | 5 - 128,766 ac. | 8 - 149,654 ac. |
| Wildlife Management Areas | 1 - 160 ac. | 8 - 9,077 ac. | 9 - 1,389 ac. | 18 - 10,626 ac. |
| Wildlife Refuges (Nat.) | --- | --- | 1 - Sandstone NWR | 1 |
| Trails | | | | |
| X-C Skiing | 1 - 4.0 mi. | --- | 3 - 34.0 mi. | 4 - 38.0 mi. |
| Interpretive | --- | --- | 3 - 12.0 mi. | 3 - 12.0 mi. |
| Hunting | --- | --- | --- | 40 - 963.5 mi. |
| Horseback Riding | --- | --- | 5 - 149.8 mi. | 5 - 149.8 mi. |
| Biking | --- | --- | 1 - 6.0 mi. | 1 - 6.0 mi. |
| Snowmobiling | 6 - 204 mi. | 2 - 22.9 mi. | 10 - 289.0 mi. | 18 - 515.9 mi. |
| Hiking | 1 - 1.0 mi. | 1 - 1.0 mi. | 7 - 239.8 mi. | 9 - 241.8 mi. |
| State Parks | 1 - 951 ac. | --- | 2 - 35,833 ac. | 3 - 36,784 ac. |
| Rest Areas | 1 | 2 | 9 | 12 |
| County Parks | 1 | 1 | --- | 2 |
| Municipal Parks | 1 | 7 | 9 | 17 |
| Campgrounds | | | | |
| Public | 2 | --- | 9 | 11 |
| Private | 2 | 6 | 10 | 18 |
| Public Group | --- | --- | 3 | 3 |
| Private Group | 2 | --- | 7 | 9 |
| Canoe Campsites | --- | --- | 5 | 5 |
| Campsites | | | | |
| Public | 58 | --- | 309 | 367 |
| Private | 55 | 365 | 405 | 825 |
| Public Group | --- | --- | 467 | 467 |
| Private Group | 247 | --- | 427 | 674 |
| Beaches | | | | |
| Public | 3 | --- | 1 | 4 |
| Private | 5 | --- | 16 | 21 |
| Picnic Grounds | | | | |
| Public | 4 | --- | 13 | 17 |
| Private | 3 | --- | 6 | 9 |
| Picnic Sites | | | | |
| Public | 74 | --- | 114 | 188 |
| Private | 8 | --- | 99 | 107 |
| Monuments | 1 | --- | 4 | 5 |
| Wild and Scenic Rivers | --- | --- | 2 | 2 - Snake-Kettle |
| Canoe and Boating Routes | --- | --- | 3 | 3 |
| Scientific and Natural Areas | --- | --- | 1 - 593 ac. | 1 - Kettle River |
| Public Accesses | 3 | 11 | 28 | 42 |

*T46N and T47N, Range 15W-21W.

Source: MN DNR, Office of Planning. State Comprehensive Outdoor Recreation Plan (SCORP) 1979.

AREA RECREATION NEED ANALYSIS

The following is a needs analysis specific to the Moose Lake Area for recreation facilities and activities which are provided by the Division of Forestry.

Hunting

Most of the 320,250 acres of public land in the Moose Lake Area are available for hunting. This is an adequate land base to provide hunting opportunities for many years to come if present hunting patterns are an indication of future trends. Opportunities exist to make it more convenient for hunters to locate public hunting areas. Development, advertisement, and distribution of maps showing the location of public lands is perhaps the best way to increase hunter awareness of the area. The opportunity also exists to improve wildlife numbers through better habitat and species management.

Snowmobile Trails

There are presently 516 miles of snowmobile trail in the Moose Lake Area, including the Minnesota/Wisconsin Boundary Trail. Managers indicate that trail use is well below capacity and snowmobile registrations have been declining so existing trail mileage should be adequate to handle use. Small segments of trail may be needed to connect communities or localities that are lacking trails to the main system. These links can best be provided by local clubs through the state grants-in-aid snowmobile program. Other trails may be closed because of lack of use or other resource management considerations.

Cross Country Ski Trails

There are 7 groomed cross country ski trails with a total of 76 miles of trail available to the public in the Moose Lake Area. Managers indicate that ski trail use in the area is well below capacity, and that the majority of use is from local residents. Possible reasons for this include driving distances and the well developed nature of cross country skiing facilities near the Twin Cities. Needs for increased trail mileage then would appear necessary only to serve local demand. If properly constructed, hiking trails can serve winter cross country ski needs. This fact should be kept in mind when developing hiking trails. There is abundant opportunity for off-trail cross country skiing experiences in the Moose Lake Area within state parks and state forests.

Camping

There are 11 public campgrounds with 367 sites in the Moose Lake Area, including 3 state parks and 6 state forest campgrounds. There are 18 private campgrounds with 825 sites. Traditionally public and private campgrounds provide a spectrum of camping opportunities for campers, with the private sector usually providing full service facilities and the public sector providing a more primitive type of facility. This is particularly true of the Division of Forestry in that all of its camping facilities are primitive in nature. While use at individual public campgrounds varies, managers indicate that only on holiday weekends are campgrounds full. High use levels are not necessarily a good measuring device to determine if supply and demand are in balance, however. Individual campsites need time to rest, to recover from use, or damage will occur. Additionally, if all available campsites are full incoming campers would have to be turned away.

These facts indicate that the number of campsites should be maintained in excess of the number of people who are expected to use them. Managers of state administered facilities feel that there are presently an adequate number of sites in the area to serve general camping needs as they presently exist. The managers indicate that there is a need for more specialized camping opportunities for backpackers, horseback riders and canoeists.

Opportunities exist to make the public more aware of public camping opportunities in the area. These include advertising, signing, mapping, and better information dispersal. If, in the future a need is shown to provide more campsites, three of the six existing forestry campgrounds have potential expansion capabilities (see Campground and Day Use Areas section). Other forestry administered lands also have the potential for campground or campsite development (see Opportunities for Future Recreation Development).

Canoeing and Boating

The Moose Lake Area contains three of the best canoeing rivers in the state. They are the St. Croix, a component of the National Wild and Scenic River System; the Kettle, a component of the State Wild and Scenic River System; and the Snake. All of the rivers are part of the State Canoe and Boating Route System. Portions of each river offer opportunities for family canoeing with minimum skill levels. The Kettle River with Hell's Gate Rapids at Banning State Park, and the Snake River with Upper and Lower Snake Falls are two of the finest whitewater rivers in the state. Developed campsites along these rivers are not properly spaced or abundant enough to provide for canoeist needs. The opportunity exists on forestry administered land to provide some campsites for canoeists. Another opportunity exists to better promote these rivers through the Canoe and Boating Route Program administered by the DNR Trails and Waterways Unit.

Horseback Riding

According to managers, horseback riding occasions have been heavy at St. Croix State Park and in the St. Croix State Forest. The State Comprehensive Outdoor Recreation Plan projects horseback riding occasions to increase by approximately 1/3 by 1995. There are approximately 150 miles of horse trail in the Area at present. Much of this in the extensive St. Croix State Park-St. Croix State Forest horseback trail system. Pressures from other trail users may cause some loss of horse trail mileage. Even with projected losses, however, managers feel the remaining horseback trail mileage will be adequate to handle use. Managers and riders have indicated a need for improved camping facilities in conjunction with the horse trails.

Bicycling

Low traffic volume, high quality roads provide the base for increased bicycling opportunities in the Moose Lake Area. Existing Division of Forestry campgrounds and dispersed parcels of land offer opportunities for bicycle camping. The Hinckley to Moose Lake portion of the Minnesota-Wisconsin Boundary Trail administered by DNR, Trails and Waterways is paved as a bicycle trail. The Willow River Campground is less than a mile from this trail and offers excellent bicycle camping opportunities. Minnesota State Highway 23, a scenic secondary route which links Banning Junction to Duluth, passes immediately adjacent to the D.A.R.

Campground and is within a mile of the Gavfert Campground. These campgrounds offer bicyclist overnight camping also. Additionally, a number of Division administered parcels of land lie adjacent to paved roads. The opportunity exists to route bicyclists to these camping facilities by including them on Minnesota Department of Transportation bikeways maps and signing or constructing routes to these facilities.

Swimming

Only four public beaches are available in the Moose Lake Area. The number of this type of facility should be increased if at all possible. Three existing campgrounds in the Moose Lake Area have potential for new beach development. The opportunity to develop this type of facility on remaining forestry administered land, however, is limited because of the remote location of the land and the small number of lakes available.

Picnic Facilities

There are 17 public picnic grounds with 188 sites in the Moose Lake Area. Additionally, campgrounds serve the needs of picnickers when they are not full. Most often picnic grounds are associated with some other type of recreation development such as parks, campgrounds, rest areas, access, or beaches. Except for the beaches, there seems to be an adequate and ample number and distribution of these facilities with picnic grounds in the area. As for beaches, the compatibility with picnic areas is high. Therefore it is recommended that if beaches are developed, picnic grounds should also be developed as an associated facility.

Hiking

There are approximately 240 miles of hiking trail in the Moose Lake Area. Hiking is an activity which is compatible with developed recreation facilities such as campgrounds and picnic areas. Most of the Forestry administered recreation facilities in the area have hiking trails in close proximity. Consideration should be given to the development of hiking trails in conjunction with those facilities where no hiking trails are present.

Backpacking

Presently no facilities or trails exist in the Moose Lake Area to solely serve the backpacker. This, and the fact that backpacking is not actively promoted in the area, or in the state as a whole, probably accounts for the low immediate demand for backpacking projected by the State Comprehensive Outdoor Recreation Plan. In general, the development and advertisement of recreation facilities will generate use, so projections can be deceiving. Backpacking and associated primitive campsites provide great recreation opportunities for Forestry administered lands in the Moose Lake Area. Lands which parallel rivers provide the scenic diversity necessary to provide for quality backpacking experiences.

ORV Use

The advent of the 3-wheeled vehicle has added an additional use to the Area's trail systems. Managers indicate the number of both 2 and 3 wheeled vehicles using Division of Forestry administered lands in the Area have increased markedly over the past few years. Sales trends for this type of vehicle indicate that this will likely be a continuing phenomenon. To this point few problems have presented themselves concerning the use of this type of vehicle. Problems anticipated with increased use, however, will

require measures be taken to adequately provide for use, to protect significant natural resources, resolve use conflicts and provide for the safety of all trail system users.

Users of 4 wheel drive vehicles desire trails for their use. The State Comprehensive Outdoor Recreation Plan shows a long-term decrease in this type of use. ~~Four wheel drive vehicles are capable of damaging road beds and trail rights-of-way.~~ As a result, their use will have to be strictly controlled.

Access to Fishing Lakes and Streams, and Fish Stocking and Management

Because of the small number of lakes on Forestry administered lands, opportunities are few to increase lake access and fish stocking and management. Improved access and fisheries management to rivers and streams that cross or are adjacent to Forestry administered land, however, provide excellent opportunities. Better information concerning the availability of fishing resources (maps, brochures, etc.) would serve the public well.

Bird Watching, Nature Study and Other Dispersed Recreation Activities

The large Forestry administered land base provides many opportunities for these activities. Interpretation of natural features can increase public understanding and enjoyment.

DIVISION OF FORESTRY ADMINISTERED RECREATION FACILITIES

This section describes division administered facilities, lists any needed repairs or improvements, and proposes new recreation developments.

CAMPGROUNDS AND DAY USE AREAS

D.A.R. Campground

Location

In the D.A.R. State Forest on Minnesota State Highway 23 approximately 3/4 mile north of Askov (see Figure G.2).

Existing Facilities

- 6 campsites with fire rings, picnic tables and parking spurs
- 2 pit toilets
- 5 picnic sites with tables and fire rings
- 1 cash box
- 1 metal gate
- 1 hand pump

Use Data

The D.A.R. Campground receives very little use, mainly because it is isolated from recreational amenities such as lakes, rivers or trails. The use that does occur at this campground is probably related to its location on Minnesota State Highway 23, which is a scenic secondary route linking Duluth and the Twin Cities. Some of its use can also be attributed to the campground's proximity to the city of Askov. Information concerning users of this campground is limited by low attendance figures and by the fact that it has only been a pay campground during the last camping season.

Condition, Repair and Improvement Needs

The campground loop road has deteriorated and is in need of maintenance. Camping and parking areas lack definition. Pit toilets should be replaced by handicapped accessible vault toilets for user convenience and improved sanitation. This campground is surrounded by low marshy land which makes expansion impractical. Better promotion of this site could increase use.

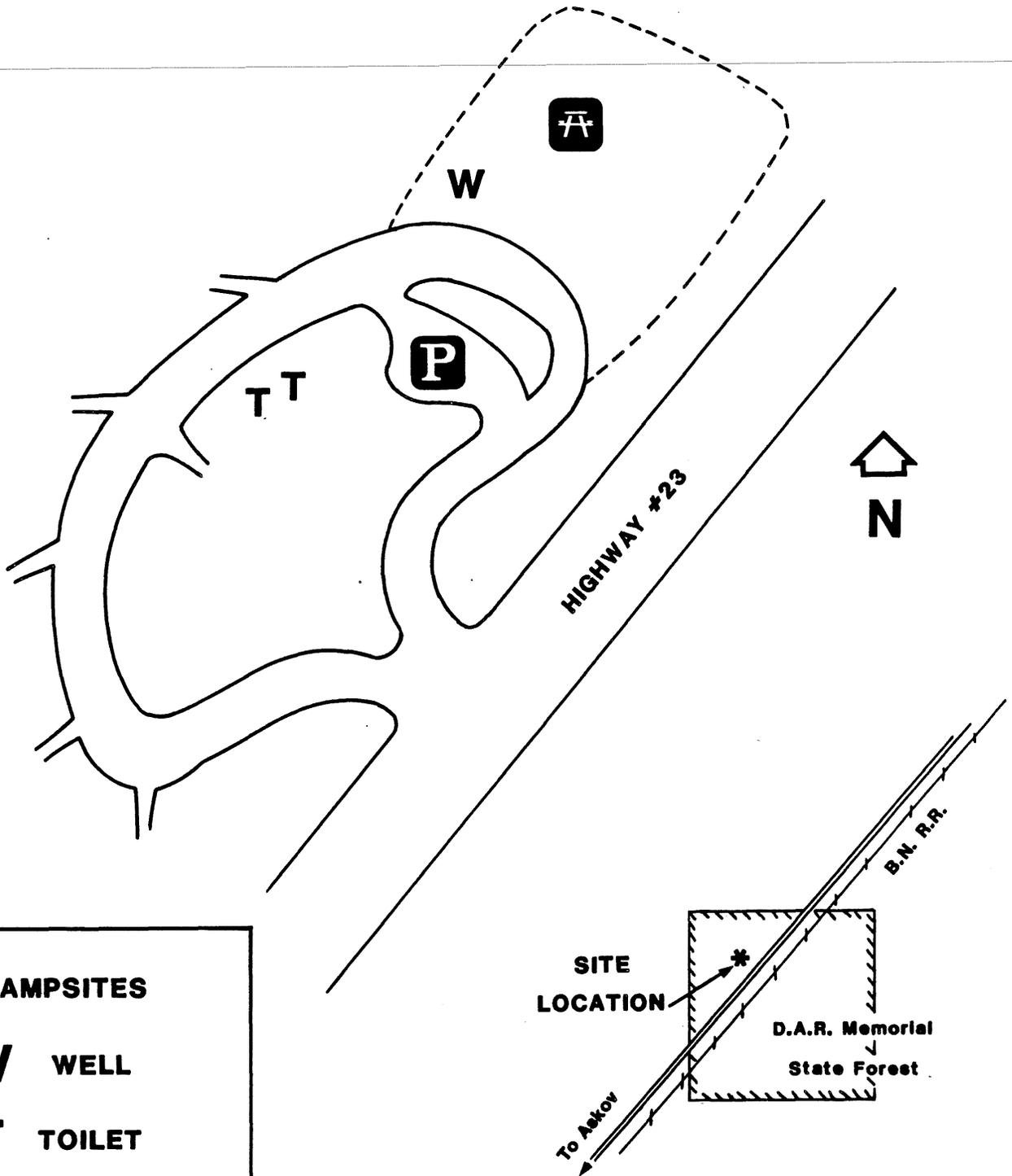
Proposed Actions

| | <u>Costs</u> |
|---|--------------|
| 1. Repair campground loop road. | \$ 500 |
| 2. Gravel and define campsite parking areas with posts. | 3,000 |
| 3. Install handicapped accessible vault toilets. | <u>5,000</u> |
| | \$8,500 |

FIGURE G.2

D.A.R. CAMPGROUND

D.A.R. MEMORIAL STATE FOREST



- 6 CAMPSITES**
- W** WELL
- T** TOILET
- P** PARKING
- ⌘** PICNIC AREA

Boulder Campground

Location

In the St. Croix State Forest on the Tamarack Forest Road (see Figure G.3).

Existing Facilities

- 16 campsites with fire rings, picnic tables, and parking spurs
- 3 tent only campsites with fire rings and picnic tables
- 1 parking lot for tent only sites
- 8 picnic sites with fire rings and picnic tables
- 2 handicapped accessible vault toilets
- 1 cash box
- 1 boat access and parking lot
- 1 hand pump

Use Data

The Boulder Lake Campground receives moderate to heavy camping pressure on weekends during the camping season and is often full on holiday weekends. The campground offers a primitive camping alternative to the nearby St. Croix State Park campground and is also available for use as an overflow facility when the park campground reaches capacity. The Boulder Lake Campground provides access to the Minnesota/Wisconsin Boundary Trail. Campground users come predominantly from the Twin Cities metropolitan area (87%). Local and out of state use is slight, at 3% and 5% respectively.

Condition, Repair and Improvement Needs

Campsite and parking areas lack definition. The addition of a docking facility adjacent to the water access development, a beach and a fish cleaning house with a well would all provide convenience for campers. Expansion potential is excellent.

Proposed Actions

| | <u>Costs</u> |
|---|---------------|
| 1. Gravel and define campsite parking areas with posts. | \$ 8,000 |
| 2. Construct removable docking facility. | 1,000 |
| 3. Develop beach. | 2,000 |
| 4. Develop fish cleaning house with well. | <u>10,000</u> |
| | \$21,000 |

Snake River Campground

Location

In the Chengwatana State Forest, approximately 8 miles east of Pine City on County Road 118 (see Figure G.4).

