

DEPARTMENT OF NATURAL RESOURCES:

Blufflands/Rochester Plateau
Subsection Forest Resource Management Planning

ADDENDUM

High Biodiversity Area Management Plan

Partridge Creek

Final

October 2005



Division of Forestry Planning Document
Printed October 2005

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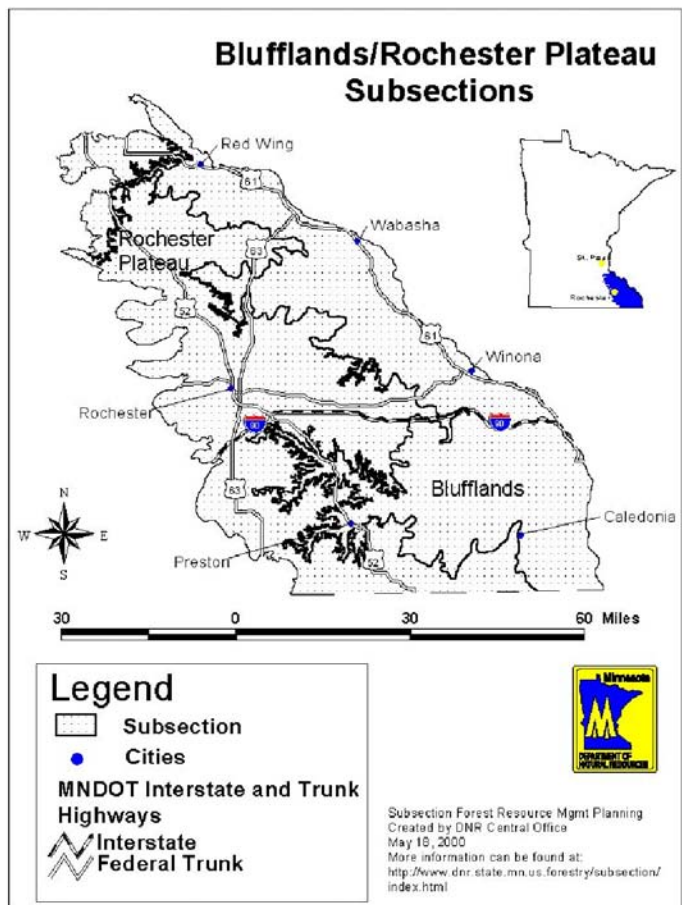
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Introduction

The purpose of this plan is to provide a framework for forest management within the Partridge Creek Area. This is an area within the Partridge Creek watershed of Olmsted County and was identified as a high biodiversity site. This plan will be an addendum to the Blufflands Subsection Forest Resource Management Plan, which was completed by a Department of Natural Resources (DNR) interdisciplinary team in 2002. This plan, as well as the broader subsection plan, is to be reviewed and revised after seven years. The plan is for State-owned property only, however, some management recommendations in the plan may be appropriate for adjacent private lands as well.

The Partridge Creek Area is located approximately eight miles southeast of Rochester, MN. It lies within the Blufflands ecological landscape area. It is made up of a block of state land within the Richard J. Dorer State Forest as well as privately owned property. Partridge Creek runs through the middle of the area.



Following the completion of Minnesota County Biological Survey (MCBS) fieldwork in 1996, the Partridge Creek Area was noted as being one of 13 sites on State owned properties in southeast Minnesota with significantly high biodiversity. In his evaluation of the Partridge Creek Area, Fred Harris, a biologist with the MCBS, states that "As a whole, the site is one of the largest areas of unfragmented, continuous-canopied forest to be seen in Olmsted County". The MCBS proceeded to delineate two sets of boundaries for these sites. The broader boundary encompasses 846 acres and is referred to as the Project Area. Approximately 1/3 of this area is in State ownership as part of the Richard J. Dorer State Forest and 2/3 is in private ownership. The Critical Habitat Zone boundary contains the core area of rare natural feature locations. The Critical Habitat Zone contains 118 acres, 94 of which are part of the State Forest.

