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Restoring Ecosystems within Minnesota State Parks

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Resources that once drew Native Americans, trappers, fur traders, loggers, and farmers to the area known as Minnesota were plentiful. These resources have greatly diminished and are left remaining in pockets throughout the state. Many of these remaining resources are now incorporated into the Minnesota State Park system. This paper will discuss not only the restoration programming occurring in Minnesota State Parks, but also Minnesota State Parks in general and some of the objectives and policies that are pertinent to restoration.

Minnesota Statute 86A.01 to 86A.11, known as the Outdoor Recreation Act of 1975, established an outdoor recreation 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 (MN DNR, 1981)." The goal of the Minnesota Department of Natural Resources (MN DNR), Division of Parks and Recreation was established to "protect and perpetuate extensive areas of the state possessing resources which illustrate and exemplify Minnesota's natural phenomena, and provide for the use, enjoyment, and understanding of such resources without impairment for the enjoyment and recreation of future generations (MN DNR, 1981)."

To meet this goal Minnesota State Parks need to meet or have the potential to meet the following criteria (MN DNR, 1981):

- Depict major components characteristic of the landscape region, or contain a natural component(s) of statewide significance representing a feature of the presettlement Minnesota landscape.
- Contain natural resources sufficiently diverse and interesting to attract people from throughout the state.
- Be sufficiently large to provide for the maintenance of ecosystems and the protection of other natural features that give an area its special qualities.
- Be sufficiently large and durable so as to provide opportunities for enjoyment of their special natural qualities by significant numbers of people now and in the future.
- Contain a natural component that may be atypical of its original landscape region, yet of statewide significance in portraying a feature of presettlement Minnesota.

The general policy for resource management in Minnesota State Parks is "The department will rely on the following administrative objectives to ensure maintenance of a park's natural

resource character in order to enhance a park's ecological, aesthetic, interpretive, and educational values" (MN DNR, 1981). Some of these objectives stated include:

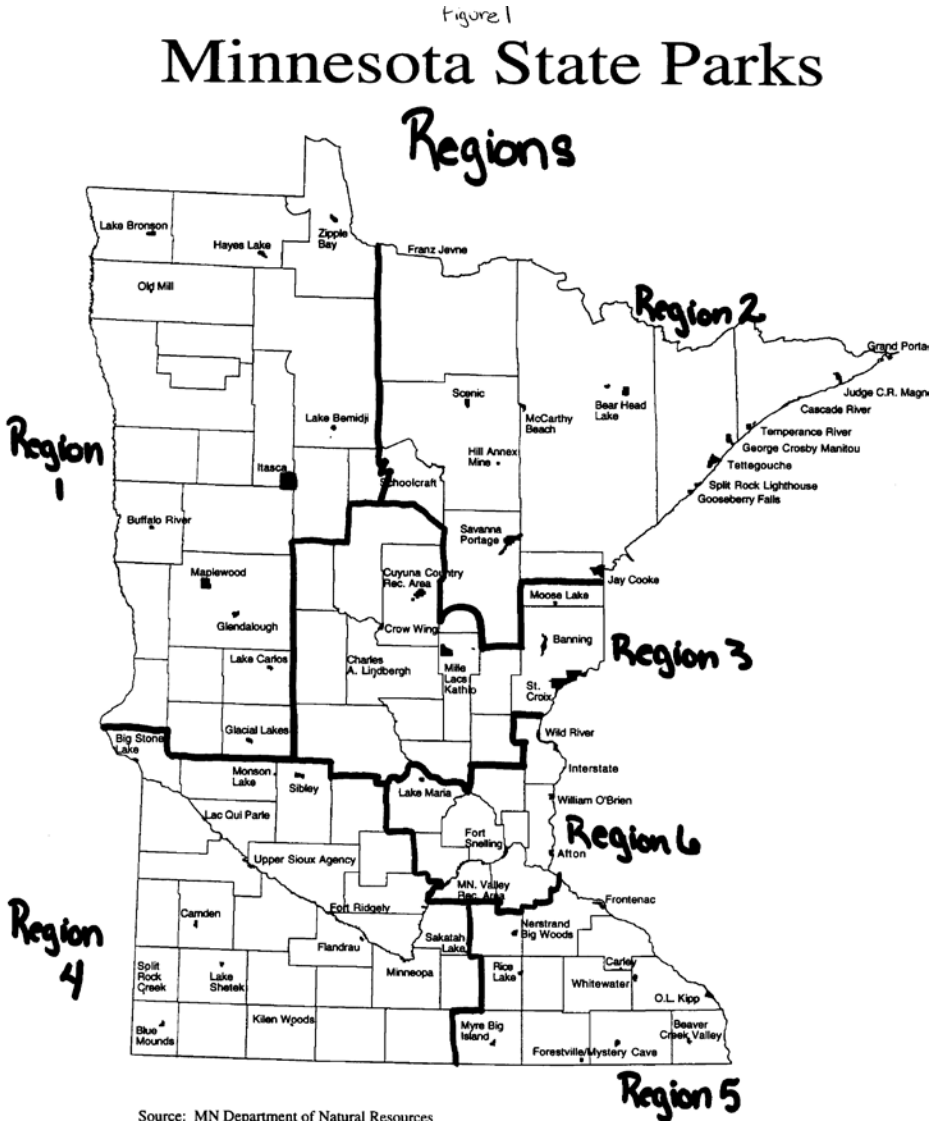
- To direct resource management programs consisting of, but no limited to, wildlife, vegetation, and fisheries, toward establishing and maintaining species or communities that were present during presettlement programs consisting of, but no limited to, wildlife, vegetation, and fisheries, toward establishing and maintaining species or communities that were present during presettlement times or successional stages of the biotic communities thereof.
- To employ resource management techniques that will enhance a park's natural systems.
- To direct vegetation management toward utilizing natural methods in the maintenance and establishment of vegetative communities.
- All natural resource management will strive to replicate natural appearance and community structure in details such as form, line, and texture.