Existing Facilities

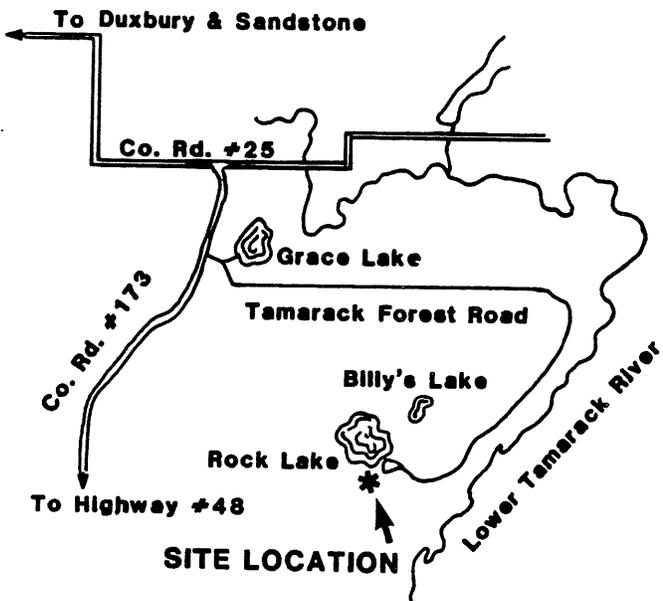
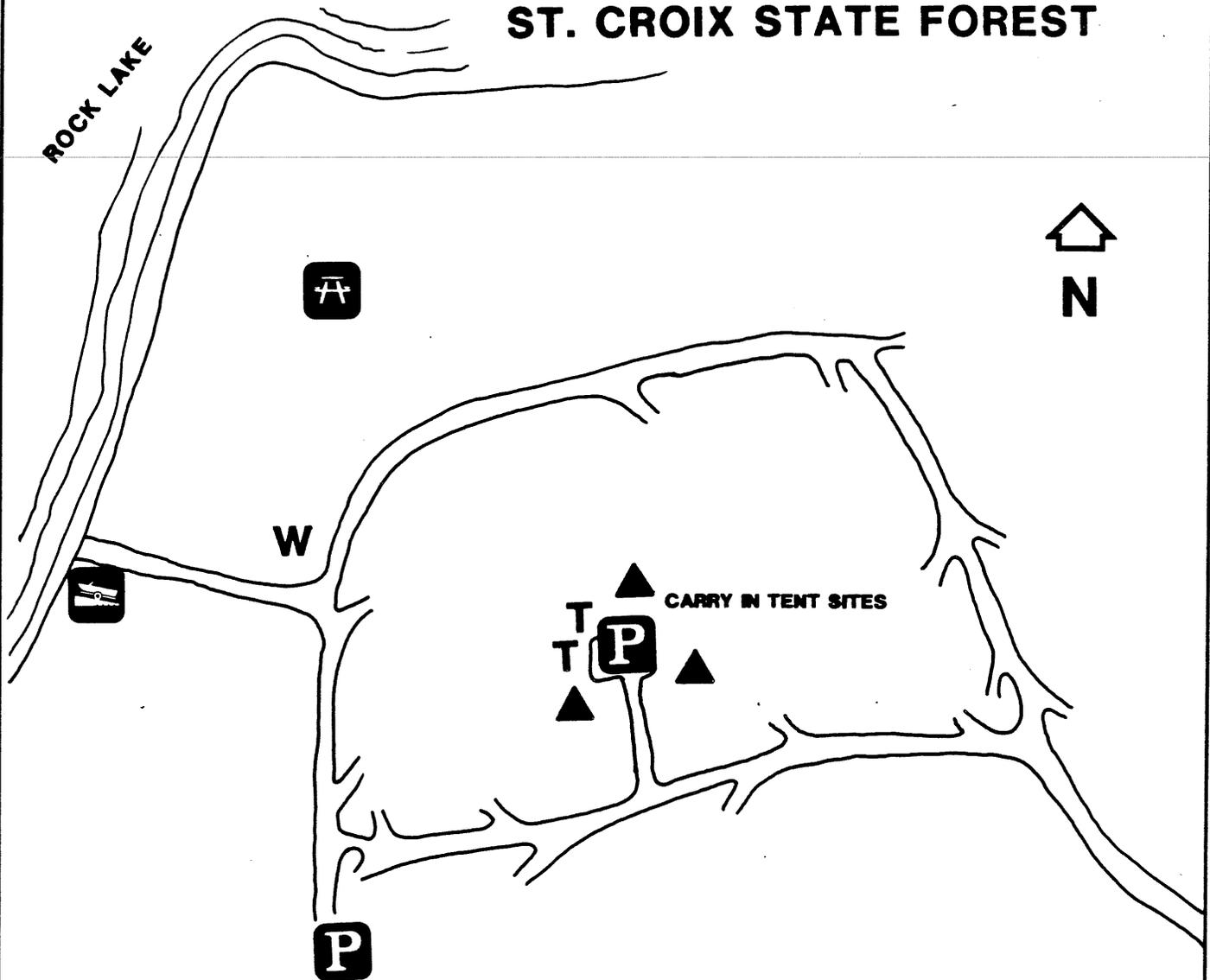
- 26 campsites with fire rings, picnic tables, and parking spurs
- 4 handicapped accessible vault toilets
- 1 cash box
- 2 hand pumps

Use Data

This campground is on the Snake River, one mile above its confluence with the St. Croix River. Snake Bite canoe landing (administered by the National Park Service) at the junction of the rivers is a heavily used facility. The Minnesota/Wisconsin Boundary Trail passes adjacent to the

FIGURE G.3

BOULDER CAMPGROUND ST. CROIX STATE FOREST



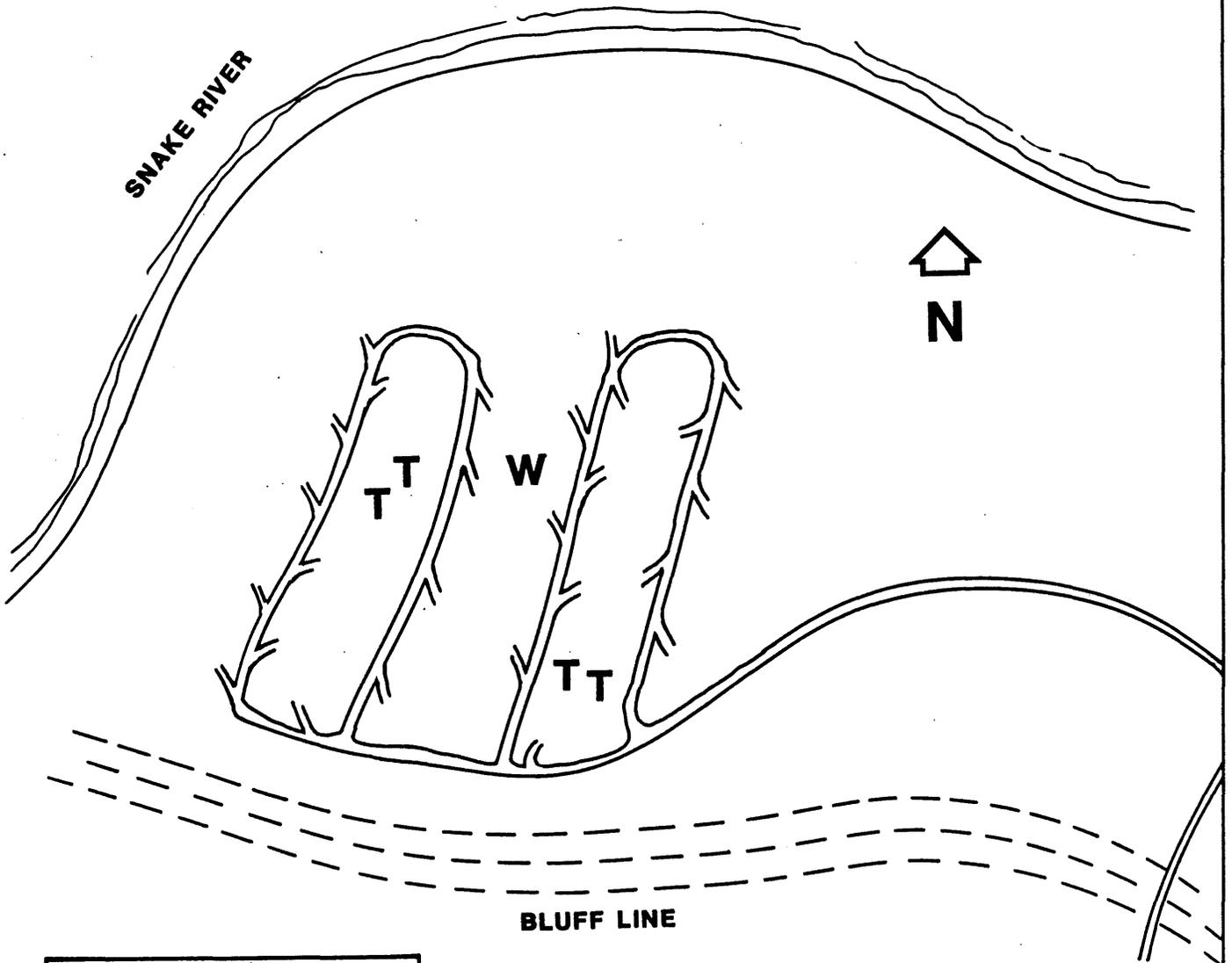
19 CAMP SITES

- W** WELL
- T** TOILET
- P** PARKING
- [Boat Access Icon]** BOAT ACCESS
- [Picnic Area Icon]** PICNIC AREA

FIGURE G.4

SNAKE RIVER CAMPGROUND

CHENGWATANA STATE FOREST

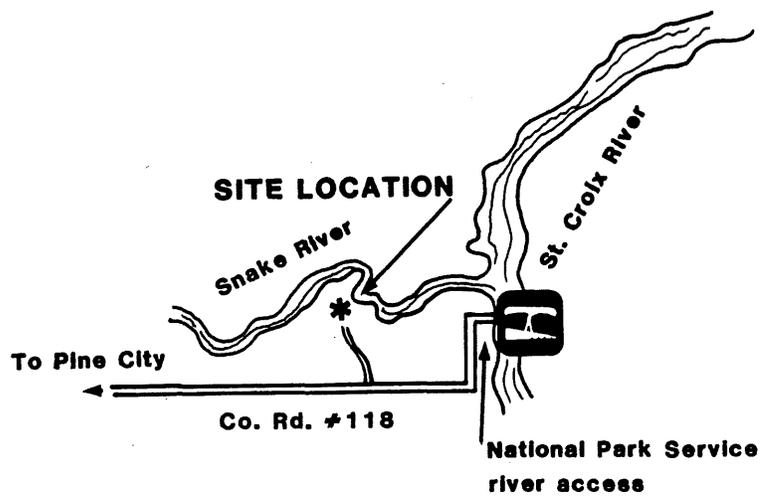


26 CAMPSITES

W WELL

T TOILET

 CANOE ACCESS



campground. Use at the campground is moderate to heavy on weekends during the camping season. Use often reaches capacity on holiday weekends. A large percentage of the campground users come from the Twin Cities metropolitan area (82%). Another 12% come from northern Minnesota. A large percentage of these, however, come from the local area (9%). Only 2% of the campers come from southern Minnesota and 4% from out of state.

Condition, Repair and Improvement Needs

The entrance road to the campground has severe erosion problems due to unstable soils on steep slopes. Campsites and parking spurs lack definition. Installation of a fish cleaning house with a well would be a convenience to campground users. Expansion possibilities adjacent to this campground are excellent.

| Proposed Actions | <u>Costs</u> |
|---|---------------|
| 1. Gravel and define campsite parking areas with posts. | \$13,000 |
| 2. Develop fish cleaning house with well. | 10,000 |
| 3. Erosion control and culverts for entrance road. | <u>10,000</u> |
| | \$33,000 |

Gafvert Campground

Location

In the Nemadji State Forest, approximately three miles east of Nickerson off the Net Lake Forest Road (see Figure G.5).

Existing Facilities.

- 9 campsites with fire rings, picnic tables, and parking spurs
- 1 picnic site with table and fire ring
- 1 public access to Pickerel Lake - concrete ramp
- 1 parking lot in association with access - 50' x 20'
- 1 hand pump
- 1 cash box
- 2 toilets
- 1 beach

Use Data

The Gafvert Campground is located in a relatively undeveloped part of the state. The only access to the area is via Minnesota State Highway 23 which is a scenic secondary route connecting the Twin Cities and Duluth. The Minnesota/Wisconsin Boundary Trail passes adjacent to the campground. Use of the campground is moderate on weekends during the camping season. The campground reaches capacity on most holiday weekends. The majority of users are from the Twin Cities metropolitan area (66%). Twenty-five percent come from northern Minnesota, most from an area proximate the campground which includes Duluth 30 miles to the northeast. Five percent of the users come from southern Minnesota and another 4% from out of state.

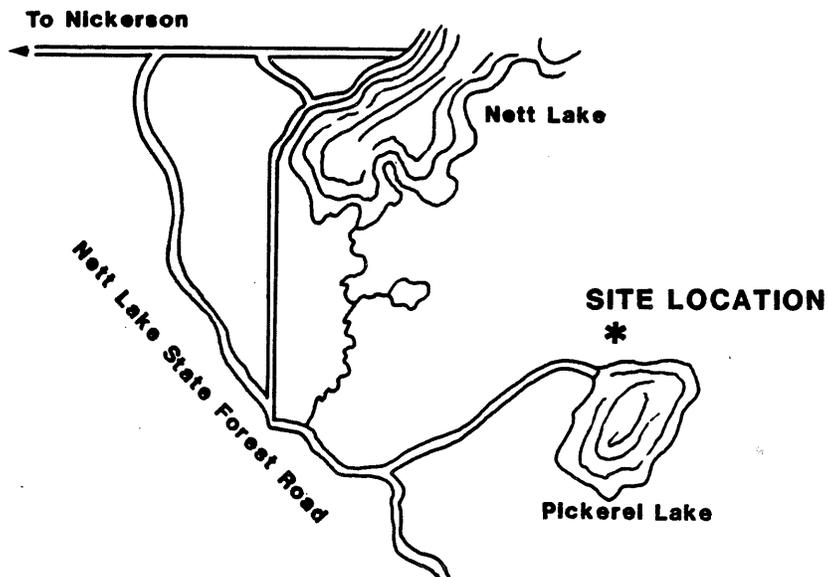
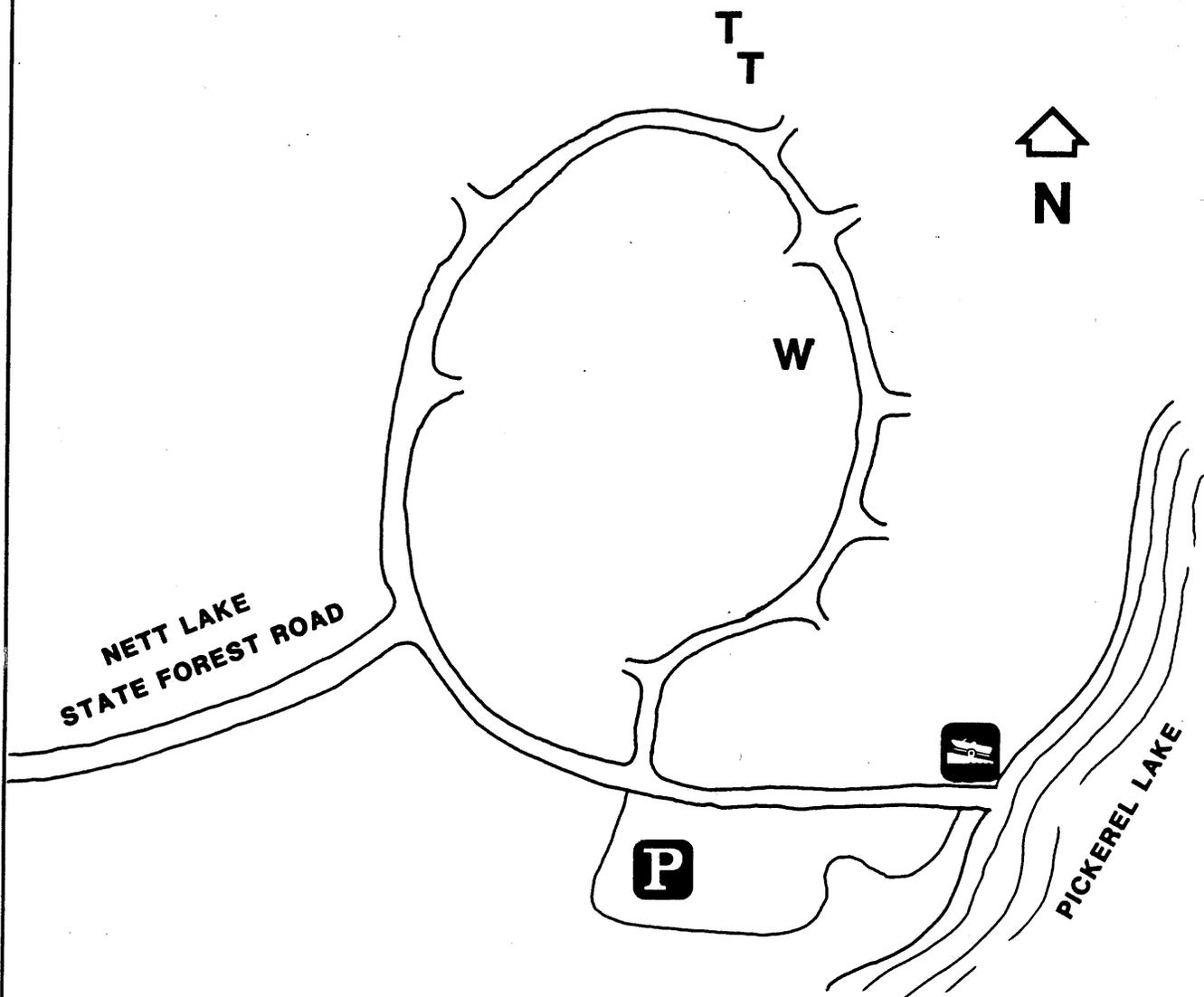
Condition, Repair and Improvement Needs

Some campsites need to be reconstructed because of location on hills. Campsites and parking spurs lack definition. Minor improvements are necessary to upgrade the public access, the access parking lot, the beach and the picnic area. Vault toilets and a removable dock should be installed for user convenience. There is potential for the

FIGURE 6.2

GAFVERT CAMPGROUND

NEMADJI STATE FOREST



9 CAMPSITES

- W** WELL
- T** TOILET
- P** PARKING
-  BOAT ACCESS

development of a short hiking-interpretive trail. Opportunity for expansion is limited to an adjacent birch stand. Other surrounding lands are low and wet.

| Proposed Actions | <u>Costs</u> |
|---|-----------------------|
| 1. Reconstruct campsites with topographic problems. | \$ 6,000 |
| 2. Gravel and define campsite parking areas with posts. | 4,500 |
| 3. Repair public access. | 1,500 |
| 4. Repair access parking lot. | 1,000 |
| 5. Improve picnic area. | 1,000 |
| 6. Develop hiking-interpretive trail. | see Trails section |
| 7. Improve beach area. | 2,000 |
| 8. Install fish cleaning house with well. | 10,000 |
| 9. Install handicapped accessible vault toilets. | 5,000 |
| 10. Install portable dock. | <u>1,000</u> |
| | \$32,000 |

Willow River Campground

Location

In the General C.C. Andrews State Forest, one mile east of Willow River off Interstate Highway 35 (see Figure G.6).

Existing Facilities

- 32 campsites with fire rings, picnic tables, and parking spurs
- 8 pit toilets
- 1 public access to Stanton Lake (part of Willow River flowage)
- 1 public access parking lot
- 2 hand pumps
- 2 cash boxes

Use Data

The Willow River Campground is located on an impoundment of the Willow River that provides fishing and swimming as well as a scenic backdrop for the campground. Recreational trails are available in the General C.C. Andrews State Forest for hiking and motorized uses during the summer and for snowmobiling in the winter. The forest also provides an opportunity for hunters.

The campground is adjacent to Interstate Highway 35 which connects points south including the Twin Cities metropolitan area with the port city of Duluth and the scenic North Shore and border lakes region beyond. The campground is about 2 miles from exit number 205 which lies approximately 100 miles from the Twin Cities and about 50 miles from Duluth.

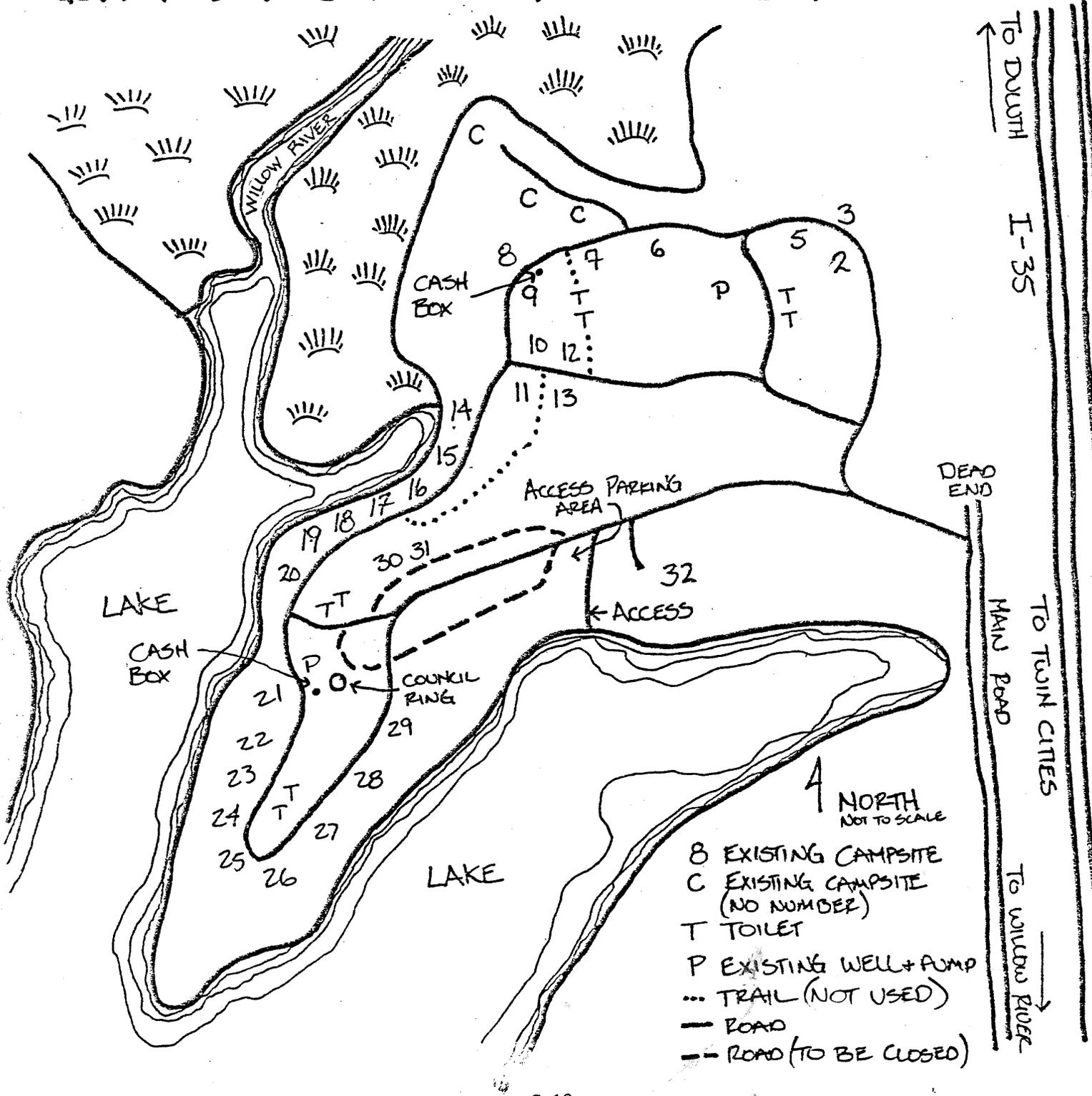
The Willow River Campground operates at capacity only on holiday weekends during the summer. On other summer weekends use is moderate. Weekday use is minimal. While overall use at the Willow River Campground can presently be considered low the potential exists to increase use. The campground is ideally located in relation to travel patterns so that it can serve users who desire primitive facilities en-route to destinations farther north.