Division directors for the DNR Divisions of Wildlife, Forestry, and Ecological Services determined that long-term management plans would be developed for the 13 designated high biodiversity sites. The division directors also provided that management of these sites should focus on the site as a whole, employ practices that perpetuate endangered, threatened, or special concern species, and native plant communities while following the mandates of forestry or wildlife administered lands.

Background History & Site Description

Much of the State Forest Land in the Partridge Creek Area was purchased from Dr. Manfred Muentner in two transactions, the first in 1979 and the second in 1993. Dr. Muentner was interested in forest

management and planted many trees on his property, mainly in the open bottomlands. His forested land was enrolled in the Tree Farm Program. A Forest Management Plan was completed for his property in 1972 by DNR forester Bill Barnacle. Upon Bill's recent retirement the property has now been designated as the Barnacle Tract. The 1972 Barnacle forestry plan notes that logging had occurred on two sites on the Muentner property. One of these sites would include the northeast corner of the area now designated as the Critical Habitat Zone. Active grazing was also a concern discussed in the Barnacle plan. This grazing occurred on sites in the current Critical Habitat Zone as well as the rest of the watershed. In the document An Evaluation of the Ecological Significance of The Partridge Creek Area, MCBS ecologist Fred Harris notes that the stand structure of the Lowland Hardwood Forest and Mesic Oak Forest plant communities was a result of selective logging. He also mentions that grazing occurred on much of the area. Abandoned livestock fences are found throughout the area.

Three smaller privately owned parcels of land have also been acquired in the area, a ten acre parcel in 1979, a ten acre parcel in 1987 and a 32 acre parcel in the early 1990's.

The first comprehensive forest inventory by the Division of Forestry, a Cooperative Stand Assessment(CSA), was completed in 1982-83. A second inventory to update the original data was completed in 1996. Both of these inventories resulted in fairly broad typing of timber stands. As a result, management practices tend to be applied to less acreage than the CSA data might indicate as further field evaluation occurs. There are presently 16 CSA stands within the Partridge Creek project boundary.

Since the DNR Division of Forestry first acquired land in the Partridge Creek Area in the 1970's, there have been 39 permits issued for the harvesting of fuelwood. Many of these were in the Critical Habitat Zone area. A small, DNR-Wildlife funded, aspen recycling project resulted in a clear-cut of a small aspen clone in 1998. This project was also in the current Critical Habitat Zone. Two timber sales have been completed. One of these was in CSA oak type #9 in 1986 and the other was an 11-acre sale of three aspen clones within CSA type #3 in 1998. Both of these sales were outside the Critical Habitat Zone, but within the project boundary.

In 1995-96, field work was performed in the Partridge Creek Area by the Minnesota County Biological Survey. A forest bird survey was completed in 1996 by the Natural Resources Research Institute. Two birds of special concern status¹, the Acadian Flycatcher and the Bald Eagle were found to inhabit the site. The Cerulean Warbler is another species that has been seen in the Kinney Creek area, about ¼ to ½ mile to the east. One endangered plant species, Golden-seal, was found as well as four threatened plant species. The threatened species include Jame's Sedge, Spreading Sedge, Narrow-leaved Spleenwort, and False Mermaid. Three plant species of special concern, Moschatel, Goldie's Fern, and Ginseng, were found. The DNR Division of Fish and Wildlife did an evaluation of Partridge Creek shortly after the second purchase of land from Dr. Muentner. No trout were found in the stream and it was found to be marginal for trout habitat due to warm water temperatures.

The MCBS field project in the Partridge Creek Area provided the impetus for the establishment of a northern hardwoods old growth type. In 2000 a DNR interdisciplinary team performed a field evaluation of the stand and determined that it met the minimum standards for old growth. This old growth reserve is 30 acres in size and consists of one entire CSA stand and approximately 70% of a second stand.

¹ All the plant and animal species listed in this paragraph, with the exception of the Bald Eagle, have a special status only under Minnesota Statutes. Special Concern species do not require protection under Minnesota Statutes or associated Rules. The Bald Eagle has a threatened status under federal law. SEE APPENDIX #5.