The Minnesota State Park Resource Management Program was started in 1978 in order for the Division of Parks and Recreation to better ensure the resources of Minnesota are properly managed (MN DNR, no date). The Resource Management Program has three primary objectives that help set boundaries and ideas for restoration projects that occur within the state parks. These objectives are:

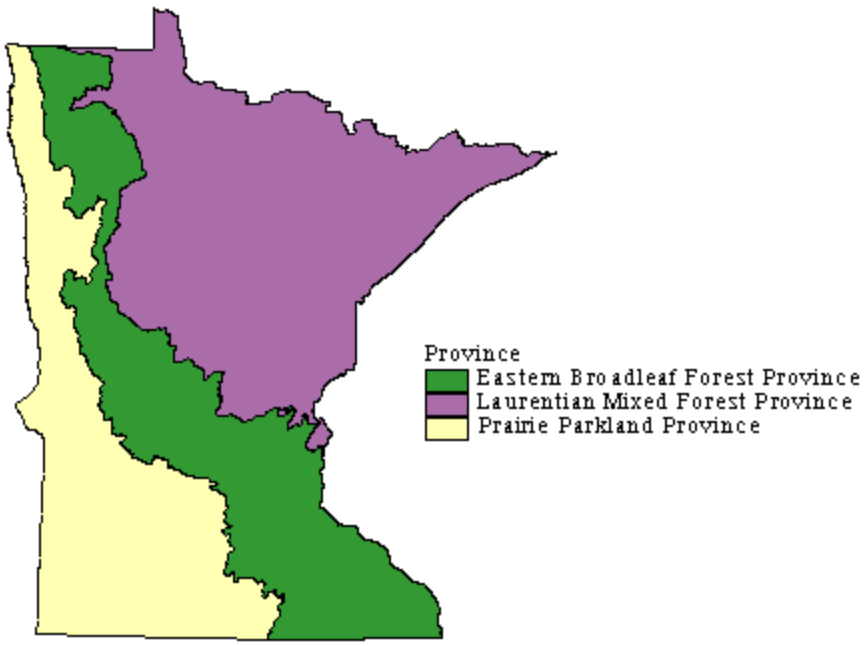
- Keeping what we have by preserving natural communities, archaeological and historic sites, rare and endangered plants and animals.
- Restoring what we've lost by recreating examples of original Minnesota landscape prior to settlement.
- Striking the balance between use and protection by minimizing the impact of public use and facility development on natural and cultural resources. It also required enhancing the natural and historical setting in which outdoor recreation and interpretation occurs.