EXISTING FACILITIES

FIGURE G.6

WILLOW RIVER CAMPGROUND

GENERAL ANDREWS STATE FOREST



- 8 EXISTING CAMPSITE
- C EXISTING CAMPSITE (NO NUMBER)
- T TOILET
- P EXISTING WELL + PUMP
- ... TRAIL (NOT USED)
- ROAD
- - - ROAD (TO BE CLOSED)

The Hinckley to Moose Lake railroad grade which is administered by DNR, Trails and Waterways and has been paved for bicycling lies approximately one mile west of the campground. Presently there is no sign on Interstate 35 to let potential campers know that camping is available at the Willow River State Forest Campground. Provision of a state forest campground sign coupled with better information about DNR, Division of Forestry campgrounds in general and connection with the paved bikeway could increase use substantially.

A survey of camper registration showed that a vast majority of campers came from the Twin Cities metropolitan area (71%). An additional 8% of the campers were from the local area while 15% were from the rest of the state. Campers from outside of Minnesota accounted for the remaining 6% of campground use. States closest to Minnesota did not dominate out of state camper numbers as would be expected.

Condition, Repair and Improvement Needs

A rehabilitation plan for this campground was prepared by the Division of Forestry in 1983 (see Figure G.7). Funds for rehabilitation were received for rehabilitation work from the Legislative Commission on Minnesota Resources for the 1983-84 biennium. Rehabilitation work is currently underway. The following is the condition, repair and improvement needs as specified in that plan:

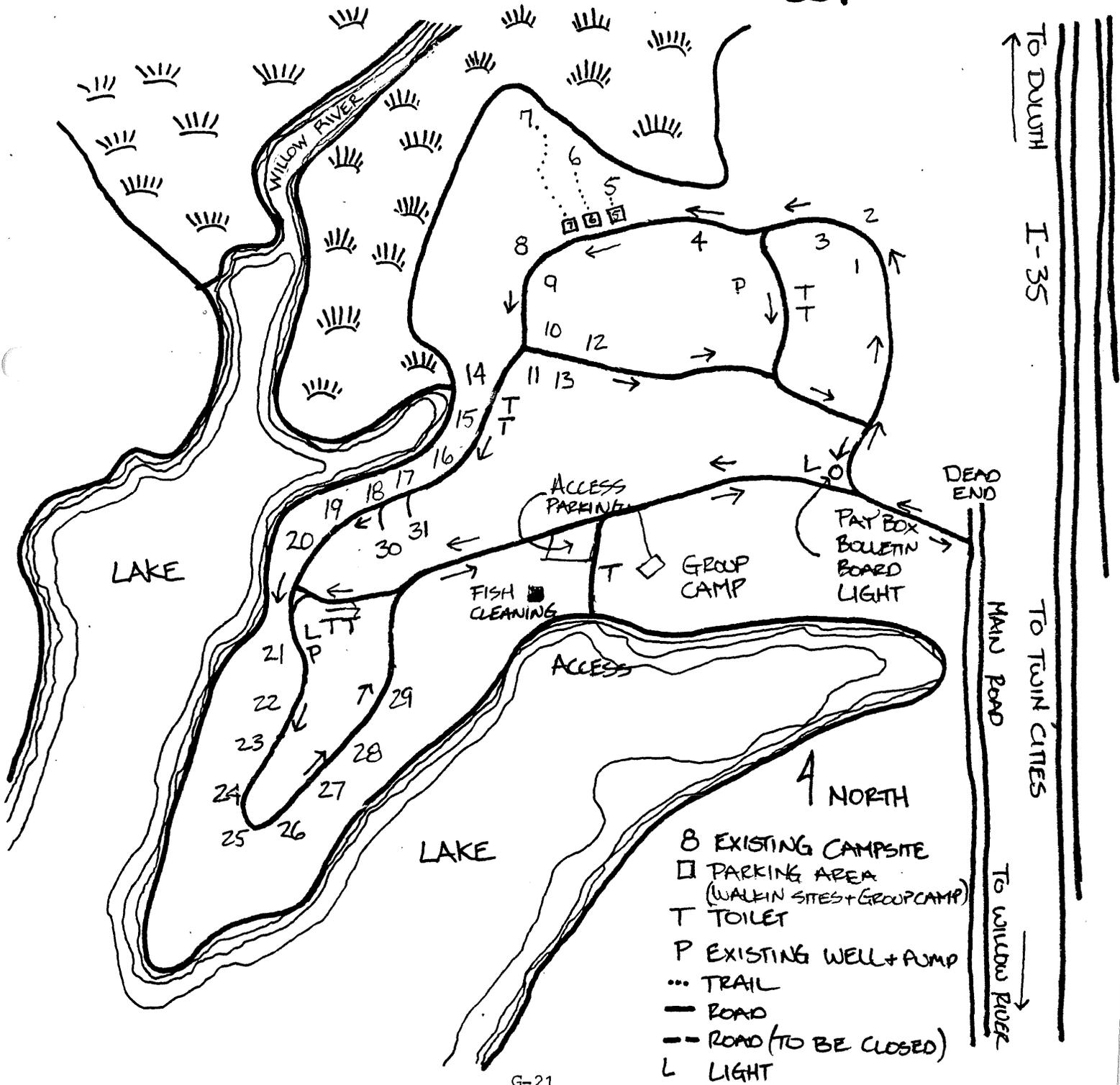
The Willow River Campground was constructed in 1963 and is generally in good condition. Only minor improvements are necessary to ensure adequate facilities for users. Vehicular traffic to three campsites on a point has caused erosion. Changing these sites to walk-in sites by removing and revegetating present road access, providing three 2-car parking lots on an existing campground loop and providing individual trails to the sites would solve the problem. Campsites 30 and 31 are too close together and are accessed by a road which should be removed. These sites should be separated and access gained to these sites from an existing loop. Campsite 32 is in a large area consisting of scattered trees and openings. If this campsite were removed a small group camp which could also be used for overflow camping could be constructed. A number of fire rings in the campground have deteriorated and are in need of replacement. To provide for user convenience as well as a more desirable facility seven of the eight existing pit toilets should be replaced with handicapped accessible vault toilets. Reduction in the number of toilets and the construction of the group camp would require toilet location changes.

A number of roads in the existing campground serve no purpose and should be closed and revegetated. The road to the access and southern-most camping loop should be widened to accommodate two-way traffic. All other campground loop roads should be one-way counter-clockwise. All roads as well as campsite parking spurs should be graveled and graded. Parking spurs should be defined with posts to prevent infringement on campsites by vehicular traffic. The two existing campground pay boxes should be removed and replaced by a single box at the junction of the access road and first camping loop. A bulletin board and security light should be added near the pay box for user convenience. An additional security light should be provided

PROPOSED FACILITIES WILLOW RIVER CAMPGROUND

FIGURE G.7

GENERAL ANDREWS STATE FOREST



near the pump in the southern-most loop. A fish cleaning house should be constructed near the public access. The campground area should be signed appropriately for user safety and convenience. Proper signs are detailed in the DNR Sign Manual.

| Actions Currently Being Implemented | <u>Costs</u> |
|--|---------------|
| 1. Remove road access to proposed walk-in camping area and revegetate. | \$ 2,500 |
| 2. Develop three walk-in campsites, each with 2 car parking areas. | 2,500 |
| 3. Separate, reconstruct and change access to campsites 30 and 31. | 4,000 |
| 4. Convert campsite 32 to a group camp area consisting of 3 tent only areas, each with room for about 15 campers. Construct parking spaces for 6 cars. | 8,000 |
| 5. Remove and replace deteriorated fire rings. | 1,000 |
| 6. Replace 8 existing pit toilets with 7 handi-capped accessible vault toilets in appropriate locations. | 23,000 |
| 7. Close and revegetate roads not serving a purpose. | 4,000 |
| 8. Designate traffic flows and sign (see #14 below). | 0 |
| 9. Gravel and grade all roads and parking spurs. | 5,000 |
| 10. Define parking spurs with posts. | 3,000 |
| 11. Move pay box and provide security light and bulletin board. | 2,000 |
| 12. Provide security light near pump. | 1,000 |
| 13. Construct a fish cleaning house. | <u>10,000</u> |
| | \$66,000 |

Potential Future Actions

If campground use reaches capacity in the future there is adequate space on the existing loop system to develop 8 to 10 additional campsites. No new sanitary or water facilities would have to be added. If this expansion takes place, present facilities would be adequate to serve needs.

Public Access and Parking Lot

The repair of erosion adjacent to the roadway leading to the boat ramp is necessary. The parking lot associated with the access facility should be expanded slightly to accommodate 10 cars and trailers. The parking area should be graveled, graded and posted to limit vehicular infringement on the surrounding area.

| Actions Currently Being Implemented | <u>Costs</u> |
|---|--------------|
| 1. Repair erosion. | \$ 2,000 |
| 2. Expand, gravel, grade and post parking area. | <u>3,000</u> |
| | \$ 5,000 |

Signs

All use areas should be signed appropriately for user safety and convenience. Proper signs are detailed in the DNR Sign Manual.

Actions Currently Being Implemented

1. Properly sign all areas.

Costs
\$ 2,000

\$ 2,000

o Grand Total for Willow River Rehabilitation:

\$73,000*

*This project has previously been funded and rehabilitation work is under way.

Two projects which were not mentioned in the Willow River rehabilitation plan have been identified since completion of the plan. Both have merit. The first is a beach area on Stanton Lake. In light of the small number of beaches in the area and the association with the campground it appears a beach would be a viable recreation facility. The second project would be a paved bicycle trail from the campground to the Hinckley-Moose Lake bicycle trail. Such a trail would make the campground more attractive and usable for bicycle campers (see General C.C. Andrews trails section for details).

Proposed Actions

1. See rehabilitation plan.
2. Develop beach area.
3. Develop hard surface connection to bicycle trail.

Costs

\$5,000

see Trails
section

\$5,000

Tamarack River Horse Camp

Location

In the St. Croix State Forest on the Tamarack Forest Road (see Figure G.8).

Existing Facilities

- 1 parking lot
- 1 horse corral
- 3 tent only campsites
- 3 picnic sites with table and fire ring
- 1 council ring
- 2 handicapped accessible vault toilets

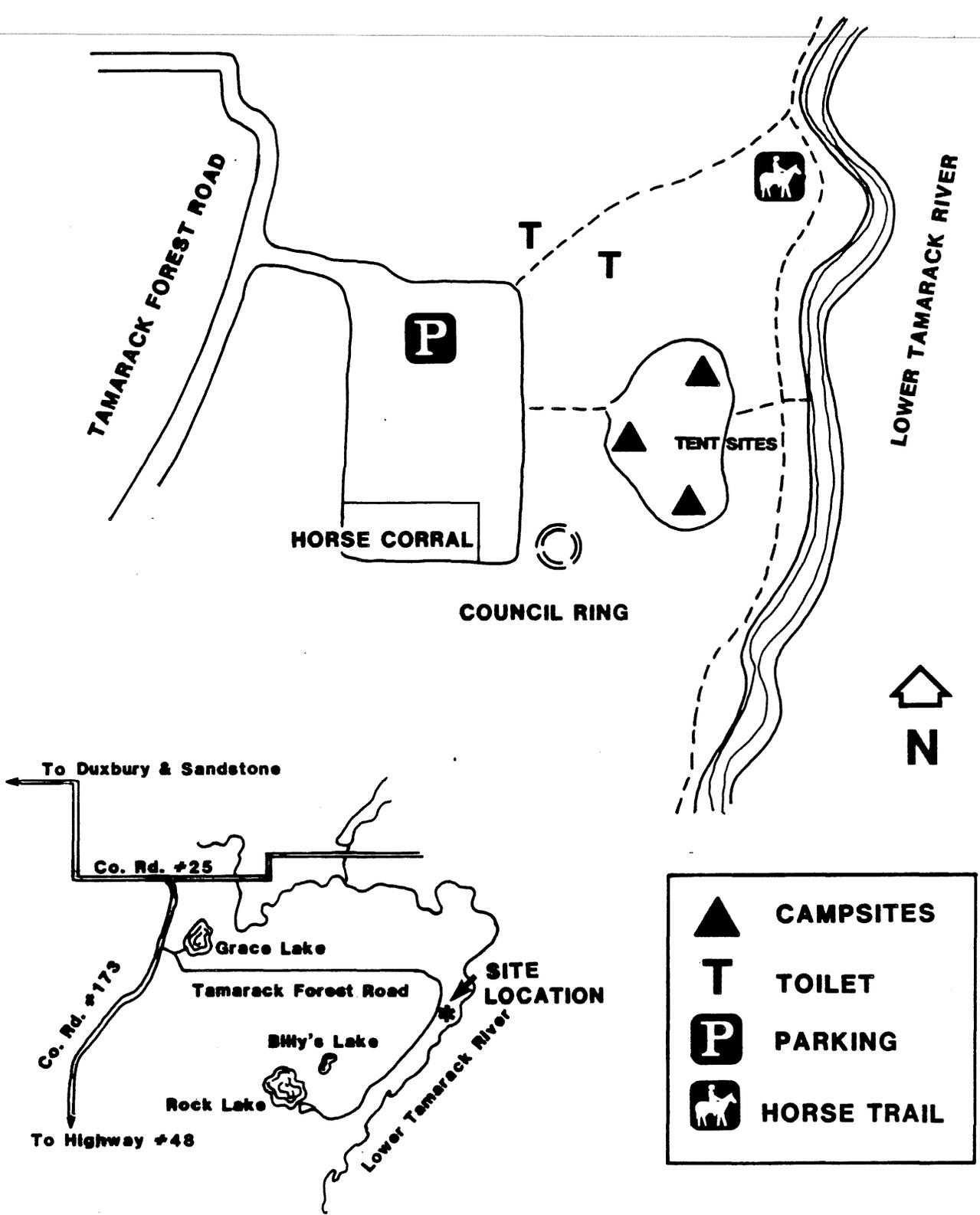
Use Data

The Tamarack River Horse Camp serves a large network of horse and snowmobile trails in and adjacent to the St. Croix State Forest. Its trail system connects to the Minnesota-Wisconsin Boundary Trail and to horse trails in St. Croix State Park. Representatives of horseback clubs who use this area say that it has great potential but that some work is needed. Although there are no reliable figures on day use of the area or the trails, both the District Forester at Eaglehead and the Park Manager at St. Croix State Park say use of the facility is heavy. A number of trail users, mostly horseback riders, stay overnight at the Horse Camp. Camper registration records indicate that 50% come from the Twin Cities

FIGURE G.8

TAMARACK RIVER HORSECAMP

ST.CROIX STATE FOREST



metropolitan area. Mostly from the rural suburbs. Another 22% come from various portions of northern Minnesota. Out of state use of this facility is particularly high with 20% of the users coming from Wisconsin.

Condition, Repair and Improvement Needs

The present parking area at the horse camp is too small to accommodate the numbers of vehicles and trailers which commonly use the area. Horseback riders presently camp in the parking lot. The potential exists to expand parking facilities and add spurs for vehicular camping. This area lacks a well which is necessary to provide water for users.

| Proposed Actions | Costs |
|--|--------------|
| 1. Expand parking lot. | \$ 5,000 |
| 2. Develop a vehicular camping spurs off parking lot with 6 campsites. | 14,000 |
| 3. Provide well and pump. | <u>5,000</u> |
| | \$24,000 |

Rum River State Forest Day-Use Area

Location

In the Rum River State Forest, approximately 10 miles west of Mora off County Road 56 and the South Branch Forest Road.

Existing Facilities

2 picnic sites with picnic tables and fire rings
1 pit toilet
1 parking area

Use Data

This site serves as a small picnic area in the summer and as a parking lot for snowmobilers in the winter. Summer use of the area is extremely low according to the District Forester at Mora. The Grouse Dog Association uses this area for field dog trials. Because of the remote location of this area vandalism and enforcement are likely to be continuing problems.

Condition, Repair and Improvement Needs

There is potential to expand the parking area which is presently too small to accommodate winter use. The existing toilet has been vandalized. The Grouse Dog Association has expressed interest in developing trails for field dog trials and hiking.

| Proposed Actions | Costs |
|---|--------------------|
| 1. Expand parking lot. | \$1,000 |
| 2. Develop field dog trial-hiking trails. | see Trails section |
| 3. Replace vandalized toilet with wilderness box toilets. | <u>1,000</u> |
| | \$2,000 |

Dago Lake Day Use Area

Dago Lake is located in the General C.C. Andrews State Forest. Presently an area on the south shore of the lake is signed as a day use area to give foresters the enforcement authority of Department of Natural Resources Recreation Rules (NR1) because of problems with recurrent parties. The day use area is well suited for further development as it is located on high, well drained land near a lake. Possible development could include a campground, picnic area, swimming area or trail parking facility. The state administered land adjacent to the day use area receives extensive use by ORV's. Very few designated ORV trails are available. Many of the trails necessary for ORV use already exist in the C.C. Andrews State Forest as fire breaks or as snowmobile trails. The amount of new trail development necessary for ORV use in General C.C. Andrews would be minimal. Soils in the forest are generally level and sandy so compaction and erosion problems would be minimal. Much of the forest is covered with pine plantation which is a concern that would have to be dealt with because of the potential for forest fires at certain times of the year.

| Proposed Actions | Costs |
|---|--------------|
| 1. Develop 5 site picnic ground. | \$1,500 |
| 2. Develop parking lot. | 1,500 |
| 3. Develop handicapped accessible vault toilets. | <u>5,000</u> |
| 4. See General C.C. Andrews trails writeup and map. | |
| | \$8,000 |

OTHER RECREATIONAL FACILITIES

In addition to the larger developed recreation facilities the Division of Forestry in the Moose Lake Area administers a number of smaller dispersed facilities. These include recreational parking lots, primitive campsites, trail shelters and public accesses (see trail maps of individual state forests for location). For the most part these facilities are in good physical shape. Repair and improvement is proposed only at one site in the St. Croix State Forest along the St. Croix River. New dispersed facilities are proposed for the St. Croix, Nemadji, and Chengwatana state forests, and for the Snake River State Forest in conjunction with a proposed backpacking trail.

St Croix State Forest/St. Croix River Site

| Proposed Actions | Costs |
|--|--------------|
| 1. Improve canoe campsite. | \$2,500 |
| 2. Install wilderness toilet. | 1,000 |
| 3. Improve parking area and turn around. | <u>3,000</u> |
| | \$6,500 |

St. Croix State Forest

| Proposed Actions | Costs |
|---|----------------|
| 1. Develop 3 primitive campsites at McDermott Creek in conjunction with the Minnesota-Wisconsin Boundary Trail. | \$1,500 |
| 2. Develop an Adirondak shelter at McDermott Creek in conjunction with the Minnesota-Wisconsin Boundary Trail. | 500 |
| | <u>\$2,000</u> |

Nemadji State Forest

| Proposed Actions | Costs |
|---|----------------|
| 1. Develop 3 primitive campsites near the existing Adirondak shelter in the southern part of the forest in conjunction with the Minnesota-Wisconsin Boundary Trail. | \$1,500 |
| 2. Develop 3 primitive campsites at Keene Creek when the Boundary Trail is upgraded to carry summer traffic. | 1,500 |
| | <u>\$3,000</u> |

Chengwatana State Forest

| Proposed Actions | Costs |
|--|--------|
| 1. Develop an Adirondak shelter at Redhorse Creek near the existing primitive campsite in conjunction with the Minnesota-Wisconsin Boundary Trail. | \$ 500 |

Snake River/Dispersed Sites

| Proposed Actions | Costs |
|---|-----------------|
| 1. Develop 10 backpacking campsites (see Snake River trails map). | \$ 5,000 |
| 2. Install 10 wilderness toilets. | 5,000 |
| 3. Develop 10 car parking lot. | 3,000 |
| | <u>\$13,000</u> |

TRAILS

The Division of Forestry has operational authority for 226 miles of trail in the Moose Lake Area. This mileage includes 131 miles of Forestry administered unit trails (within state forests), 78 miles of the Minnesota-Wisconsin Boundary Trail, and 17 miles of the Range Line Snowmobile Trail.* Additionally the division administers 249.2 miles of state forest road. Many of these roads are presently being used or have the potential of being used as trails (see Table G.2).

The Department of Natural Resources, Trails and Waterways Unit is responsible for administering the funding for development and maintenance of forest unit trails. They are also responsible for planning and administration of the Minnesota-Wisconsin Boundary Trail which stretches

*A portion of the Minnesota-Wisconsin Boundary Trail and all of the Range Line Trail mileage lies outside of state forest boundaries.