Long Range Vegetation Management Goals

Seven of the eight endangered, threatened, and special concern plant species located in the Partridge Creek Area are located within the two northern hardwoods old growth stands and their 330' SMZ. One special concern plant, ginseng, was located in CSA type number 6. Total protection of the old growth stands and that portion of the SMZ where endangered and threatened plant species occur should help to protect the species located there in the short term. If new scientific research indicates that certain land management practices would be beneficial to these species, these practices would be implemented only after consultation with the regional plant ecologist and/or non-game wildlife specialist. According to the regional non-game wildlife specialist, the special concern bird species should be adequately protected with the old growth reserve and SMZ management guidelines.

DNR Ecological Services has established long range goals for native plant communities that are applicable throughout the landscape. In the Partridge Creek Area the native communities and the associated goals include:

MAPLE-BASSWOOD

Description – Maple basswood forests are typically mesic to wet-mesic dense canopy forests on steep north to east facing slopes. Sugar maple (*Acer saccharum*), basswood (*Tilia Americana*), and red oak (*Quercus rubra*) are the dominant canopy trees. In the Partridge Creek Area the maple-basswood forest becomes wet-mesic where it transitions to the lowland hardwood forest of the bottomlands. Most of the maple basswood forest areas of the Partridge Creek Area are typed as northern hardwood stands under the CSA database.

Long Term Objective- The goal for this native plant community is to maintain the maple basswood native plant community while retaining a diverse shrub layer and maintaining or increasing the diversity of native plants in the herbaceous layer.

Short Term Plan – All or portions of seven CSA forest cover types in the Partridge Creek Project Area make up the maple-basswood plant community designated by the MCBS. They are as follows:

<u>Section #</u>	<u>CSA Type</u>
11	9 NH59
14	3 NH59
14	6 NH57
14	9 O56
14	10 NH69
14	12 NH66
14	13 NH56

Two of these CSA stands, #'s 10 and 13 of section 14, are designated as old growth stands. No management activities are planned for these stands.

CSA stand numbers 3, 6, and 12 of section 14 and stand 9 of section 11 have met the stand selection criteria for harvest as established by the subsection forest resource management plan. Except for stand #12, which has poor access, the stands will be harvested within the 7-year period of time covered by this SFRMP plan addendum. The long-term management objectives of the maple basswood plant community, as stated above, provide the overall management goals of the timber harvests for the portions of the stands

that are maple-basswood. Best Management Practices will be followed. In addition, the sale preparation, specifications, monitoring, and evaluation will be guided by additional direction provided by the division /section directors of DNR Forestry, Wildlife, and Ecological Services (Appendix 2).

CSA type # 9 of section 14 did not meet the harvesting criteria and no management activities are planned for this type.

LOWLAND HARDWOOD FOREST

Description – Lowland hardwood forests are typically wet-mesic lowland forests on alluvial soils above the normal flood level in small valleys. The lowland hardwood forest in the Partridge Creek Area has groundwater seepage areas that occur where the side slopes meet the valley bottom. The herbaceous layer in these areas is dominated by marsh marigolds. The canopy has frequent gaps, dead falls, and occasional standing dead snags. Early in the year, the lowland forests of higher quality have an understory that is a diverse and continuous array of spring ephemerals. In the Partridge Creek Area these native plant communities are classified as a lowland hardwood cover type in the CSA database.

Long Term Objective -The goal for this plant community is to maintain a quality lowland hardwood community while protecting the groundwater seepage springs and herbaceous ground cover. There is one plant community of this type in the Partridge Creek Area. The management focus in this area will be protection of ETS species locations, protection of springs, and adherence to riparian area and SMZ zone guidelines. Any timber harvesting that is done should protect the plant community and remove non-natives.

Short Term Plan- CSA type # 5 in section 14 is the only cover type that contains any lowland hardwood forest plant community. Type #5 is classed as a LH64 type, however, the average size and density of the trees appears to be somewhat less than what the inventory would indicate. For this reason as well as limited access and the management constraints due to the adjacent old growth stands, no management activity is planned in this cover type during the 7-year planning period.