Restoration planning within a state park involves numerous people. The Minnesota Department of Natural Resources has divided the state into 6 regions and each of these regions is further divided into two or three areas (Figure 1). The Division of Parks and Recreations has a resource specialist for each area and region. The area and regional resource specialists coordinate with park managers/staff to plan restoration projects for the park. In a few parks, such as Itasca, St. Croix, and Fort Snelling State Parks, there is a resource specialist for those individual parks. These specialists are responsible for maintaining the restoration projects for the park. To coordinate all the specialists and projects, there is a statewide resource specialist. Currently, this position of statewide resource specialist is unstaffed.

Figure 1



Restoration in Minnesota State Parks requires knowledge about several vegetation types. Within Minnesota one can find three major biomes: Prairie Parkland, Laurentian Mixed Forest and Eastern Broadleaf Forest (Figure 2). Each of these biomes is broken down further by vegetation type. Vegetation types of the Prairie and Broadleaf Forest are: Upland Prairie and Prairie Wetland, Aspen Parkland, Oak Woodland and Brushland, Floodplain Forest, and Maple-Basswood Forest. Vegetation types of the Larentian mixed Forest include: Northern Hardwood Forest, Great Lakes Pines Forest, Jack Pine Forest, Boreal Hardwood-Conifer Forest, and Peatland (MN DNR, 1988). State parks can be found within all the biomes and vegetation types. This leads to several different kinds of restoration projects being done all over the state.



Selection for restoration projects is a long process. Park managers rank projects within their parks according to their priority level. The priority level is based upon the management plan of the park, any pressing projects that need to be completed and what looks feasible in terms of success and economics. Once project priority lists have been made by the park managers, the regional resource specialist goes through all the parks' priority lists within his/her region with similar guidelines. They prioritize the projects according to significance and feasibility (Mike Rice, personal communication, April 24, 1998). The resource specialist then ranks the projects for the region. These lists then go to the Central Office and the statewide resource specialist goes through them and ranks them. In the absence of a statewide resource specialist, the operations director makes the prioritizing decision. The final ranking is dependent upon several factors. Depending on what Minnesota State Parks would like to focus on the factors may change year to year. An important factor is whether the project is a continuation of an already existing restoration. This is done so projects are completed before other projects are started. Another factor is whether the park has leveraging money, which is collected from other means, such as grants and donations. Priority is also given to parks that are dealing with issues deemed important by the MN DNR and the public. One such issue deemed important by the MN DNR is the prairie restoration occurring in Blue Mounds. The staff workload is also considered when prioritizing.

The prioritizing needs to be done because there is not enough funding for all the projects. The funding for the restoration projects mostly comes from the merchandise sold at the parks and through the Minnesota State Parks Nature Store catalog (Ron Hains, personal communication, April 27, 1998). It does not include vehicle nor camping permit sales. For the last two to three years the amount used coming from merchandise sales has been $300,000-$400,000 a year for all parks combined. Funding can also come from the legislature. This can come in the form of bonding money or from the general fund. Bonding money is given for implementation. It is

given to long lasting projects, generally spanning at least 20 years. Only a small amount of money comes from the general fund. The general fund is for use by all aspects of the Division of Parks and Recreation and the money is generally funneled to other areas of importance.

Projects are occurring in 37 of the state parks across Minnesota. The majority of restorations are tallgrass and mixed grass prairie, oak savanna, and pine forest (Table 1). A range of activities is undertaken to manage the restoration projects and Minnesota's natural communities. Some of these include: plant and animal inventories, noxious weed control, turf management, insect and disease control, prescribed burns, hazardous tree detection, resource inventories, erosion control, pesticide use, technical information dissemination, and develop unit and system wide plans (MN DNR, no date). One of the most prevalent activities is prescribed burning. Burns are one way to enhance the flowering and seed production of prairie plants, while also limiting the encroachment of exotics and revitalizing the native species. It also is used as a fire hazard fuel reduction method in forest restoration. This is especially important in high fuel areas such as St. Croix State Park and Crow Wing State Park (Denise Boudreau, personal communication, April 27, 1998).