Table G.2. Forest Roads with Portions used as Designated Trails.

| Road Number | Road Name | Section | Twp.- Range | Portion Length | Road Class | Trail Type |
|-------------|-----------------|--------------------------------------|----------------------------------|----------------|------------|--|
| 5 | Park Trail | 13, 24, 25, 36 | 44-17 | 4.50 | 5 | MN/WI Boundary |
| 4 | Net Lake Road | | | 15.75 | 5 | St. For. Trail and MN/WI Boundary |
| 226 | Harlis-Holyoke | 33 | 46-16 | 1.00 | 5 | St. For. Trail |
| 337 | Kerrick Road | 28, 29, 33 | 45-17 | 2.35 | 5 | St. For. Trail and GIA |
| 338 | Duquette Road | 21 15, 16 | 45-17 45-17 | 1.25 1.50 | 5 4 | St. For. Trail |
| 5 | Park Trail | 32, 33 | 44-16 | .75 9.75 | 4 5 | St. For. Trail St. For. Trail |
| 247 | St. Croix | 9, 16 | 41-16 | 10.00 .75 | 5 4 | St. For. Trail St. For. Trail |
| 232 | Tamarack Trail | 1 | 41-16 | 4.50 .25 | 5 4 | St. For. Trail St. For. Trail |
| 3 | Beldon | 36 | 44-16 | .25 | 4 | St. For. Trail |
| 344 | | 22 | 42-17 | 1.00 | 5 | St. For. Trail |
| 257 | Chengwatana | 18 | 39-19 | 16.00 .25 | 5 4 | St. For. Trail MN/WI Boundary MN/WI Boundary |
| 2 | Kanabec | | | 1.70 4.30 | 5 4 | St. For. Trail |
| 270 | Chesley Brook | | | 2.50 | 4 | St. For. Trail |
| 340 | General Andrews | 2 14, 30 31 25, 36 E½ 25 | 44-20 45-19 45-20 45-20 | 9.40 1.20 | 4 | St. For. Trail GIA |

from the Twin Cities to Duluth. A plan for this trail was completed by the Trails and Waterways Unit in 1982. The plan specifies the types of use which are allowed along the Boundary Trail. For the majority of the trail's length the use of two and three wheeled vehicles is not allowed. Among the reasons for this is the fact that the Department has agreed in principal to allow part of the non-motorized North Country National Scenic Trail to be routed within the Minnesota-Wisconsin Boundary Trail corridor if the non-motorized requirement could be waived during the winter months. The National Park Service recognizes the need to treat this trail differently than those in more moderate climates, but has indicated that it will take an Act of Congress to provide for snowmobile use on a national scenic trail. In the meantime, there has been a tremendous rise in the popularity of all-terrain vehicles (ATV's).

The Division of Forestry feels that the use of two and three wheeled vehicles is appropriate and desirable on some segments of the Boundary Trail, particularly in cases where the trail can be used to form a loop system with unit trails proposed for two and three wheel use. With the above facts in mind the Division of Forestry has requested and the Trails and Waterways Unit has agreed to reevaluate the Boundary Trail Plan as regards summer motorized use. This may require a realignment of the North Country National Scenic Trail. Ongoing coordination is necessary between the Division of Forestry and the Trails and Waterways Unit to ensure a smoothly functioning trails system in the Moose Lake Area. Depending on the results of the re-evaluation, minor changes may be necessary to the unit trail proposals in this plan.

Trails Policies

The Department of Natural Resources has developed policies for State, Unit, and Grant in Aid trails (DNR-Policies 10, 11 and 12). Division of Forestry Circular Letter 3501 sets forth guidelines concerning timber cutting and extractive operations adjacent to recreational trails on state land. All of the trails in the Moose Lake Area were developed prior to the development of these policies. Previous unwritten policy allowed all trail uses on forestry administered trails and roads except where posted otherwise. Rules concerning recreational motor vehicle use on state forest land are anticipated and will be applied to the trails in the Moose Lake Area when they are adopted. In the absence of such rules, the following principles concerning recreational motor vehicle use on state forest land in the Moose Lake Area were developed to protect natural resources, resolve use conflicts, provide for the safety of users, and aid in the decision making process:

- Because the extent and effects of recreational motor vehicle use is not known, use will be monitored closely and changes in trail policies will be made if necessary.
- Restrict recreational motor vehicle traffic to roads or trails. Unrestricted cross-country travel or off trail scrambling will not be permitted.
- Allow only vehicles licensed to operate on public highways to use permanent forest roads (Class 1-4) to provide for public safety and prevent use conflicts. Exceptions may be made where necessary to provide trail connections if safety and use conflicts can be overcome.
- 2 and 3 wheel vehicles* will be allowed to use trails or class 5 roads which have not been signed to prohibit motorized vehicles.
- Restrict 4-wheel drive vehicles to roads because of potential for environmental damage.
- Trails and roads may be designated and signed for specific uses to prevent user conflicts and provide for user safety.
- Certain roads and trails may be closed to vehicular traffic to prevent roadway damage or to protect resources on a temporary or permanent basis.
- Snowmobile trails are closed to other types of vehicular use December 1 through April 1.

*Two-wheel recreational vehicle. "Two-wheel recreational vehicle" means every motor vehicle having a seat or saddle for use of the rider and designed to travel on not more than two wheels in contact with the ground which is being used for off-road recreational purposes.

*Three-wheel off-road vehicle. "Three-wheel off-road vehicle" means a flotation-tired vehicle of not less than three low pressure tires, but not more than six tires, which is limited in engine displacement not to exceed 800 cubic centimeters and total dry weight not to exceed 600 pounds, which is being used for off-road recreational purposes.

Chengwatana State Forest

Existing Trails System

There are 30.4 miles of trail in the Chengwatana State Forest. Twenty-three and two-tenths miles are forest unit trail and 7.2 miles are a portion of the Minnesota-Wisconsin Boundary Trail. The use of the majority of unit trail in the forest is limited almost exclusively to snowmobiling because of the wetness of the underlying terrain. The Redhorse Creek Trail, a short seven mile upland loop has been designated for hiking and cross-country skiing. Two miles of this hiking/cross-country ski loop system parallels or is on the treadway of the Minnesota-Wisconsin Boundary Trail causing safety concerns and potential use conflicts. The Chengwatana snowmobile trail system connects to a system of grants in aid trails in Pine County and to the trails in St. Croix State Park.

Trails Concept (Figure G.9)

The concept for trail use in the Chengwatana is to designate 16.2 miles of unit trail and 7.2 miles of the Minnesota-Wisconsin Boundary Trail as snowmobile trail in the winter. During the summer the 16.2 miles of unit trail will not be maintained or recommended for use because wetness makes the trail unsuitable. The 7.2 mile segment of the Minnesota-Wisconsin Boundary Trail will be designated for hiking and horseback riding during the summer. The Minnesota-Wisconsin Boundary Trail Plan (Minnesota Department of Natural Resources, Trails and Waterways Unit, 1982) does not allow summer motorized use on this section of the Boundary Trail. Five miles of the hiking/cross-country skiing loop will be designated for these uses during the appropriate season. The two miles of this trail which formerly paralleled or were on the treadway of the Minnesota-Wisconsin Boundary Trail will no longer be continued because of safety considerations and possible use conflicts. The trail head for the hiking/ski trail will be moved from the Snake River Campground area to the end of the Chengwatana State Forest Road.

A 5.75 mile loop trail will be developed for 2 and 3 wheeler use in the summer and snowmobiling in the winter. Five miles of this trail will follow old trails and the remaining 0.75 mile will be a new treadway.

Repair and Improvement Needs

The unit snowmobile trails and the Minnesota-Wisconsin Boundary Trail have recently been upgraded for user enjoyment, safety and ease of maintenance. An additional parking area for snowmobile users is necessary on the west edge of the forest. Munch Town Hall has an existing parking lot which might be used with township approval. New access to the cross-country ski loop is necessary because of the closure of the two miles of trail along the Boundary Trail. Access can be provided off CSAH 10 along the Chengwatana Forest Road if agreement can be reached with the county to plow the road. The Minnesota-Wisconsin Boundary Trail Plan proposes a horseman's camping and staging area at the trail parking facility near the Snake River Campground. Development of this facility is contingent on the re-evaluation of the Boundary Trail Plan.

| Proposed Actions | <u>Costs</u> |
|---|---------------------------------------|
| 1. Designate 16.2 miles of unit trail and 7.2 miles of the Minnesota-Wisconsin Boundary Trail for snowmobiling in winter. | \$0 |
| 2. Designate 5 miles of trail for hiking and cross-country skiing. | 0 |
| 3. Develop agreement to plow the Chengwatana Forest Road to the cross-country ski loop. | No cost figure available at this time |
| 4. Explore the possibility of obtaining a lease at Munch Town Hall for snowmobiling. | \$0 |
| 5. Develop horseman's area contingent on the results of the Boundary Trail Plan re-evaluation. | Trails & Waterways funding |
| 6. Develop 5.75 mile 2 and 3 wheeler trail. | <u>\$1,000</u> |
| | \$1,000 |

St. Croix State Forest

Existing Trail System

There are 51.6 miles of trail in the St. Croix State Forest. Thirty-two and three-tenths miles are forest unit trail and 19.3 miles are a portion of the Minnesota-Wisconsin Boundary Trail. All of the unit trails are currently used for hiking and horseback riding. Twenty-five and two-tenths miles of the unit trail system are used for snowmobiling in the winter. The Minnesota-Wisconsin Boundary Trail in this forest is used for hiking and horseback riding in the summer and for snowmobiling in the winter. A proposal exists to route a portion of the North Country Trail (federal proposal) on some of the existing St. Croix State Forest trails. Forest snowmobile trails are connected to a system of grants-in-aid snowmobile trails in Pine County and the Minnesota-Wisconsin Boundary Trail connects to trail systems in St. Croix State Park and the Nemadji State Forest. The southernmost section of the Boundary Trail links St. Croix State Park with the Tamarack River horse trail and campground in the St. Croix State Forest.

Trails Concept (Figure G.10)

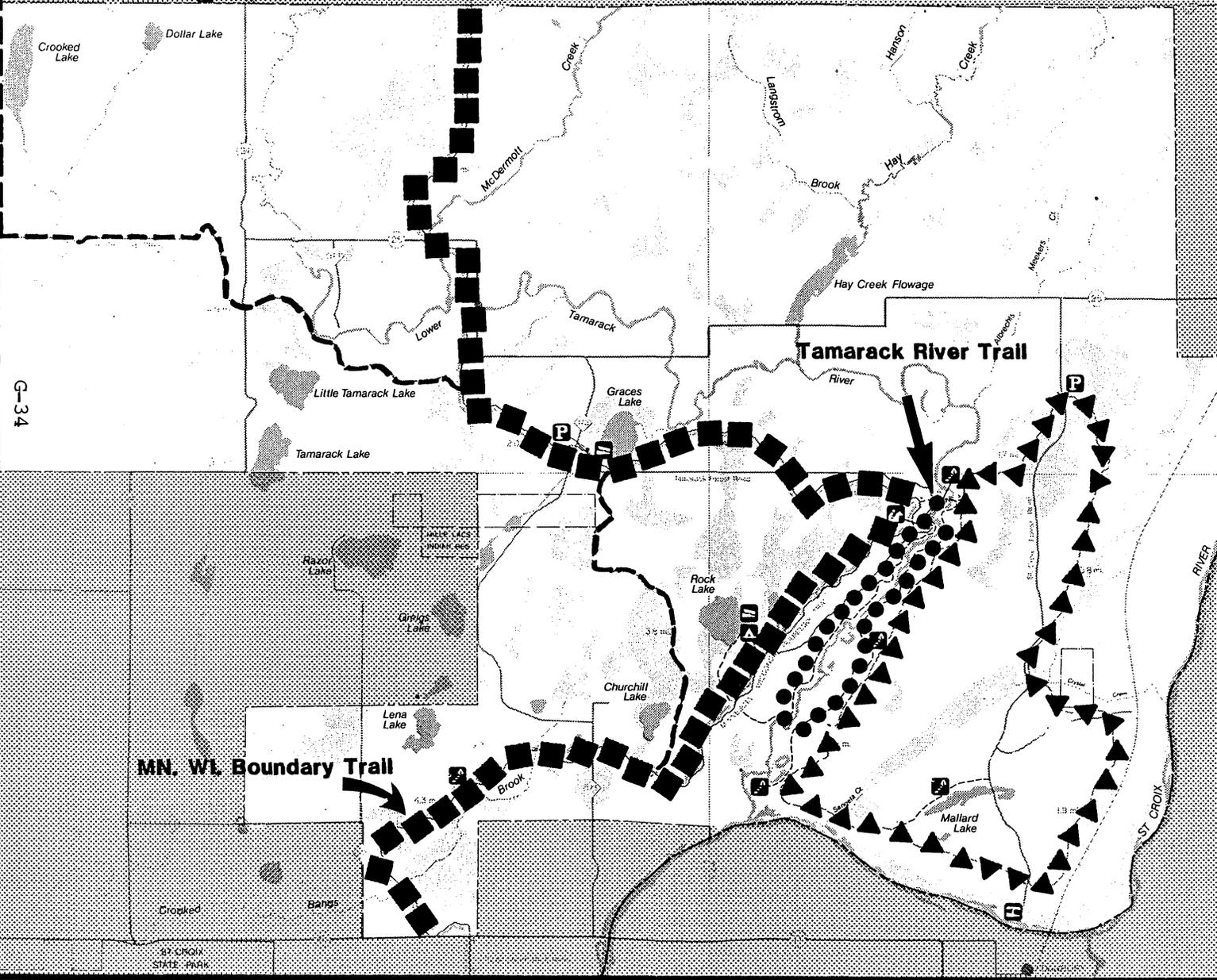
The concept for trail use in the St. Croix State Forest is to designate 25.2 miles of unit trail and 19.3 miles of the Minnesota-Wisconsin Boundary Trail for snowmobile use in the winter. In the summer 26.4 miles of trail would be designated for horseback riding and hiking. This includes the entire 19.3 miles of the Minnesota-Wisconsin Boundary Trail and 7.1 miles of unit trail. The Minnesota-Wisconsin Boundary Trail Plan (MN DNR Trails and Waterways Unit, 1982) does not allow summer motorized use on the St. Croix State Forest section of the Minnesota-Wisconsin Boundary Trail. The use of two and three wheel vehicles is increasing in the forest. In recognition of this fact a 14 mile segment of unit trail on the east side of the forest will be designated for use by two and three wheel vehicles. Eight and seven-tenths miles of unit trail would not be maintained and recommended for summer use because wetness makes the trail unsuitable. The North Country National Scenic Trail will be accommodated in the forest.

St. Croix State Forest
 SCALE IN MILES
 0 1 2
 SCALE IN KILOMETERS
 0 2 4

ST. CROIX STATE FOREST

FIGURE G.10

Trails Concept, St. Croix State Forest



LEGEND

| | |
|--|--|
| <p>Designated Uses</p> <p>Winter / Summer</p> <p>Symbol</p> <p>● none / horseback & hiking</p> <p>■ snowmobile / horseback & hiking</p> <p>▲ snowmobile / ORV</p> <p>— snowmobile / none</p> | <p>FACILITIES</p> <p>🏠 Forestry Office</p> <p>P Parking</p> <p>🏕 Campground</p> <p>🚤 Boat Access</p> <p>🛶 Canoe Access</p> <p>🏞 Horsemen's Camp</p> <p>🏠 Primitive Campsite</p> |
|--|--|



G-34

MN. WI. Boundary Trail

Tamarack River Trail

ST. CROIX STATE PARK

Repair and Improvement Needs

Portions of the unit trail and the Boundary Trail which are used for snowmobiling are too narrow and winding to adequately provide for user safety and ease of maintenance. Widening and straightening of these segments would solve this problem. Work should comply with standards outlined in the Trails Development Manual (Trails & Waterways, 1981). Erosion has occurred along some segments of trail and repair is necessary. Special erosion control measures are necessary in some cases to adequately provide for ORV and horseback use.

| Proposed Actions | Costs |
|--|--------------|
| 1. Designate and rehabilitate 25.2 miles of unit trail for snowmobiling. | \$ 8,000 |
| 2. Designate and rehabilitate 19.3 miles of the Minnesota-Wisconsin Boundary Trail for snowmobiling. | 15,000 |
| 3. Designate, sign and repair erosion and develop erosion control measures on 14.8 miles of 2 and 3-wheel motorized trail. | 10,000 |
| 4. Designate and rehabilitate 26.4 miles of horseback trail. | <u>7,000</u> |
| | \$40,000 |

Nemadji State Forest

Existing Trails System

Total trail mileage in the Nemadji State Forest is 68.6. This includes 43.1 miles of unit trail and 25.5 miles of the Minnesota-Wisconsin Boundary Trail. All the trail mileage in the forest is used for snowmobiling. Trail use during other seasons is constrained by wet terrain. Only in the northwest corner of the forest are there a substantial number of upland trail miles available for all season use. Nemadji's snowmobile trails connect to a system of grants-in-aid trail in Pine and Carlton counties. The Minnesota-Wisconsin Boundary Trail connects the Nemadji with the St. Croix State Forest trail system and to trail systems further south. A proposal exists to route a portion of the North Country Trail (federal proposal) on some of the existing Nemadji State Forest trails. An enduro motorcycle race is held annually, by special use permit, on trails within the forest.

Trails Concept (Figure G.11)

The concept for trail use in the Nemadji State Forest is to designate 53.9 miles of trail for snowmobiling in the winter. Included in this total is the entire 25.5 mile segment of the Minnesota-Wisconsin Boundary Trail that lies in the Nemadji. In the summer all but a short one-mile segment (to be designated for use by two and three wheelers) of the Minnesota-Wisconsin Boundary Trail will be designated for hiking and horseback use. The use of two and three wheel vehicles is increasing in the forest. In recognition of this fact a 15 mile loop system will be designated for two and three wheeled vehicle use in the northwest portion of the forest. This includes a one mile segment of the Minnesota-Wisconsin Boundary Trail. The Minnesota-Wisconsin Boundary Trail Plan (MN DNR 1982) makes provision for this type of use in this location. About 14.7 miles of existing trail in the eastern Nemadji State Forest will not be maintained or groomed for any recreational uses because of wetness. The remaining 10.5 miles of unit trail will not be maintained or recommended for summer use because wetness

LEGEND

| Symbol | Designated Uses |
|--------|---------------------------------|
| ■ | Winter / Summer |
| ▲ | Snowmobile / Hiking & Horseback |
| — | Snowmobile / ORV |
| ○ | Snowmobile / None |
| ○ | None / Hiking proposed |

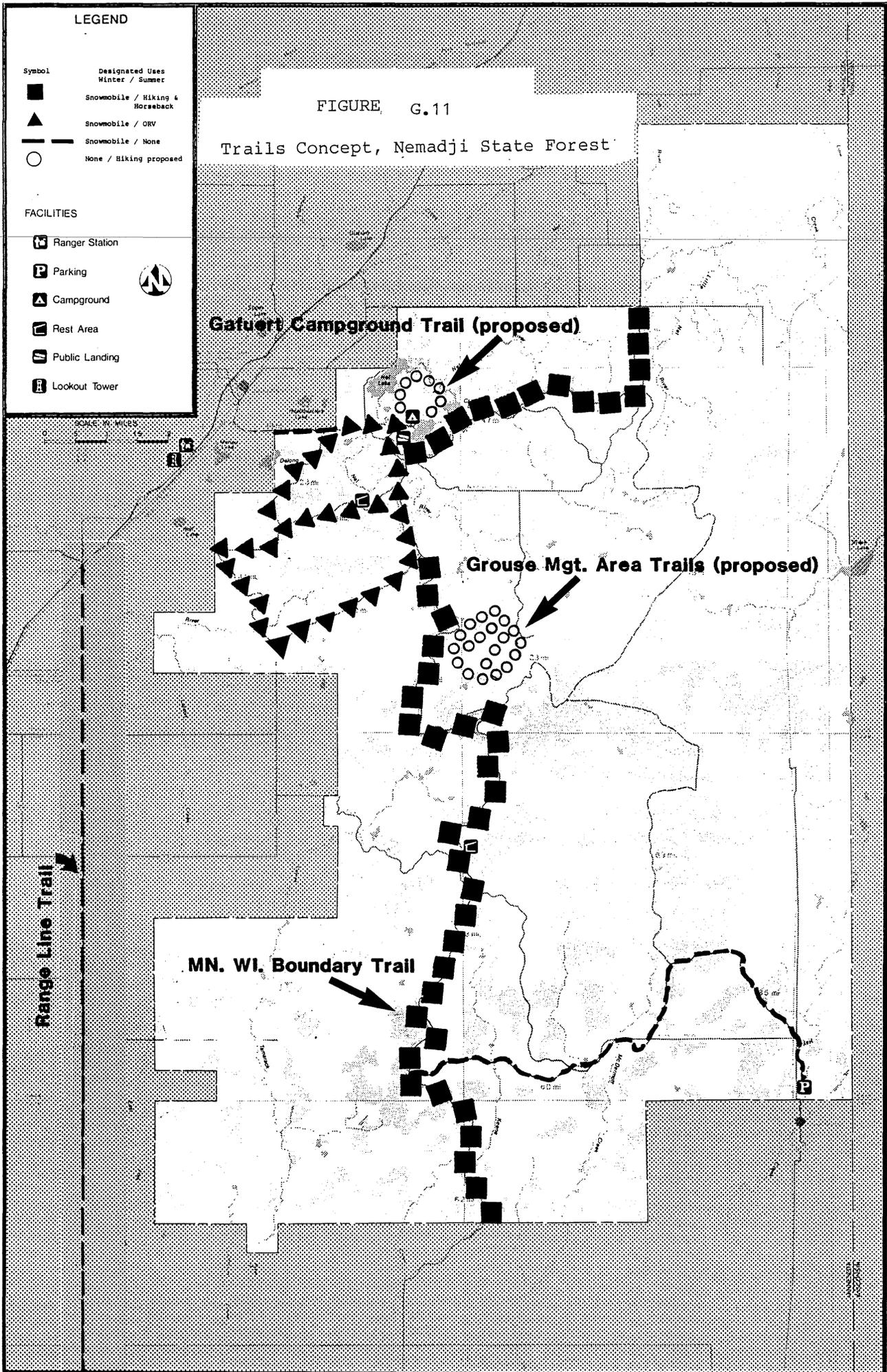
FACILITIES

-  Ranger Station
-  Parking
-  Campground
-  Rest Area
-  Public Landing
-  Lookout Tower



FIGURE G.11

Trails Concept, Nemadji State Forest



makes them unsuitable. If the North Country National Scenic Trail is developed it can be accommodated in the forest. A new 2 mile hiking/interpretive trail is proposed in conjunction with Gafvert Campground. The Grouse Dog Association has proposed a system of trails at the end of a spur off Net Lake Forest Road to be used for field dog trials. These trails will be designated for hiking.