MESIC OAK FOREST

Description – Oak forests (mesic subtype) are typically dry-mesic to mesic forests, often on gradual west and east-facing slopes and broad ridge crests. Dominant canopy trees can include red oak and white oak (*Quercus Alba*). In the Partridge Creek Area these communities grade to maple-basswood on east and north-facing slopes and to dry-mesic oak forest where sugar maple completely drops out and the herbaceous flora changes. At Partridge Creek the red oak and basswood predominate and occur with white oak and sugar maple.

Long Term Objective - As mesic oak forest is designated as an S2 natural community, it should be actively managed to ensure its perpetuation. Management practices, where possible, should be used to retain these as oak types. In areas where maple-basswood succession is inevitable, the stands will be allowed to succeed to maple basswood.

Short Term Plan- All or portions of eight CSA cover types in the Partridge Creek Project Area make up the Mesic Oak Forest plant community designated by the MCBS. They are as follows:

<u>Section #</u>	<u>CSA Type</u>
11	2 NH57
11	9 NH59

14	3 NH59
14	4 NH56
14	6 NH57
14	9 O56
14	10 NH69
14	11 CH45

CSA cover type #'s 2 and 9 of section 11 and #'s 3,4, and 6 of section 14 have met the stand selection criteria for harvest. These stands will be harvested during the 7 year period covered by this SFRMP plan addendum. The long term management objectives of the mesic oak forest plant community, as stated above, provide the overall management goals of the timber harvests for the portions of the stands that are mesic oak. Best Management Practices will be followed. In addition, the sale preparation, specifications, monitoring, and evaluation will be guided by additional direction provided by the division /section directors of DNR Forestry, Wildlife, and Ecological Services (Appendix 2).

Monitoring of the effects of various harvesting techniques will be ongoing at Caledonia Oaks in Houston County. Information from these studies may be used, if applicable, to revise future plan updates.

CSA type #10 of section 14 is an old growth stand and no management activities will be implemented there. Access problems preclude management activities in type # 11 and no management needs have been identified for type #9.

DRY OAK FOREST

Description – Oak forest (dry subtype) often occurs on south to west- facing slopes with a canopy dominated by northern pin oak (*Quercus ellipsoidalis*), and/or bur oak (*Quercus macrocarpa*). Generally, these dry oak forests occur on areas where succession has led to a relatively closed canopy.

Long Term Objective - The goal in dry oak forest management is to encourage regeneration of the oak community through controlled burning and carefully planned logging to open up the community. Eliminating non-native species is also a high priority.

Short Term Plan- In the Partridge Creek Area the dry oak forest is found in two CSA cover types; # 10 and # 3 of section 14. No management is planned for CSA type #10 because of its status as an old growth type. CSA type #3 has met the criteria for harvest by the SFRMP process. This type will be harvested in the next seven years using Best Management Practices and with the long-term objectives for the plant community as a guide. Steep slopes, poor access, and low timber value may limit the extent of prescribed burning and harvest management activities.

WHITE PINE-HARDWOOD FOREST

Description - Dry to mesic forest on steep slopes, often associated wit cliffs and bedrock outcrops. At Partridge Creek a mesic variant of this community occurs on the east to north-facing slopes where the pines occur with sugar maple, red oak, and basswood and a dry variant on steep west to south-facing slopes where the pine occur with bur oak. White pines dominate the canopy of these areas with deciduous trees in the sub-canopy.

Long Term Objective - Management should ensure the perpetuation of the white pine-hardwood forest. Scarification and release would be practices to utilize to enhance survival, growth, and regeneration of white pine.

Short Term Plan- CSA cover type #'s 6, 10, and 11 of section 14 all contain some white pine- hardwood forest plant community type. Release and scarification activities to enhance white pine survival and regeneration will be implemented in type # 6 when harvesting activities, as noted above, take place. These management actions will follow the long term objectives for the plant community and will, likewise, be guided by the additional direction provided by the division /section directors of DNR Forestry, Wildlife, and Ecological Services (Appendix 2).