Park staff not only burn prairies, but also plant and seed them to encourage revegetation. Planting and seeding is done at the initial stages of restorations. Generally seeds are purchased from a vendor, although several parks now have established prairies from which they collect seed. One example of this is Lake Carlos State Park. Prairie seeds, especially wildflower species, are collected from and used for other restoration within that region (Chris Weir-Koetter, personal communication, April 23, 1998). For example, an interesting project in Buffalo River State Park is the restoration of a 40-acre gravel pit to a native prairie and wetland area. Seeds for the project originate at Lake Carlos State Park. Buffalo River State Park also uses this seed to revegetate other disturbed areas that are being converted from agriculture to native tallgrass prairie (Chris Weir-Koetter, personal communication, April 23, 1998). The seeds may be more successful because they are planted in a similar geographical ecotype and habitat. "Matching plants to local habitat means that preservation of local stands of even common species offers a level of biodiversity that is a valuable resource for current and future restoration needs (Handel, Robinson , & Beattie, 1994 p. 232)."

Selective logging has occurred in some parks to open up the understory and allow for more growth to occur for forest restoration. Selective logging has also been done to remove exotic species from some parks and to convert plantations to a more natural mix of species (Chris Weir-Koetter, personal communication, April 23, 1998). Hays Lake State Park is an example of a conversion from a plantation into a more natural mix. The area within Hays Lake had been heavily homesteaded and Scotch pine (*Pinus sylvestris),* an exotic, was planted. Through the use of selective logging, the MN DNR staff are removing the Scotch pine and planting a native mixture of jack pine (*Pinus banksiana)* and red pine (*Pinus resinosa).* Selective logging of Scotch pine is also occurring at Old Mill State Park, where it was planted by homesteaders. Interestingly, because of the historical aspect of the homestead, five of the second generation trees will be left. The removal and control of exotics, especially buckthorn (*Rhamnus cathartica),* is occurring throughout the state in numerous parks (Table 1).

For white pine (*Pinus strobus)* restoration deer enclosures are used. Deer herd size has increased due to the less severe winters and food being readily available throughout the year. These enclosures are fences built around young pine that restrict the deer's ability to eat them before they reach maturity. Deer hunts are done in St. Croix State Park and Itasca State Park to thin the herd and reduce the damage done to vegetation. Other parks (such as Wild River State Park) have held deer hunts, but not on an annual basis (Denise Boudreau, personal communication, April 27, 1998).

Minnesota State Parks monitor their restoration projects, but there is no standard way of measuring the effectiveness (Mike Rice, personal communication, April 24, 1998). The monitoring is done by the resource specialist and the park staff and can include photoplot and vegetation plot monitoring (Mike Rice, personal communication, April 24, 1998). Continual monitoring can show whether the project is developing the way that it was planned, but there is no standard that declares the site a success. This continual monitoring also identifies sites that are not successful. An example of this is at Old Mill State Park. An old barnyard site is being converted from quackgrass (*Agropyron repen)s* to prairie, but thus far has not been very successful. Although there are some native species recolonizing, the restoration is not going as expected because the quackgrass has been difficult to get rid of even with burns and chemical treatment. The park will continue with burns and chemical treatments, but they do not expect total reclamation because the quackgrass is too resilient (Chris Weir-Koetter, personal communication, April, 23, 1998).