Repair and Improvement Needs

Portions of the unit trail and Boundary Trail which are used for snowmobiling are too narrow and winding to adequately provide for user safety and ease of maintenance. Widening and straightening of these segments would solve these problems. Work should comply with standards outlined in the Trails Development Manual (Trails & Waterways, 1981). The Minnesota-Wisconsin Boundary Trail requires 3 bridges to cross steep banked creeks. Erosion control measures are necessary on the proposed two and three wheeler trails. The Minnesota-Wisconsin Boundary Trail Plan proposes a horseman's camping and staging area at the Gafvert Campground. Development of this facility is contingent on the Boundary Trail Plan re-evaluation. Control erosion along the enduro motorcycle course, especially at the State Line Creek crossing.

| Proposed Actions | <u>Costs</u> |
|---|----------------------------------|
| 1. Designate and rehabilitate 28.4 miles of unit snowmobile trail. | \$10,000 |
| 2. Designate and rehabilitate 25.5 miles of the Minnesota-Wisconsin Boundary Trail for snowmobiling. | 20,000 |
| 3. Develop 3 bridges. | 15,000 |
| 4. Designate, develop and provide preventative erosion control measures on 15 miles of two and three wheeler trail. | 10,000 |
| 5. Develop 2 miles of hiking/interpretive trail near Gafvert Campground. | 5,000 |
| 6. Provide hiking trail system at end of spur off Net Lake Forest Road (to be provided by the Ruffed Grouse Society). | 0 |
| 7. Do not maintain 14.7 miles of unit trail on eastern side of forest for motorized recreational traffic. | 0 |
| 8. Develop horseman's area contingent on the results of the Boundary Trail Plan re-evaluation. | Trails & Waterways funding |
| 9. Control erosion along enduro course, improve State Line Creek crossing. | <u>2,000</u> |
| | \$62,000 |

General C.C. Andrews State Forest

Existing Trails

The General C.C. Andrews State Forest contains 9.4 miles of unit trail which are used for hiking and horseback riding in the summer and snowmobiling in the winter. The use of 2 and 3-wheeled vehicles has increased dramatically in the forest in recent years. General C.C. Andrews State Forests' snowmobile trails connect to a system of grants-in-aid trails in Pine County. They also connect to the Hinckley to Moose Lake portion of the Minnesota-Wisconsin Boundary Trail-West Addition which is just to the west of the forest. This trail is to be used for bicycling and horseback riding.

Trails Concept (Figure G.12)

The concept for trail use in the General C.C. Andrews State Forest is to designate 9.4 miles of unit trail for snowmobiling in the winter. A 5 mile loop trail would be designated on the east side of Interstate Highway 35 for summer use by two and three wheeled vehicles. The remaining trails and roads on the east side of the highway would be posted to prohibit ORV's because of possible use conflicts. On the west side of Interstate 35 a corridor would be developed to the south for two and three wheelers to connect the loop system on the east side of the highway to the city of Willow River and potentially to the Willow River Campground (see proposal below for bridge across the Willow River). The remaining trails and roads on the west side of Interstate 35 would be posted to prohibit ORV's because of possible conflicts with the Willow River Nursery and other existing uses. Approximately 2 miles of trails will be designated for summer horse use. A connection to the horseback trails along the Minnesota-Wisconsin Boundary Trail West Addition will be provided. A major constraining factor to the two and three wheeler proposal exists in that the township bridge that crosses Interstate 35 is not currently available for ORV use because of state law. The development of a 1 1/4 mile paved bike trail to connect the Willow River Campground and the Moose Lake to Hinckley portion of the Boundary Trail would provide a safe, convenient campground access for bicycle campers. This trail will require a bridge to span the Willow River. In addition to bicycle traffic, this bridge could also provide 3 wheel access to the campground area. However, there is potential for conflict between these two user groups. This bridge should be built only when bicycle and/or three-wheel use becomes significant to warrant construction and consideration is given to potential use conflicts.

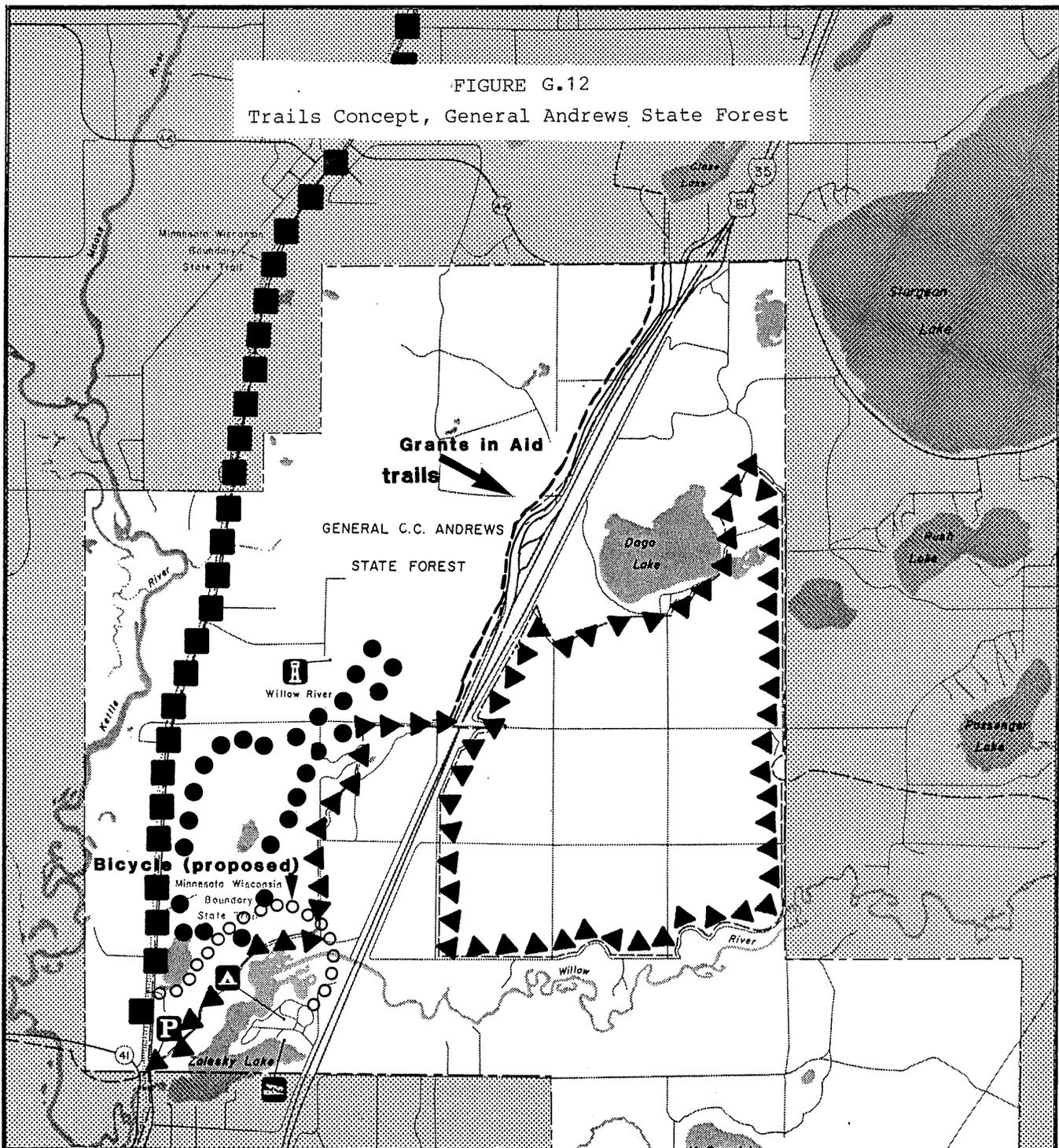
An alternative to the bicycle trail bridge proposal would be to pave a bicycle trail adjacent to the campground road and through the city of Willow River to the Hinckley-Moose Lake Bicycle Trail. This proposal appears less attractive from an aesthetic viewpoint.

Repair and Improvement Needs

The trails to be used for 2 and 3-wheeled vehicles will require measures to minimize resource damage including trail hardening and erosion control. Measures to prevent forest fires resulting from trail use will also be necessary.

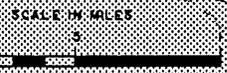
| Proposed Actions | Costs |
|---|---------------------------|
| 1. Designate 9.4 miles of trail for snowmobiling. | \$ 0 |
| 2. Develop, designate and sign 5 to 7 miles of trail for 2 and 3-wheeled motorized vehicles. | 15,000 |
| 3. Seek amendment of law to allow ORV use across township bridge. | 0 |
| 4. Designate 2 miles of trail for horseback riding. | 0 |
| 5. Develop 1 1/4 miles paved bicycle trail contingent on trail use of the Minnesota-Wisconsin Boundary Trail West Addition. | 40,000 |
| 5. Construct bridge across the Willow River contingent on bicycle use on the Minnesota-Wisconsin Boundary Trail West Addition, or on three wheel use in the forest. | <u>30,000</u> \$85,000 |

FIGURE G.12
Trails Concept, General Andrews State Forest



LEGEND

| | |
|---|---|
| <p>symbol</p> <p>■ Designated uses Winter / Summer</p> <p>▲ Snowmobile / bicycle, hiking, horseback</p> <p>— Snowmobile / None</p> <p>○ None / bicycle</p> <p>● horse trail</p> | <p>FACILITIES</p> <p> Ranger Station</p> <p> Lookout Tower</p> <p> Parking</p> <p> Water Access (trailer)</p> <p> Water Access (carry-in)</p> <p> Campground</p> <p> Picnic Area</p> |
|---|---|



**General Andrews
State Forest**

Rum River State Forest

Existing Trails

The majority of the Rum River State Forest lies outside of the Moose Lake Area. The portion which is within the area contains 15 miles of unit trail used almost exclusively for snowmobiling. This snowmobiling system connects to a larger system of trails in the remainder of the Rum River State Forest and to a system of grants in aid trails in Kanabec County.

Trails Concept (Figure G.13)

The trails concept for the Rum River State Forest is to designate 9 miles of trail for snowmobiling in the winter. In the summer there will be no designated use on this trail segment. This segment of trail should be reevaluated for possible two and three wheel use when the remainder of the Rum River Forest is evaluated in the Cambridge Area Plan. Six miles of trail which lie on the Kanabec Forest Road will be closed for user safety. Develop hiking trail loop in conjunction with the day use area.

Repair and Improvement Needs

Portions of the snowmobile trail are winding and too narrow for user safety. Rehabilitation is necessary.

Proposed Actions

| | Cost |
|---|----------------|
| 1. Designate and rehabilitate 9 miles of snowmobile trail. | \$5,000 |
| 2. Close 6 miles of trail on Kanabec Forest Road. | 0 |
| 3. Develop and designate a system of hiking trails from Day Use Area for field dog trials. | 0 |
| | <u>\$5,000</u> |

Snake River State Forest

Existing Trails

The Snake River State Forest contains the 7.9 mile Chesley Brook Snowmobiling Trail. Because of a lack of snowmobiling activity this trail has been ungroomed and unused for the last few years.

Trails Concept

The trails concept for the Snake River State Forest is to develop and designate a 10 mile hiking, backpacking trail system. Two suspension bridges over the Snake River and a 10 car parking lot will be necessary. The topography, land ownership pattern and visual amenities along the Snake River are well suited to this type of use. The Snake River State Forest is located within 100 miles of the Twin Cities metropolitan area putting it within easy weekend driving distance. The majority of existing developed backpacking opportunities in the state are substantially more distant from this population center. The Chesley Brook snowmobile trail will remain closed unless demand indicates otherwise.

FIGURE G.13

Trails Concept, Rum River State Forest

FACILITIES

- ● ● No recreational motorized use.
- ▲ ▲ ▲ ▲ Snowmobile winter-
Two & three wheeler summer.
- — — — — Snowmobile winter-
No designated use summer.

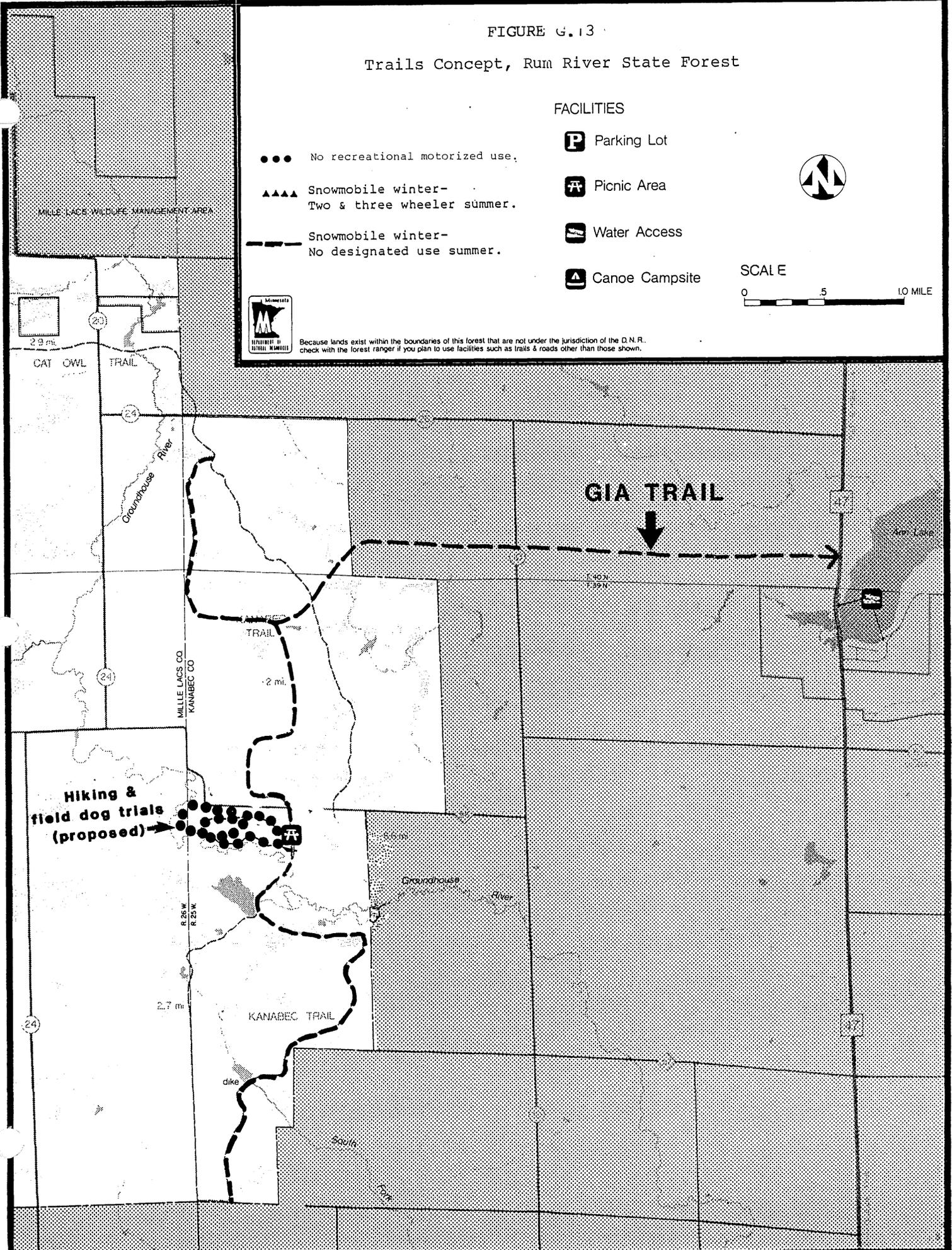
- Parking Lot
- Picnic Area
- Water Access
- Canoe Campsite



SCALE



Because lands exist within the boundaries of this forest that are not under the jurisdiction of the D.N.R. check with the forest ranger if you plan to use facilities such as trails & roads other than those shown.



Hiking & field dog trials (proposed)

GIA TRAIL

FIGURE G.14

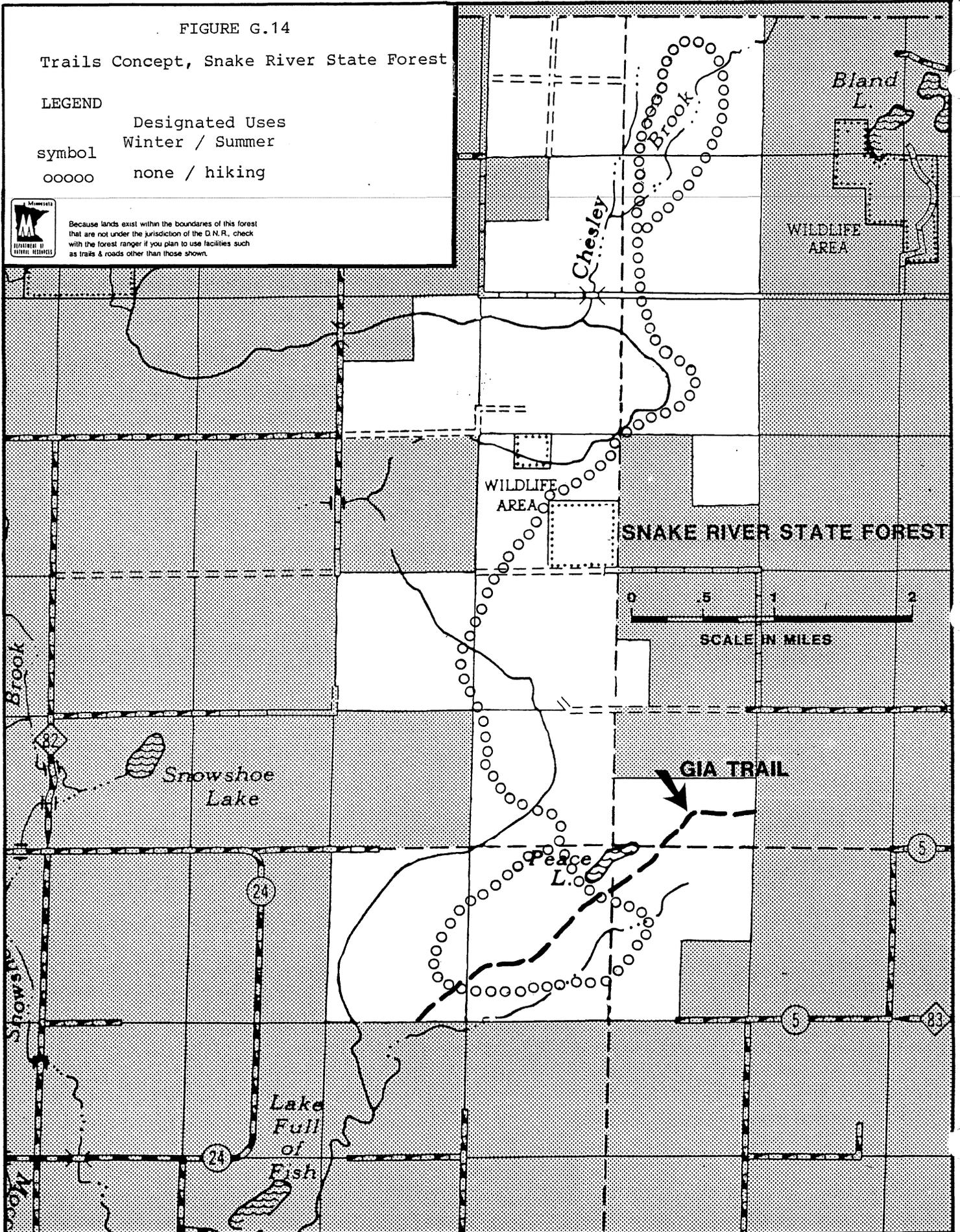
Trails Concept, Snake River State Forest

LEGEND

| | |
|--------|-----------------|
| | Designated Uses |
| symbol | Winter / Summer |
| ooooo | none / hiking |



Because lands exist within the boundaries of this forest that are not under the jurisdiction of the D.N.R., check with the forest ranger if you plan to use facilities such as trails & roads other than those shown.



| Proposed Actions | Costs |
|---|----------|
| 1. Develop and designate 10 mile hiking-backpacking trail. | \$10,000 |
| 2. Develop 2 suspension bridges 3 feet wide over the Snake River. | 40,000 |
| 3. Develop 10 car parking lot. | 2,000 |
| 4. See section on other recreation facilities for backpack campsite proposal. | <u>0</u> |
| | \$52,000 |

Minnesota-Wisconsin Boundary Trail (outside state forest boundaries)

Existing Trail

The authorized alignment for this trail extends from St. Paul to Duluth. Within the Moose Lake Area the trail passes through the Nemadji, St. Croix and Chengwatana state forests. The Minnesota-Wisconsin Boundary Trail connects these units and the St. Croix State Park. Connecting segments cross private land and are used basically for snowmobiling. The connection between St. Croix State Park and St. Croix State Forest is also used by horseback riders. Trail use provisions will be re-evaluated.