No management will occur in cover type #10 because of its status as an old growth type. No management activities are planned for type # 11 during the 7- year plan period because of limited access to this area.

MIXED OAK WOODLAND

Description- Oak woodland occurs on dry to mesic sites throughout the deciduous forest-woodland zone. Oak woodland is floristically and structurally intermediate between Oak Savanna and Oak Forest, with a patchy tree canopy and an understory dominated by shrubs and tree saplings. In the Partridge Creek Area the oak woodland overstory is dominated by open-grown bur oak.

Long Term Objective – The management goal in this plant community would be perpetuation of the fairly open oak canopy through carefully implemented prescribed burns and/or through timber harvesting.

Short Term Plan – CSA type # 12 of section 14 contains a couple of acres of mixed oak woodland plant community. This area has poor access because of steep slopes and adjacent private property. No management activities are planned in this cover type in the 7-year period covered by this plan.

ASPEN

Description – Aspen is a pioneer, short lived, trees species that is found in small pockets or small stands throughout the Blufflands and Rochester Plateau subsections. These pockets can be found imbedded in several plant communities such as maple-basswood, mesic oak, and dry oak forest.

Long Term Objective – The goal for aspen in the SFRMP plan is to maintain or increase its acreage to benefit various wildlife and non-game wildlife species.

Short Term Plan- CSA cover type #'s 3, 6, and 11 of section 14 have pockets or inclusions of aspen. As provided in Appendix 2, harvesting of aspen clones should only be done in conjunction with a timber harvest of the surrounding stand. Thus planned harvests in CSA type #'s 3 and 6 would include aspen harvesting or felling at that time. Other from Appendix 2 which pertain to aspen pockets, maple-basswood management, and mesic oak management will also be followed.

Access problems with type 11 will prevent aspen cutting during the 7 year plan period.

Enhance game and non-game wildlife habitat

Narrative -DNR wildlife and fisheries managers have been consulted in the past with regard to improving habitat in the Partridge Creek Area. The aspen recycling project, funded by the Ruffed Grouse Society, was one result of this collaboration. The cooperative effort in improving wildlife habitat will continue. This is a popular area for hunting deer, squirrels, grouse, wild turkeys and other game animals. It has probably been hunted by some of the same local families for generations. The area also provides good habitat for non-game birds and mammals. The aquatic wildlife habitat appears to be fairly healthy and stable, but information on this resource is not readily available.

As the forest stands in this area continue to age and move toward more shade tolerant species, the habitat for wildlife will change as well. The diversity of species may increase, but species dependent on mast for food may decline in numbers. Uneven-age management will also be detrimental to species such as rough grouse that need some areas of young forest.

Short Term Plan – A stream survey by DNR Fisheries will be requested for Partridge Creek in the seven year planning period. Changing land use patterns in the area could influence stream quality. Proven practices that enhance wildlife habitat will be incorporated whenever possible. Select harvests should not create any additional forest edge areas.

Provide sustainable recreation opportunities

Narrative - Hunting, horseback riding, OHV use, hiking/running, and bird watching are some of the present activities that occur in the Partridge Creek Area. The majority of the forest roads have been gated to stop pick-up trucks and passenger car traffic. However, 4-wheelers still bypass these barriers. Most of this is local traffic. This traffic is increasing and getting to be more of a problem. Other recreational uses of the site have been low impact and have not caused problems.

Short Term Plan – Additional signs/fencing will be put up to delineate boundary lines and permitted activities. Additional enforcement activity will be needed to get better compliance with OHV regulations.

Update CSA and MCBS data

Narrative- Plan implementation and future management planning for the Partridge Creek Area would be much easier if the type boundaries of CSA and the plant community boundaries of the MCBS inventory were more closely aligned. Timber harvests and other management activities should bring further refinements to the CSA inventory data as stand boundaries are adjusted in pre and post sale field visits.

Short Term Plan – CSA alterations will be completed as management activities are planned or completed, after regeneration checks, etc.