According to Denise Boudreau, personal communication, April 27, 1998, Region 3 is trying another method for measuring the effectiveness. She is working with County Biological Survey to set up a Ecological Classification System that will help indicate if the restoration is working. This system classifies the state at the Province/Biome, Section, Subsection, Landtype Association, Ecological Landtype Association, and the Ecological Landtype Phase levels. The three provinces/biomes found in Figure 2 reflect differences in climate, latitude, continental landmass, soil formation, and vegetative life forms of Minnesota (Boudreau, no date). These three provinces/biomes are then divided into sections which are based on geomorphic process and geologic age/origin, precipitation and temperature regimes, relief, order, suborder, or great groups of soils, and formation or series of plants (Boudreau, no date). "There is, however, a demonstrated need for the Ecological Landtype Phase delineation at the land management level. The current inventory information is dated in many of the State Parks. This information does not provide us with the current status of the natural resources in these areas. The Ecological Landtype Phase will fill in those gaps. (Boudreau, pg. 1, no date). The Ecological Landtype Phase level has been undertaken in two state parks; Banning and Savanna Portage (Denise Boudreau, personal communication, April 27, 1998). The Ecological Landtype Phase allows assessments to be done on several characteristics, including landforms, vegetation structure, drainage, and soil types. This gives managers an indication of what could be successfully planted. This system will help to monitor the area before, during, and after the restoration is complete (Denise Boudreau, personal communication, April 27, 1998). This method will eventually go statewide, giving a foundation for all resource managers to build upon.

Minnesota State Parks resource management program is an interesting one because it encompasses a mosaic of vegetation and communities. Although many restoration projects are

occurring, there are ways to improve them. First, additional funds are needed to allow for more in-depth restorations to occu, such as planting more sensitive, thus more expensive, species. Extra money could also be used to create more prairie nurseries on state park land. The seeds collected could be used for other regional parks, thus reducing the cost of other restoration projects. Another improvement would be increased public input and education of the restoration projects. The public does not always understand the need for cutting down trees or the burning of prairies. Increased education about the needs of the different ecotypes would help to increase the support of these practices.

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Table 1. Restoration Projects in Minnesota State Parks by Region*

REGION 1

Park	Type of Restoration
Buffalo River	Tall grass prairie restoration Old gravel pit restoration to a prairie and wetland
Glacial Lakes	Prairie restoration Exotic species control
Glendalough	Savanna restoration Prairie restoration
Hays Lake	Forest restoration: conversion of a plantation to a natural mix

	Pinus banksiana and *Pinus resinosa* planting *Pinus sylvestris* control
Itasca	Pine reforestation
Lake Bemidji	Shore stabilization
Lake Bronson	Prairie restoration
Lake Carlos	Shore stabilization Maintenance of prairie Exotic species control
Maplewood	Exotic species control Prairie restoration
Old Mill	Prairie restoration *Pinus sylvestris* control
Zippel Bay	Forest regeneration

REGION 2

Park	Type of Restoration
Cascade Temperance	Ground vegetation restoration on paths
Goosebury Falls	Exotic species control
Jay Cooke	*Pinus strobus* restoration
McCarthy Beach	Shrub planting
Soudan Mine	Open pit tree removal
Split Rock Lighthouse	*Pinus strobus* restoration

REGION 3

Park	Type of Restoration
Charles Lindbergh	*Pinus banksiana* restoration Exotic species control
Crow Wing	Prairie restoration
Interstate	Exotic species control
Mille Lacs Kathio	Prairie restoration
Savanna Portage	*Pinus strobus* restoration
St. Croix	*Pinus banksiana* restoration and management
Wild River	Prairie restoration Oak savanna restoration *Pinus strobus* restoration Exotic species control

REGION 4

Park	Type of Restoration
Blue Mounds	Prairie restoration and management
Fort Ridgely	Oak savanna restoration Exotic species control
Sibley	Prairie management
Split Rock Creek	*Rhamnus cathartica* control
Upper Sioux Agency	Exotic and problem species control

REGION 5

Park	Type of Restoration
Forestville	Cave restoration
Great River Bluff	Bluff prairie restoration Henslow's sparrow habitat restoration
Myre Big Island	Esker reclamation Exotic species control
Rice Lake	Wetland restoration
Sakatah Lake	Prairie/savanna restoration Exotic species control

REGION 6

Park	Type of Restoration
Afton	Habitat restoration *Digitalis lanata* control
Fort Snelling	Visitor Center landscaping with native species
William O'Brien	Exotic species control