Trails Concept

The use of these connecting trail segments is the responsibility of the DNR Trails and Waterways Unit. A plan for the Minnesota-Wisconsin Boundary Trail has been developed (MN DNR-Trails & Waterways Unit, 1982). The Division of Forestry has been involved in the upgrading and maintenance of these trail segments.

Repair and Improvement Needs

Easements for crossing county lands are in question for some of these trails segments. They should be checked and updated by the Trails and Waterways Unit (see other proposals for the Boundary Trail in trail sections for individual forests).

| Proposed Actions | Costs |
|--|------------|
| 1. Check and update easements (Trails and Waterways Unit responsibility) | <u>\$0</u> |

Range Line Trail

Existing Trail

The Range Line Trail is a 17 mile snowmobile trail on a township road just west of the Nemadji and St. Croix state forests. It is not within the forest boundary.

Trails Concept

The Range Line Trail currently provides snowmobilers with a fast north-south snowmobile route connecting the Nemadji with the St. Croix State Forest and St. Croix State Park. The upgraded Minnesota-Wisconsin Boundary Trail (see proposal for Nemadji and St. Croix state forests) will serve as an adequate replacement. Upon completion of the upgrading of the Boundary Trail the Range Line should be deleted from the state trail system. If local snowmobile clubs wish to continue this trail it could be added to their systems as a grants in aid trail.

Proposed Actions

1. Delete Range Line Trail from state system after Minnesota-Wisconsin Boundary Trail is upgraded.

Costs

\$0

OPPORTUNITIES FOR FUTURE RECREATION DEVELOPMENT

A number of locations on Forestry administered land in the Moose Lake Area have potential for future recreational development if needed. The opportunities for development can basically be separated into two categories. These are: 1) sites available for campgrounds or day use areas, and 2) areas with potential for dispersed recreational activities; (e.g., trails).

Sites Available for Campgrounds or Day Use Areas

The following sites show potential for development as campgrounds and day use areas because of proximity to open water, topographical characteristics, drainage characteristics and vegetative makeup. If substantial recreation development of these sites is contemplated in the future the planning provision of the Minnesota Outdoor Recreation Act (M.S. 86A) will have to be met. The following list shows site location by body of water, state forest, and township range and section. Included with each site location is a generalized description of the type of recreational facility which may be possible.

| <u>Body of Water</u> | <u>State Forest</u> | <u>Twp. & Range</u> | <u>Possible Use</u> |
|----------------------|-------------------------|----------------------------------|----------------------------------|
| Delong Lake | Nemadji | T45 R17 Sec. 10 | Small campground |
| Mud Lake | Nemadji | T46 R17 Sec. 31 | Small campground |
| Round Lake | Nemadji | | Small campground |
| Little Tamarack Lake | St. Croix | T42 R17 Sec. 33 | Campground-12 to 15 sites |
| Graces Lake | St. Croix | T42 R17 Sec. 36 | Small campground |
| Hay Creek Flowage | St. Croix | T42 R16 Secs. 19-20 and 29-30 | Campground |
| St. Croix River | St. Croix & Chengwatana | --- | Canoe campsites, NPS cooperation |
| Kettle River | Chengwatana | --- | Canoe campsites |
| Snake River | Snake River | --- | Canoe campsites |
| St. Croix River | Chengwatana | T38 R20 Secs. 24-26-34 | Campground, NPS cooperation |

Areas with Potential for Dispersed Recreational Activities

Much of the land which lies in the Moose Lake Area's state forests is in consolidated ownership blocks. Most of these blocks presently have some type of trail development. There is potential however to increase trail mileage for all types of use substantially if need warrants. The development of individual campsites along these trails is a possibility. Scattered forestry administered parcels along or near the Nemadji River have potential for dispersed recreational activities. The parcels along the Nemadji are separated by large blocks of county and tax-forfeited lands administered by Carlton County.

MAINTENANCE NEEDS

Ongoing maintenance of recreational facilities is necessary. Each individual facility differs as to its maintenance requirements. For example, pick-up of garbage at campgrounds is a routine maintenance procedure which must occur frequently to insure user health and aesthetics. Other maintenance such as the grading of roads or the repair of trails occurs less frequently. The money and personnel necessary to carry out the maintenance of forest recreational facilities has been, for the most part, inadequate for the task. Proper levels of funding for maintenance of recreational facilities is a cost-effective means of preventing deterioration and maintaining quality facilities.

Based on statewide averages, the estimated dollar needs for maintaining the Moose Lake Area's existing campgrounds, day use areas and other dispersed facilities is approximately \$19,000 per year. When new facilities are developed or when use increases, maintenance costs will increase proportionally. Over a ten year period maintenance costs are expected to rise from \$19,000 to \$25,000 per year.

Trail maintenance dollar needs are based on a per mile maintenance cost. For example, the estimated annual cost for the maintenance of one mile of snowmobile trail is approximately \$125. This includes brushing, grooming, bridge and treadway repair. If summer use occurs on the same stretch of trail additional dollars become necessary to maintain the trail. Cost estimates for adequate maintenance of the existing Moose Lake Area trail system is approximately \$16,000 per year. When new miles are added to the trail system, when trails serve both winter and summer use, or when use increases in general, increased maintenance dollars are necessary. Trail maintenance needs are projected to increase from \$16,000 per year to \$21,000 per year in the next 10 years.

ENFORCEMENT NEEDS

An effective enforcement program is necessary for forest recreation facilities to provide adequate protection to forest visitors, natural resources, and public and private property. The objective of any enforcement program is to gain compliance with that which is considered to be an acceptable standard of conduct and behavior. State laws passed by the legislature, and forest campground and day use rules (NR-1) and other rules and regulations promulgated by the Department of Natural Resources establish bounds of acceptable behavior and provide a legal framework for enforcement action. These measures do not go far enough in some instances,

however. Additional rules are necessary to adequately manage dispersed recreation activities which occur outside of specifically designated recreational sub-areas. Current laws and rules pertaining to trails lack clarity, which causes interpretation and thus enforcement problems.

It is the responsibility of the DNR, Division of Forestry to promulgate rules for the lands it administers. New rules pertaining to dispersed recreation, and more concise trail rules, must be promulgated if recreation on state forest lands is to be managed effectively.

Appropriate laws, rules and regulations are only a first step to adequate enforcement. Necessary manpower must be supplied at recreation sites. Manpower for the enforcement of laws and rules on DNR, Division of Forestry administered lands is the primary responsibility of DNR conservation officers. Other enforcement personnel such as county sheriffs also have enforcement authority. In some cases DNR Forestry personnel, when delegated authority by the Commissioner, can enforce NR-1 within forest campgrounds and day use areas.

Most of the time this level of management is adequate to do the task. In some cases increased manpower and/or innovative approaches are necessary to insure compliance. The responsibility of dealing with these cases rests with the Division of Forestry and law enforcement officials. To insure better cooperation, responsible forestry personnel should meet annually, or immediately as the need arises, with local conservation officers and sheriffs to discuss and implement enforcement procedures.

Public education signing and campground patrols are methods designed to make enforcement easier. In order to educate the public, copies of NR-1 and other rules should be available at all recreation sites.

APPENDIX H

Soil Resource Interpretations and Forest Management
Guidelines for Geomorphic Regions in the Moose Lake Area

| <u>Map #</u> | <u>Geomorphic Region Description</u> | <u>Page</u> |
|--------------|--|-------------|
| 53 | Nemadji-Duluth Lacustrine Plain, Clayey (Red Clay Area) | H-1 |
| 61 | McGrath Till Plain, Loamy, Gently Rolling | H-5 |
| 10C | Brainerd-Pierz Drumlin Area, Loamy | H-5 |
| 58 | Automba Drumlin Area, Loamy | H-5 |
| 14 | Mille Lacs Moraine Complex, Rolling | H-5 |
| 60 | Nickerson Moraine, Loamy to Clayey | H-8 |
| 59 | Thomson-Cloquet Moraine Complex, Rolling | H-8 |
| 36 | Hinckley Outwash Plain, Sandy | H-10 |
| 57 | Willow River Outwash Plain, Sandy | H-10 |

NEMADJI-DULUTH LACUSTRINE PLAIN, CLAYEY (53)
(Also known as the Red Clay Area)

This geomorphic area consists of a nearly level lake plain that has many deeply entrenched streams. Between the streams are nearly level ridges that generally are one half to one mile wide and several miles long. The predominant soils in this area are very clayey and present some unique problems. The major problem is soil slumping and erosion. Extensive efforts have been undertaken to find ways to stop this problem, but solutions are very expensive. There are some problems that have to be overcome for forest management also. These include the best species to grow on these soils, how to build forest roads, what types of site preparation, and limitations for harvest operations.

1. Tree Species to Manage for:

- A. Aspen - Some sites in this area will grow commercially acceptable stands, although most of the stands will start breaking up at a relatively early age (30-40 years) due to site conditions. Sites in the northern area of the lake plain, where there are mantles of silt loam and silty clay loam over the red clay material are much more suitable for good aspen growth. Potential productivity is medium (site index range of 50 to 65).
- B. White Pine - White pine was one of the important species found in this area before settlement. It would be a prime species for regeneration if not for white pine blister rust. One way to reproduce this species is to underplant seedlings in deteriorating stands of aspen and white birch. Potential productivity is medium (site index range of 50 to 60).
- C. White Spruce - There are some nice individual white spruce growing throughout this area. They can be underplanted or planted in areas that have been harvested and site prepped. Productivity potential is medium (site index range of 50 to 60).
- D. Norway Spruce - According to data collected in Wisconsin on similar soils and landforms, Norway spruce is a promising species for this area. Extra moisture is provided by the frequent fogs common around Lake Superior. Site index values varied from 72 to 75 feet for 35 year old stands growing in Wisconsin.
- E. Black Spruce - This species should exhibit good growth on upland mineral soils. Seeding might be a good possibility. Potential productivity is high (site index range of 45 to 60).
- F. Tamarack - This species should exhibit good growth on the upland mineral sites. Good site preparation would be required due to the shade intolerance of the species. Potential productivity is medium (site index range of 45 to 60).
- G. Balsam Fir - This species is probably one of the climax species of this area. Most hardwood stands have a good understory of this species. It is fairly easy to manage, but markets are

questionable and there are some problems with budworm. Potential productivity is medium (site index range of 45 to 60).

- H. Northern White Cedar - This species has a fairly high growth potential for this area. The greatest problem to overcome will probably be deer predation. Potential productivity is medium (site index range of 40 to 55).
 - I. Black Ash - This is a fairly high value species that has good growth potential for this area. Harvest operations can be set up in strip cuts to take advantage of the species' good seeding characteristics. Seeding in site prepped areas should also result in well stocked stands. Potential productivity is medium (site index range of 50 to 60).
2. Roads - Good roads can be built utilizing the existing clayey material. The road must be raised up about 12 to 16 inches above the original grade. This should be done in a series of 4 to 6 inch lifts compacted with a lambsfoot in between each lift. The clay must be dry to moist in order to compact properly. If it is too wet, the drying process may be speeded up by discing it. The road must have a good crown and ditches to move water off quickly. If water is allowed to stand on the road the bearing strength is lost and a mud hole will form. Roads built in this fashion will still be driveable during wet periods even without a gravel surface. The above procedure would also be used if a gravel surface is desired. In Michigan, where there are similar soils and landforms, road building costs are about the same in these clayey areas as they are in coarser textured materials.
 3. Harvest - Harvest timing can be quite tricky on these sites. If heavy equipment is run over these sites when they are moist or saturated, severe damage from compaction can result. This is especially critical if aspen is being harvested and is the desired species for the next rotation. Winter is the most preferred time for harvest operations, with summer (late June, July, August and early September) coming in second. Skid roads should be designed to minimize impact of equipment on the site. If possible, skidders should be limited to skid roads and not allowed to move over the entire site.

How close to the edge of steep slopes should harvest operations come before there is a danger of slumping and erosion problems? Don Benrud (SCS District Conservationist in Carlton County) feels that timber can be harvested up to within 20-50 feet of steep slope edges without any major problems. He also stated that slumping will likely occur on slopes greater than 8 percent. To be safe, a good buffer strip of 50 to 100 feet would be a good idea. Most slumping and erosion occurs when the soil becomes saturated with water or when a more pervious soil layer below the clay becomes saturated. Having very little strength, the material starts slumping. Stream and river banks that are undercut by water also create slumping problems.

4. Site Preparation - Site preparation should be as light as possible to sufficiently control plant competition and remove slash and debris as needed. As with harvest operations, severe site degradation can occur if heavy machinery is used during the time when the soil is moist or

questionable and there are some problems with budworm. Potential productivity is medium (site index range of 45 to 60).

H. Northern White Cedar - This species has a fairly high growth potential for this area. The greatest problem to overcome will probably be deer predation. Potential productivity is medium (site index range of 40 to 55).

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3. Harvest - Harvest timing can be quite tricky on these sites. If heavy equipment is run over these sites when they are moist or saturated, severe damage from compaction can result. This is especially critical if aspen is being harvested and is the desired species for the next rotation. Winter is the most preferred time for harvest operations, with summer (late June, July, August and early September) coming in second. Skid roads should be designed to minimize impact of equipment on the site. If possible, skidders should be limited to skid roads and not allowed to move over the entire site.

How close to the edge of steep slopes should harvest operations come before there is a danger of slumping and erosion problems? Don Benrud (SCS District Conservationist in Carlton County) feels that timber can be harvested up to within 20-50 feet of steep slope edges without any major problems. He also stated that slumping will likely occur on slopes greater than 8 percent. To be safe, a good buffer strip of 50 to 100 feet would be a good idea. Most slumping and erosion occurs when the soil becomes saturated with water or when a more pervious soil layer below the clay becomes saturated. Having very little strength, the material starts slumping. Stream and river banks that are undercut by water also create slumping problems.

4. Site Preparation - Site preparation should be as light as possible to sufficiently control plant competition and remove slash and debris as needed. As with harvest operations, severe site degradation can occur if heavy machinery is used during the time when the soil is moist or

wet. Shearing, discing and chemical site preparation are good techniques. Care must be taken to choose the right chemical for these sites. For instance, Velpar would not be suitable because of the extremely high rates needed for adequate control of plant competition. Economically, its use would not be justified. Depending on the plant composition, chemicals such as Roundup, Rodeo, Tordon, or Princep would be suitable.

McGRATH TILL PLAIN (61)
BRAINERD-PIERZ DRUMLIN AREA (10C)
AUTOMBA DRUMLIN AREA (58)
MILLE LACS MORAINES COMPLEX (14)

These geomorphic areas all have similar characteristics. The parent materials are reddish-brown, sandy loam till whose source was the Superior Ice Lobe. Most of the soils in these areas have a hardpan present at depths of 20 to 40 inches. This makes forest management in these areas quite challenging. Even well drained soils stay quite moist following spring breakup and after periods of heavy rainfall. Extensive site degradation can occur if operations involving heavy machinery are carried out when the sites are moist to wet. Following are some management guidelines for these geomorphic areas.

1. Tree Species to Manage for:

- A. Aspen - Most well-drained areas in these geomorphic regions have the potential to grow commercially acceptable stands. Productivity potential ranges from medium to high (site index of 55 to 70). Many clones in this geomorphic region will start to break up early due to disease problems. Bigtooth aspen clones will grow faster (higher site indexes in general than quaking aspen) and have fewer disease problems.
- B. Northern Red Oak - Most well-drained sites that have surface textures (in the mantle above the hardpan) of fine sandy loam, very fine sandy loam, or silt loam have good potential for the management of red oak. Productivity is medium (site index of 50 to 70).
- C. Basswood - Sites that are well-drained to somewhat poorly drained are suitable for management of basswood. Productivity potential is medium (site index of 55 to 70).
- D. Sugar Maple - This is a species that has not had much management in the past. There are problems with frost crack and form in most existing stands. Much of the damage is a result of past disturbances such as fires, agricultural use (especially livestock grazing) and highgrading. It is possible, with the right kind of management (shelterwood or all age) and good fire control in the stands, that this species would be a viable alternative to consider for forest management. Potential productivity is medium (site index of 50 to 65).
- E. Black Ash - This species will exhibit good growth on lowland mineral soil sites and on uplands also. Productivity potential is low to medium (site index of 45 to 60).
- F. White Spruce - White spruce is a good species to manage for on many of the upland sites in this geomorphic region. Stand stocking levels should be maintained at a fairly high level, due to the rather high risk of windthrow (because of the hardpan). Potential productivity is medium to high (site index of 55 to 70).

- G. Black Spruce - Black spruce has good potential for upland sites. In fact, it grows much faster on well-drained sites than on the poorly drained peat soils it is normally found on. Potential productivity is low to medium (site index of 30 to 45) on lowland sites and high (site index of 50 to 60) on upland sites.
- H. Tamarack - This species has good potential for both upland and lowland sites. Potential productivity is low to medium (site index of 30 to 50) for lowland areas and high (site index of 55 to 70) for upland areas.
- I. Red Pine - The important site factors for this species are soil drainage and depth of the mantle over hardpan. With good soil drainage and sufficient depth of the mantle material over the hardpan (greater than 15 inches), red pine growth will be very good. Potential productivity is medium to high (site index of 60 to 75).
- J. White Pine - With the right kind of site, this species can be grown with a minimum number of problems. The best way to regenerate this species without major losses to white pine blister rust and white pine weevil is to underplant seedlings in poor stands of aspen, birch, or other hardwoods. White pine is more tolerant of soil wetness than red pine. Productivity potential is medium to high (site index of 60 to 80).
2. Roads - Road building and maintenance can be very difficult on upland as well as lowland areas of these geomorphic regions. This is because of the hardpan presence in the soil profile and the resulting perched water table that is present in the spring and following periods of heavy rainfall. The road must have a good crown and ditches to move water off the road surface quickly. In spring and during wet periods, traffic should be controlled to minimize damage to the road bed. Other limitations are concentrations of stones and cobbles, intermittent drainages, and subsurface water flow. Local sources of gravel and class 5 material for maintenance and road building are generally available from esker formations or horizons in the soil.
3. Harvest - The major limitation to logging is the seasonal perched water table. Winter (frozen ground) is the most preferred season for harvest operations, with summer (late June, July, August and early September) also a possibility during most years.
- Logging should be halted for short periods after rainfall amounts of 1 or more inches (during summer operations). When harvesting aspen stands where aspen is going to be regenerated, logging should be limited to winter operations, due to possible damage to aspen root systems during summer logging operations.
4. Site Preparation - Site preparation should be as light as possible to sufficiently control plant competition and remove slash and debris as needed. Major limitations include seasonal perched water table, concentrations of coarse fragments, and intermittent drainages. Shearing (in combination with other methods), discing, patch scarification, and chemical site preparation are some good methods.

As with harvest operations, severe site degradation can occur if machinery is used during periods when the soil mantle is partially or fully saturated. The topsoil should be left in place if possible. Removal of much of the topsoil from a site will decrease the mantle depth above hardpan resulting in decreased rooting volume for the trees. Also, on sites where soil material is moved into windrows, up to 20 percent of the site is lost (in terms of physical area).

NICKERSON MORaine, LOAMY TO CLAYEY (60)
THOMSON-CLOQUET MORaine COMPLEX (59)

These moraines have a tremendous variety of soils. Loamy soils are most prevalent (42 percent), but there are some areas that are predominantly sandy (15 percent), clayey (14 percent), or a mixture of loamy, sandy, or gravelly (13 percent).

1. Tree Species to Manage for:

- A. Red Pine - This species can be managed on most of the well drained sites. Potential productivity is medium to high (site index range of 60 to 75) on loamy sites, and slightly lower (in the medium range) on clayey and sandy sites.
- B. Jack Pine - This species can be regenerated on most sites in these geomorphic regions. Although most commonly found on sandy sites, it will grow well on loamy and clayey sites also. Soil drainage is also no problem--jack pine will maintain adequate growth on poorly drained sites. Potential productivity is medium (site index range of 60 to 70) on sandy sites, and medium to high (site index range of 65 to 80) on loamy and clayey sites.
- C. White Pine - This species will exhibit good growth on all types of sites in these geomorphic regions. The best method to regenerate this species is to underplant seedlings in low stocked or deteriorating stands of aspen, birch, or other hardwoods. In this way, losses to white pine weevil and white pine blister rust can be minimized. Potential productivity is low to medium (site index range of 45 to 60) on sandy sites, and medium to high (site index range of 60 to 80) on loamy and clayey sites.
- D. White Spruce - This is a good species to regenerate on well-drained, loamy and clayey sites. Potential productivity is medium to high (site index range of 55 to 70) on the loamy and clayey sites.
- E. Black Spruce - Black spruce has good growth potential on most of the sites found in these geomorphic regions. In fact, it has a much greater growth potential on upland, well-drained sites than on the lowland organic sites where it is normally found. Potential productivity is low to medium (site index range of 25 to 40) on lowland sites and high (site index range of 50 to 65) on upland sites.
- F. Tamarack - Tamarack will also show good growth on upland and lowland sites, with much better growth occurring on the upland sites. It is very intolerant and requires good control of plant competition. It is also very sensitive to most chemicals currently in use. Potential productivity is low to medium (site index range of 30 to 50) for lowland sites and high (site index range of 55 to 70) for upland sites.

- G. Northern Red Oak - Most well-drained sites that are medium or fine textured are good candidates for oak regeneration. Some early success has been exhibited on sites that are planted to acorns in the fall in north central Minnesota. Good site preparation is required to control competing vegetation, whether the site is seeded or planted. Productivity potential is medium (site index range of 50 to 70).
-
- H. Aspen - This species has good growth potential for most well-drained loamy and clayey sites in these geomorphic regions. Sandy sites will also support aspen, but growth will be slow and stands will start to deteriorate at an early age due to disease problems. Potential productivity is high (site index range of 70 to 90) on loamy and clayey sites.
- I. Black Ash - This species has good growth potential for upland loamy and clayey sites. It naturally grows on poorly drained mineral sites, where growth is quite slow. Potential productivity is low to medium (site index range of 30 to 50) for lowland areas and high (site index of 55 to 70) for upland areas.
2. Roads - Road building and maintenance differs throughout these geomorphic regions depending on the soils present. Roads built in clayey and loamy areas must have a good crown and ditches to move water off the road surface quickly. In spring and during wet periods, traffic should be kept to a minimum to avoid excessive damage to the roadbed. Local sources of gravel and class 5 material for road building and maintenance can be difficult to find. The best source is the XLWL soil unit, although this unit may not have enough fine material.
 3. Harvest - Sandy sites have very few limitations for harvest and provide good opportunities for spring and summer logging areas. Loamy and clayey sites are more susceptible to logging damage during spring breakup and after periods of heavy rains. For these sites, winter is the most preferred season for harvest operations (during periods of frozen soil). Summer logging (late June, July, August and early September) is also possible during most years. Logging should be halted for short periods after rainfall amounts of 1 or more inches (during summer operations). This is especially critical on sites where aspen is being harvested. There has been a number of examples recently throughout the northern part of the state where aspen stands that were logged in summer had no aspen reproduction following harvest.
 4. Site Preparation - On all sites (particularly the sandy sites), topsoil removal into windrows is not recommended. This can cause a loss of productivity and also accelerate soil erosion. Also, on loamy and clayey sites, soil compaction can be severe if the site preparation is done during times when the soil is partially or fully saturated. Shearing (in combination with other methods), discing, patch scarification, and chemical site preparation are good site preparation methods.

HINCKLEY OUTWASH PLAIN, SANDY (62)
WILLOW RIVER OUTWASH PLAIN, SANDY (57)

1. Tree Species to Manage for:
 - A. Jack Pine - Potential productivity of this species is medium (site index of 60 to 70). Areas that have high water tables (within 3 to 6 feet of the surface) will have a higher potential productivity.
 - B. Red Pine - Potential productivity of this species is medium to high (site index of 55 to 65). Do not regenerate on sites that have poor drainage or high water table levels (within 18 inches of the surface).
 - C. White Spruce - This is a slow growing species in most areas of these geomorphic regions. Best sites are those that have a high water table (within 3 feet of the surface). On very poorly drained sites, insects can be a problem, due to stress. Potential productivity is low (site index of 45 to 55).
 - D. Aspen - Most of the sites in this geomorphic area are not very suitable to grow aspen. Productivity is low (site index of 50 to 60) and trees tend to break up at a young age (25 to 40 years) due to disease problems.
 - E. Tamarack - This species will exhibit good growth on upland sandy sites and on sites that are low and have poor drainage. Some plantations in other parts of the state on sandy soils have exhibited better height growth than red pine growing adjacent to it, although volume growth is better for red pine. Productivity is medium (site index of 40 to 60) on upland well-drained sandy sites.
2. Roads - The most limiting factor for road building is finding suitable borrow material (class 5 material with enough fines for good packing). Some of the old terraces adjacent to the St. Croix River have seams of good gravel material, but many areas of this geomorphic region are lacking in decent borrow material.
3. Harvest - On the sandy upland soils in this geomorphic region, timing of harvest is not critical. These are sites that provide good opportunities for summer wood. Spring breakup is about the only time where there might be problems as far as access and movement on the site. In the lowland areas, harvest opportunities are limited to winter operations.
4. Site Preparation - On sandy upland sites the critical factor is management of the topsoil in place. Most of the soil fertility in these soils is in the upper three inches. If this is removed site productivity is seriously impaired. Shearing, discing, patch scarification and chemical site preparation are good techniques.

APPENDIX I

Statewide Standards and Criteria for Wild,
Scenic, and Recreational Rivers
and
Management Plan for the Kettle River

The Statewide Standards and Criteria for Wild, Scenic, and Recreational Rivers were promulgated as state rules by the Commissioner of Natural Resources (Chapt. 6105.0010 through 6105.0250 in Minnesota Rules 1983). The standards and criteria establish the procedure for designating rivers, allow the creation of land use districts, and establish zoning and land use guidelines to be applied within the land use districts.

The Management Plan for the Kettle River (Chapt. 6105.0500 through 6105.0760 in Minnesota Rules 1983) was prepared according to the procedures outlined in the statewide standards and criteria. It includes the legal description of the Kettle River Land Use District and identifies recreational facilities to be developed. Those forest resource compartments that fall wholly or partially within the Kettle River Land Use District are noted in Appendix D. The statewide standards and/or standards in the Kettle River Management Plan will apply in those compartments.

Copies of the Statewide Standards and Criteria and the Management Plan for the Kettle River are on file at the Moose Lake Area Office, Route 2, 701 So. Kenwood, Moose Lake, MN 55767.

APPENDIX J

Protected Waters Map and Inventory

The DNR has completed an inventory of protected waters and wetlands in the Moose Lake Area. One purpose of the inventory was to determine where permits are required for activities that change the course, current, or cross section of a protected water basin or watercourse. All protected waters and wetlands are listed in the appropriate forest resource management compartments in Appendix D. The Division of Forestry will follow Division of Waters guidelines and will obtain required permits for activities affecting protected waters.

Copies of the maps and associated lists of protected waters in the Moose Lake Area are on file at the area and district forestry offices.

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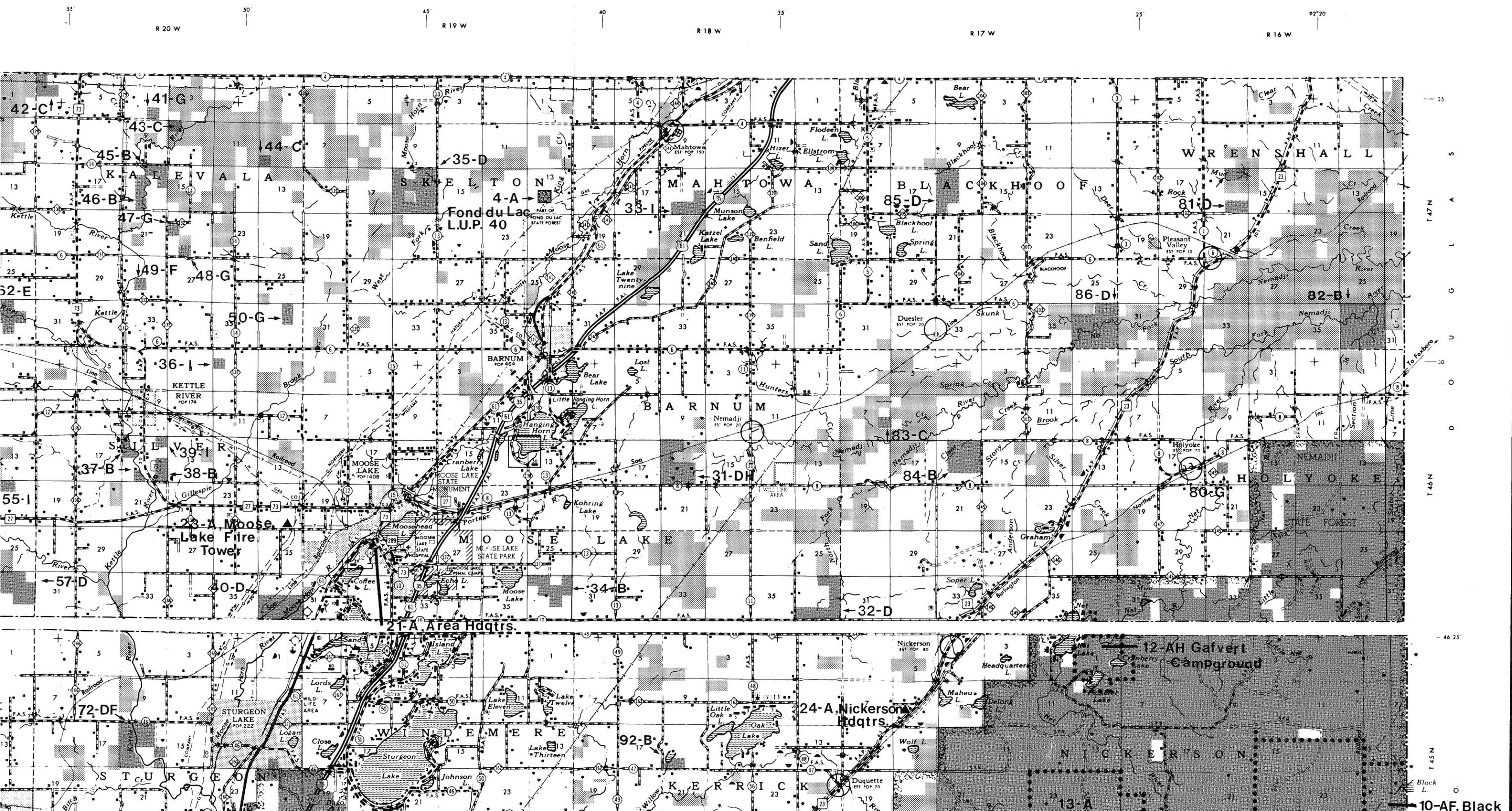
83
Research

110
W. B. B.

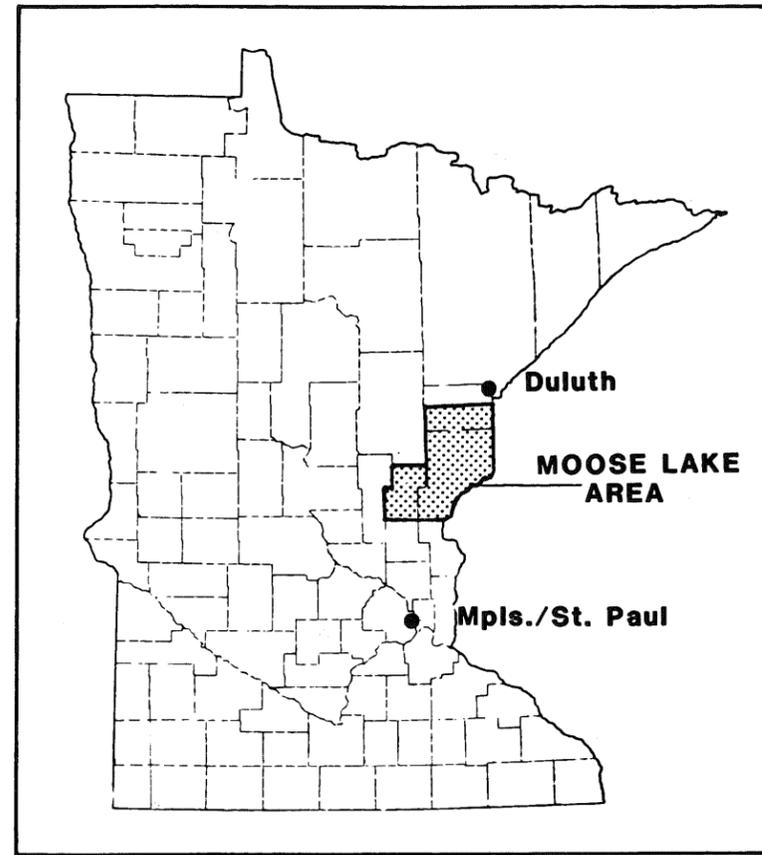
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32

IP/LAND ADMINISTRATION PLAN



Outline map of Minnesota showing location of this Area within the State



Sources

Ownership- DNR Land Ownership/Classification Report, 1983.

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Base Map- General Highway Maps of Carlton, Kanabec and Pine Counties,
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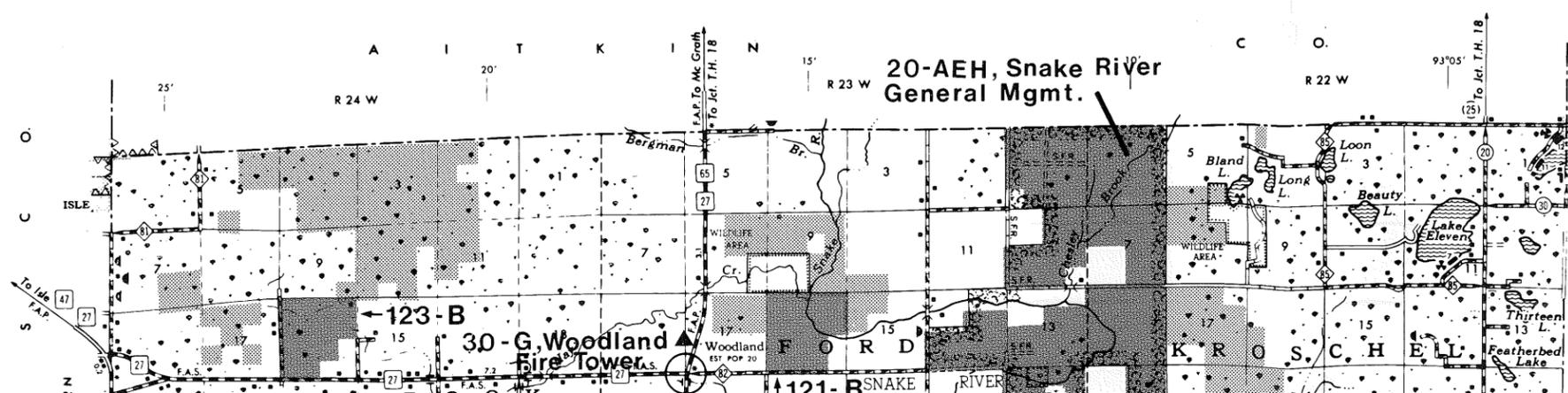
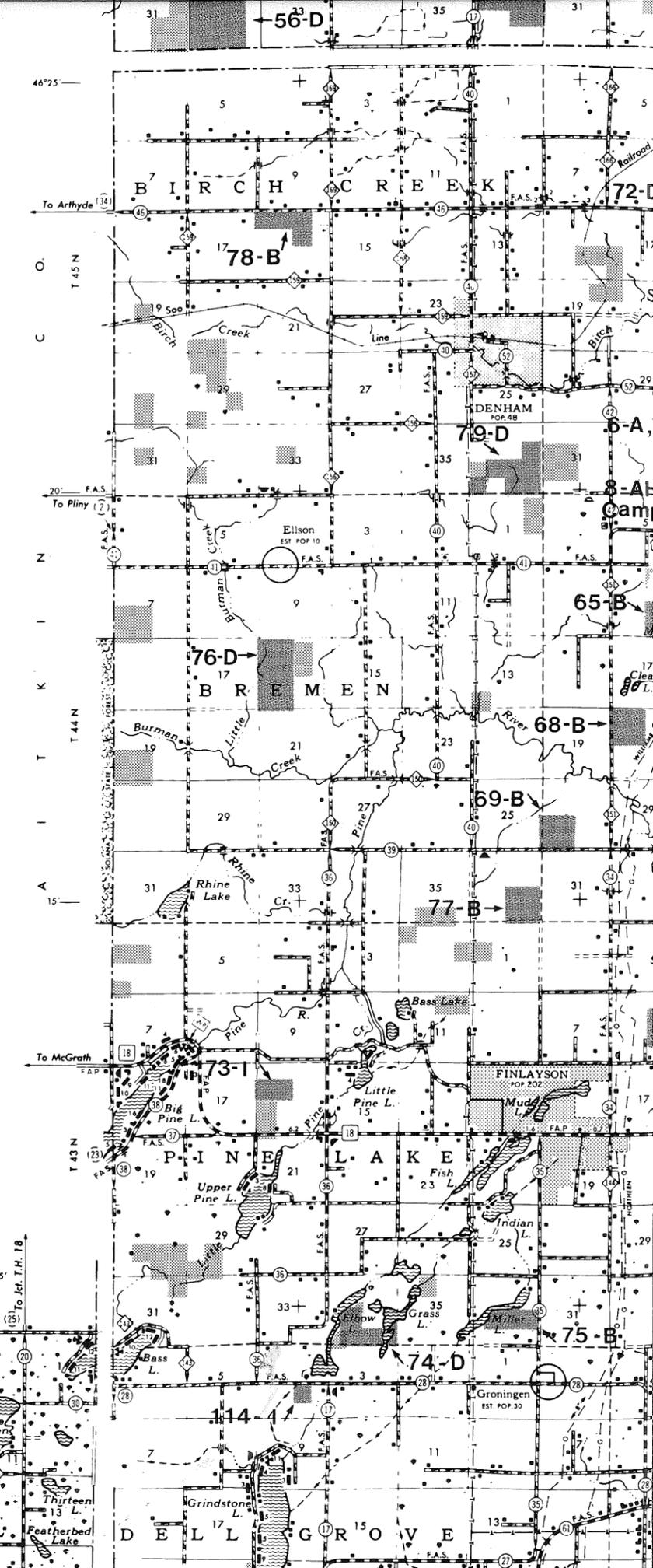
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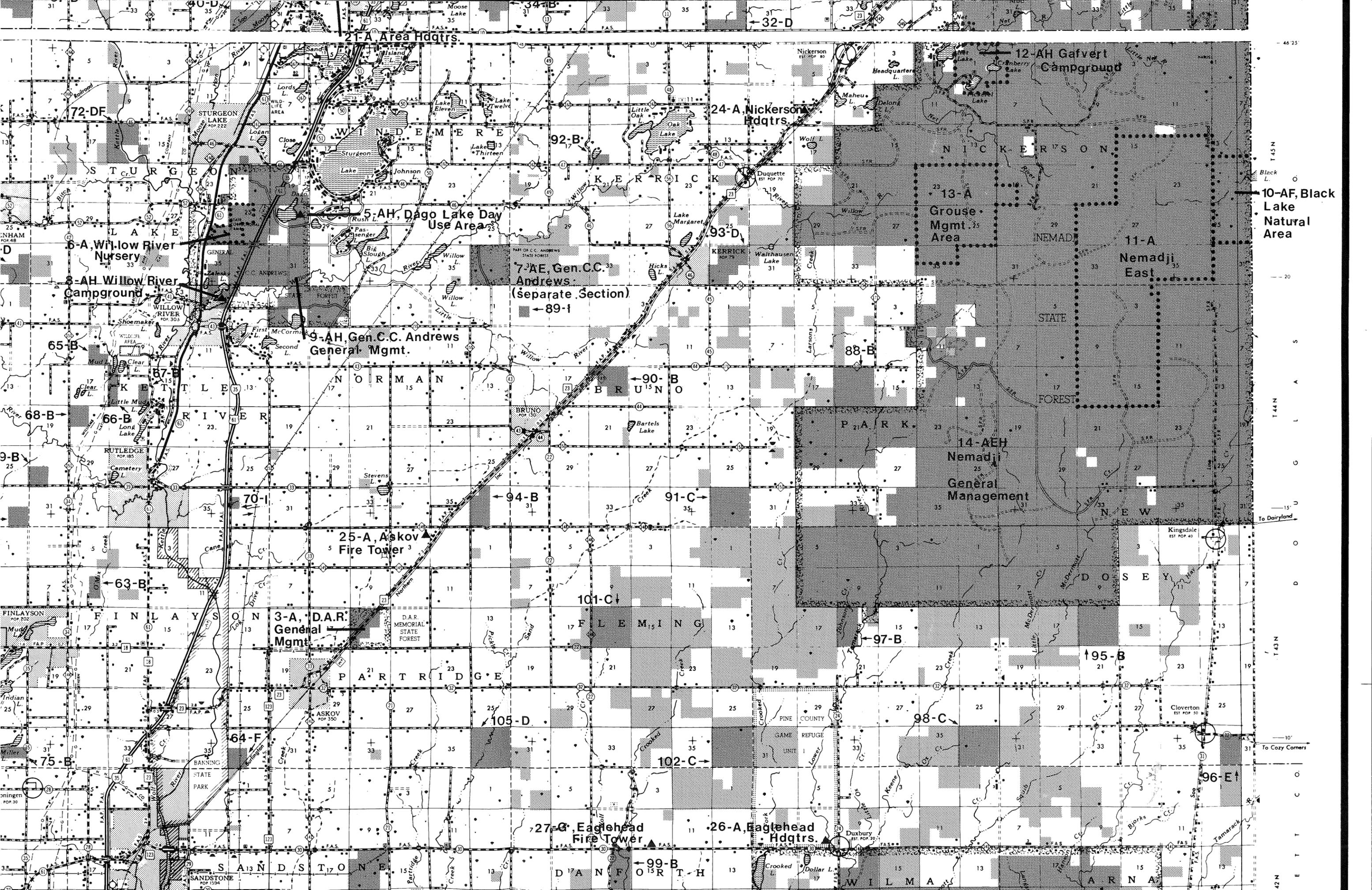
Moose Lake Area Forester

Rt. 2, 701 Kenwood

Moose Lake , Mn. 55767

(218) 485-4474





21-A Area Hdqtrs.

24-A Nickerson Hdqtrs.

12-AH Gavvert Campground

72-DF

92-B

13-A Grouse Mgmt Area

10-AF, Black Lake Natural Area

5-A Willow River Nursery

5-AH, Dago Lake Day Use Area

7-AE, Gen C.C. Andrews (Separate Section) ←89-1

8-AH Willow River Campground

9-AH, Gen C.C. Andrews General Mgmt.

65-B

←90-B

88-B

66-B

25-A, Askov Fire Tower

←94-B

91-C

14-AEH Nemadji General Management

67-B

101-C

←97-B

↑95-B

68-B

3-A, D.A.R. General Mgmt.

105-D

102-C

98-C

69-B

←63-B

75-B

27-G, Eaglehead Fire Tower

26-A, Eaglehead Hdqtrs.

96-E

←99-B

46 25

20

15

10

42

T 43 N
T 44 N
T 45 N
T 46 N

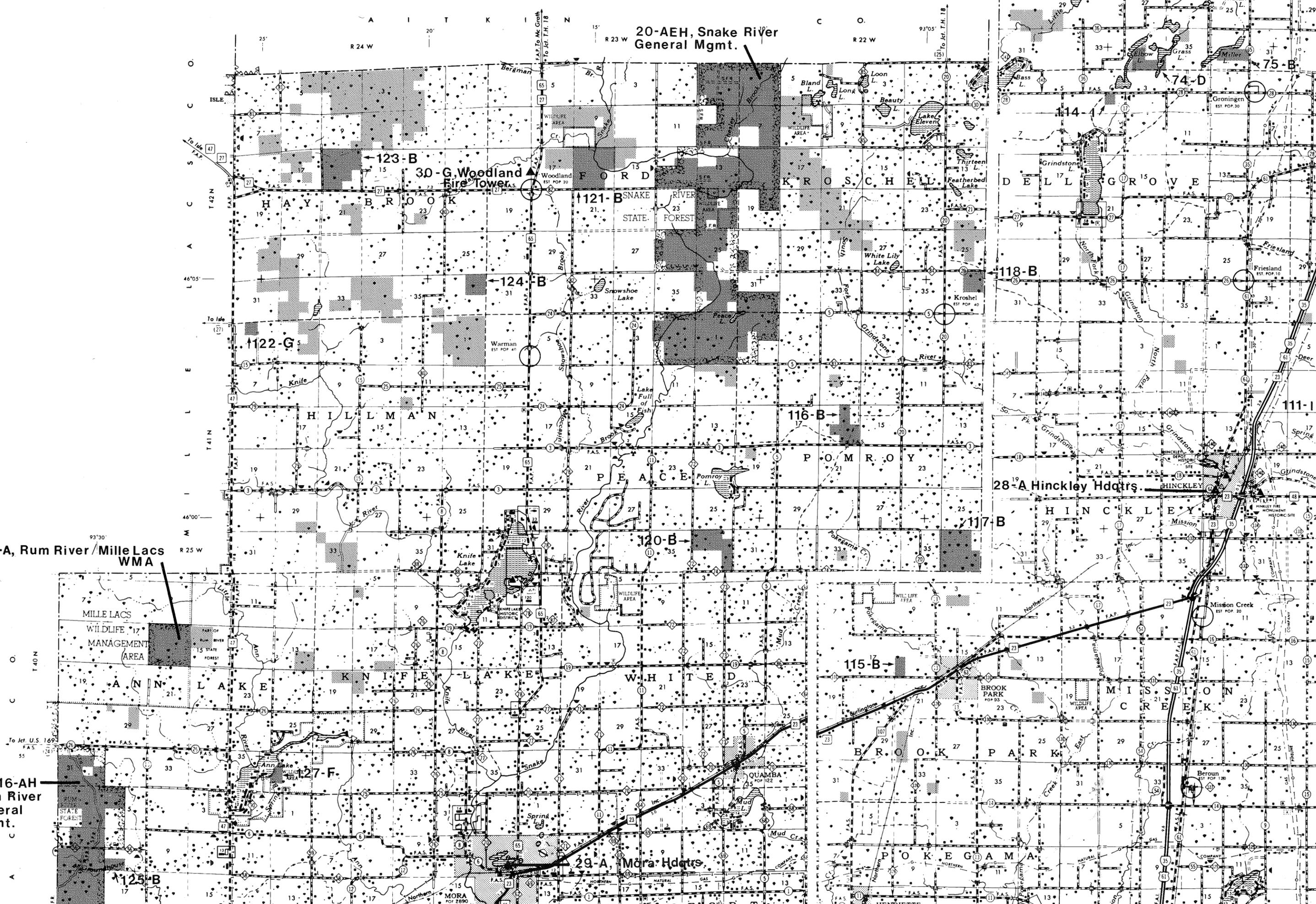
To Dairyland

To Cozy Corners

20-AEH, Snake River
General Mgmt.

15-A, Rum River/Mille Lacs
WMA

16-AH
Rum River
General Mgmt.



123-B
30-G Woodland
Fire Tower

124-B
Snowshoe Lake

122-G
Warman

120-B
Lake Full

127-F
Ann Lake

29-A, Mora Hdqrs

118-B
Grindstone

115-B
Brook Park

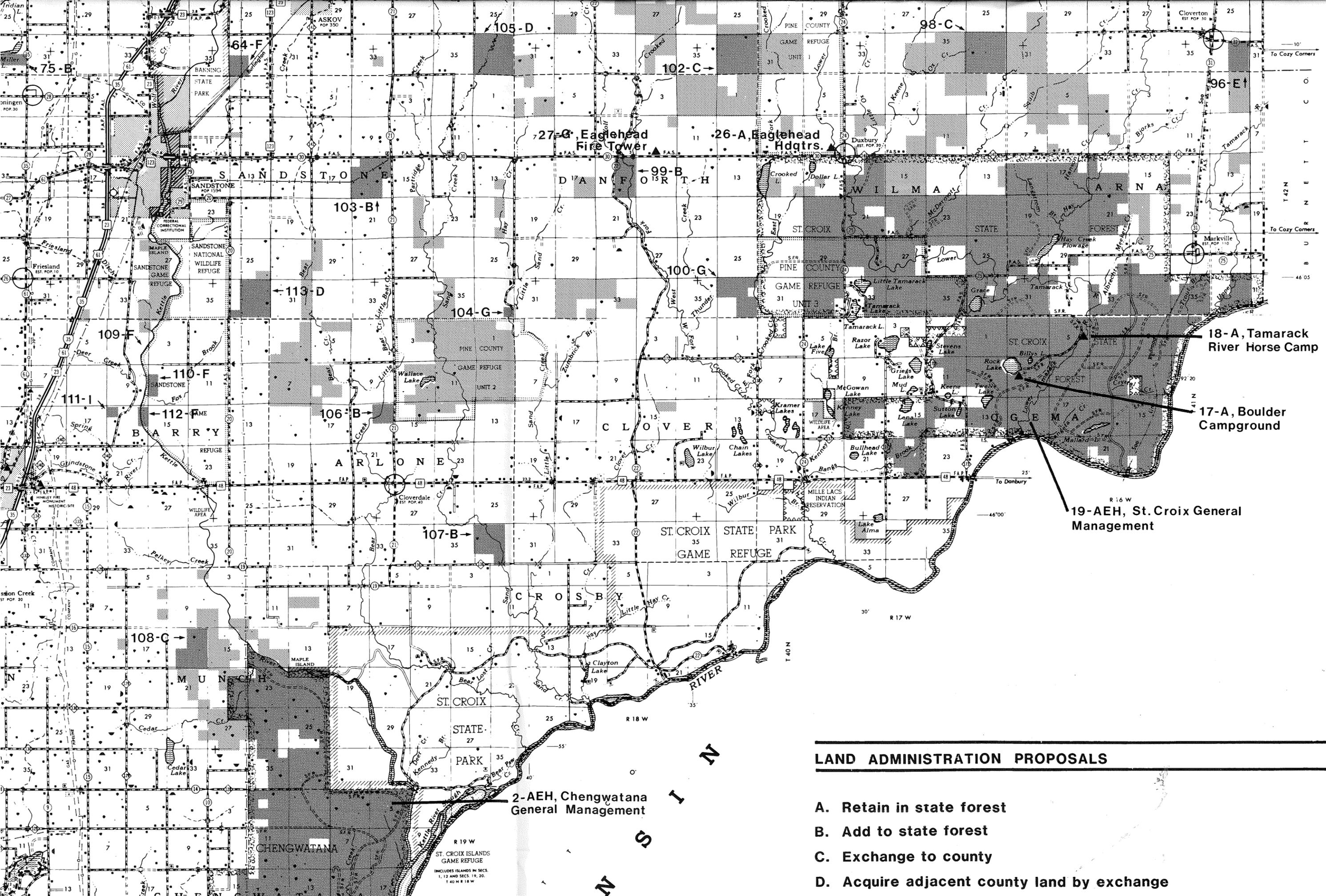
28-A Hinckley Hdqrs

74-D
Grass L.

75-B
Indian L.

111-I
Deer

117-B
Mission Creek



LAND ADMINISTRATION PROPOSALS

- A. Retain in state forest
- B. Add to state forest
- C. Exchange to county
- D. Acquire adjacent county land by exchange

2-AEH, Chengwatana General Management

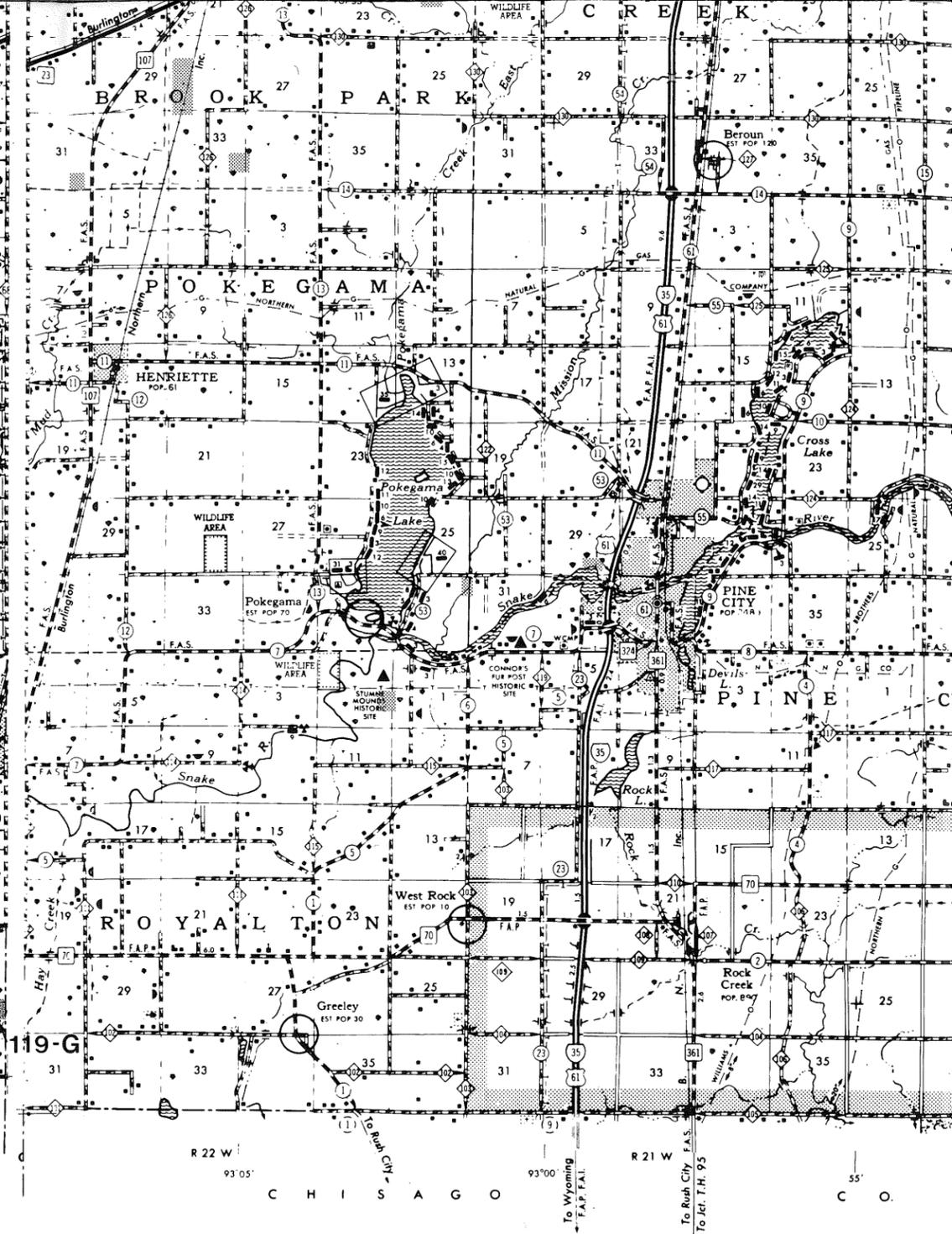
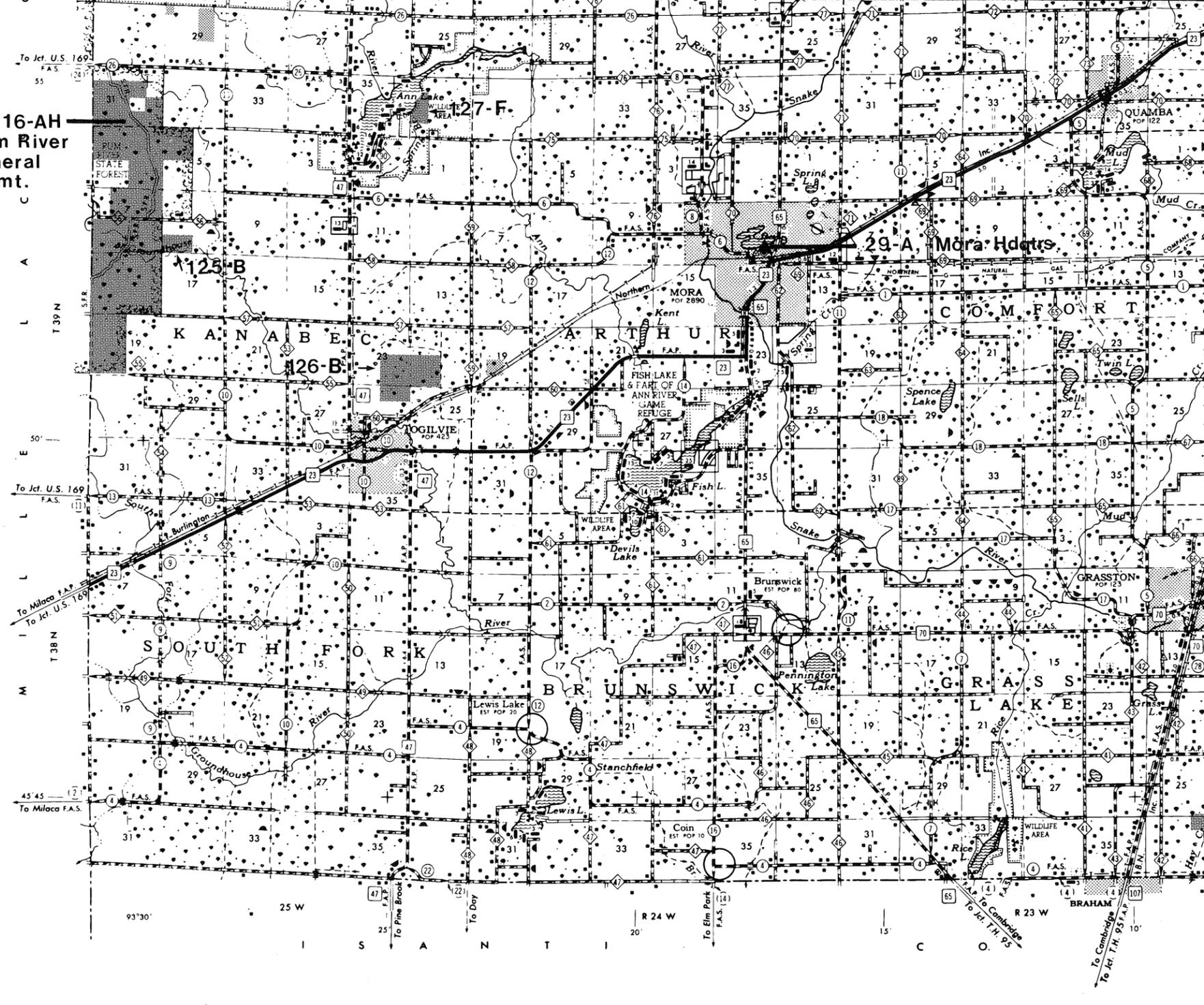
19-AEH, St. Croix General Management

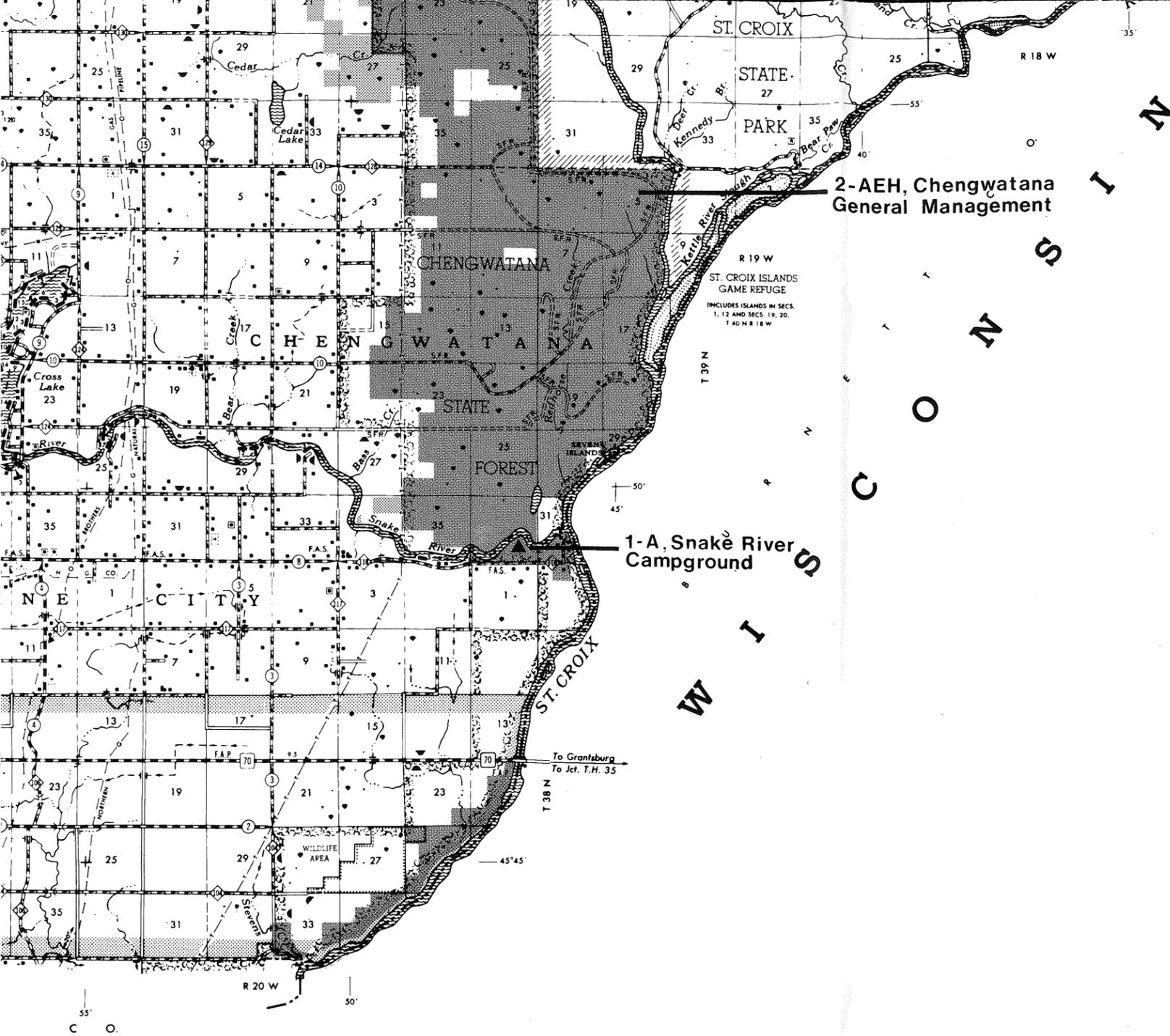
17-A, Boulder Campground

18-A, Tamarack River Horse Camp

CHENGWATANA
ST. CROIX ISLANDS
GAME REFUGE
INCLUDES ISLANDS IN SECS.
1, 12 AND SECS. 19, 20.
T. 40 N. R. 18 W.

16-AH
Rum River
General
Mgmt.





LAND ADMINISTRATION PROPOSALS

- A. Retain in state forest
- B. Add to state forest
- C. Exchange to county
- D. Acquire adjacent county land by exchange
- E. Exchange to county or acquire adjacent county land by exchange
- F. Transfer administrative control
- G. Surplus land - exchange or sell
- H. Acquire adjacent land
- I. Undedicated- Custodial Management