Acquisition of key private land parcels

Narrative- There is a significant amount of private land within the Partridge Creek Area and some private land in the Critical Habitat Zone as well. It would make sense to try to acquire this parcel to add to the State Forest system. Other land purchases in the Partridge Creek Area that would allow DNR - Forestry to square off boundaries, add management efficiencies, and protect riparian areas will be pursued. Acquisition of lands further up the Partridge Creek watershed would enhance stream protection. Partnering in acquisition efforts with other DNR divisions, other government agencies, and private organizations may be necessary.

Appendix 1: Stands Scheduled for Harvest

Stand #	Type	Acres	Harvest Type	FY Sale
3 Section 14	Northern Hardwoods	115	Select	04
4 Section 14	Northern Hardwoods	4	Select	04
6 Section 14	Northern Hardwoods	26	Variable	03
2 Section 11	Northern Hardwoods	28	Variable	04
9 Section 11	Northern Hardwoods	4	Select	06

Appendix 2: Additional Management Guidance

Harvest of high quality maple-basswood communities

Selective harvest will be allowed if site teams jointly develop detailed plans that include joint on-site visits. The following conditions will apply:

- Oak resources can be salvaged as these sites are converted to purer maple basswood communities. This should be done by selective, individual or small group marking and removals.
- Harvest activity should limit canopy gap creation wherever possible and account for fill in by remaining crowns.
- Seasonal and equipment restrictions should be used to limit soil disturbance; horse logging on frozen ground should be done where appropriate in the most sensitive sites).
- Trees should be jointly marked as well as the layout for access and skid trails to minimize any additional permanent fragmentation.
- Portions of stands that support unique or rare resources (such as a rare species or a rich spring ephemeral flora) may be delineated for no harvest.
- A pre and post treatment monitoring and evaluation protocol for species and communities of concern (both native and exotic) should be developed and implemented in each stand. Harvest plans should also take into account whether or not invasive exotic species occur in stands immediately adjacent to those being harvested.

With respect to the last bullet, Ecological Services staff will continue discussions with USDA Forest Service staff to further explore the opportunities to collect pre-treatment data during the 2004 field season.

Mesic oak communities and oak regeneration

The mesic oak communities should be managed. The benefits of an oak component to wildlife species, particularly game species, are important. These stand types should be individually examined, selecting those with the greatest chance to regenerate oak to actively manage through timber harvest and other silviculture techniques. Those with advanced maple-basswood regeneration should be allowed to succeed to more shade tolerant northern hardwoods. Subsection timber management plans should consider small, medium, and large-scale harvests in these types to provide habitat for game and non-game species, including forest interior birds.

A variety of types of harvests and other silvicultural practices should be practiced as well. Clear-cuts are the norm to regenerate oak in southeastern Minnesota, but efforts to apply group selection and shelterwood cuts should be applied where appropriate. Group selection creates a feathered edge effect that is far different than that created by cutting next to an open agricultural field and mimics those natural blowdowns that occurred in 1998 in the southeast. To promote natural regeneration and protect soil productivity, look for opportunities to clear-cut the forested type on more level terrain following pre-sale soil scarification. Harvesting on steeper slopes, where appropriate, would be restricted to shelterwood, group selection, or variations of these harvest methods without soil scarification

Prescribed fire should also promote oak regeneration, either prior to or after a sale in an attempt to reduce shade tolerant competition. Through the use of this tool, we may be able to reduce our pre- and post-sale chemical treatments. The highest quality biodiversity sites for recreation will receive the highest priority

for prescribed fire funding. Wildlife will work with the Divisions of Ecological Services and Forestry to ensure that these sites are regenerated through the application of fire.

Aspen and white pine pockets

The cover type goal as listed in the Blufflands/Rochester Plateau Subsection Forest Resource Management Plan is to maintain or moderately increase the white pine acreage and increase the aspen acreage for various wildlife and non-game species. As stated in the plan, there are relatively few stands of aspen larger than five-acres in size in southeastern Minnesota.

Native white pine stands are limited in number, but provide multiple benefits to numerous game and non-game species from roosting sites for wild turkeys to perches and roost areas for bald eagles. The department believes it is necessary to access some of the sites for management to ensure natural regeneration occurs.

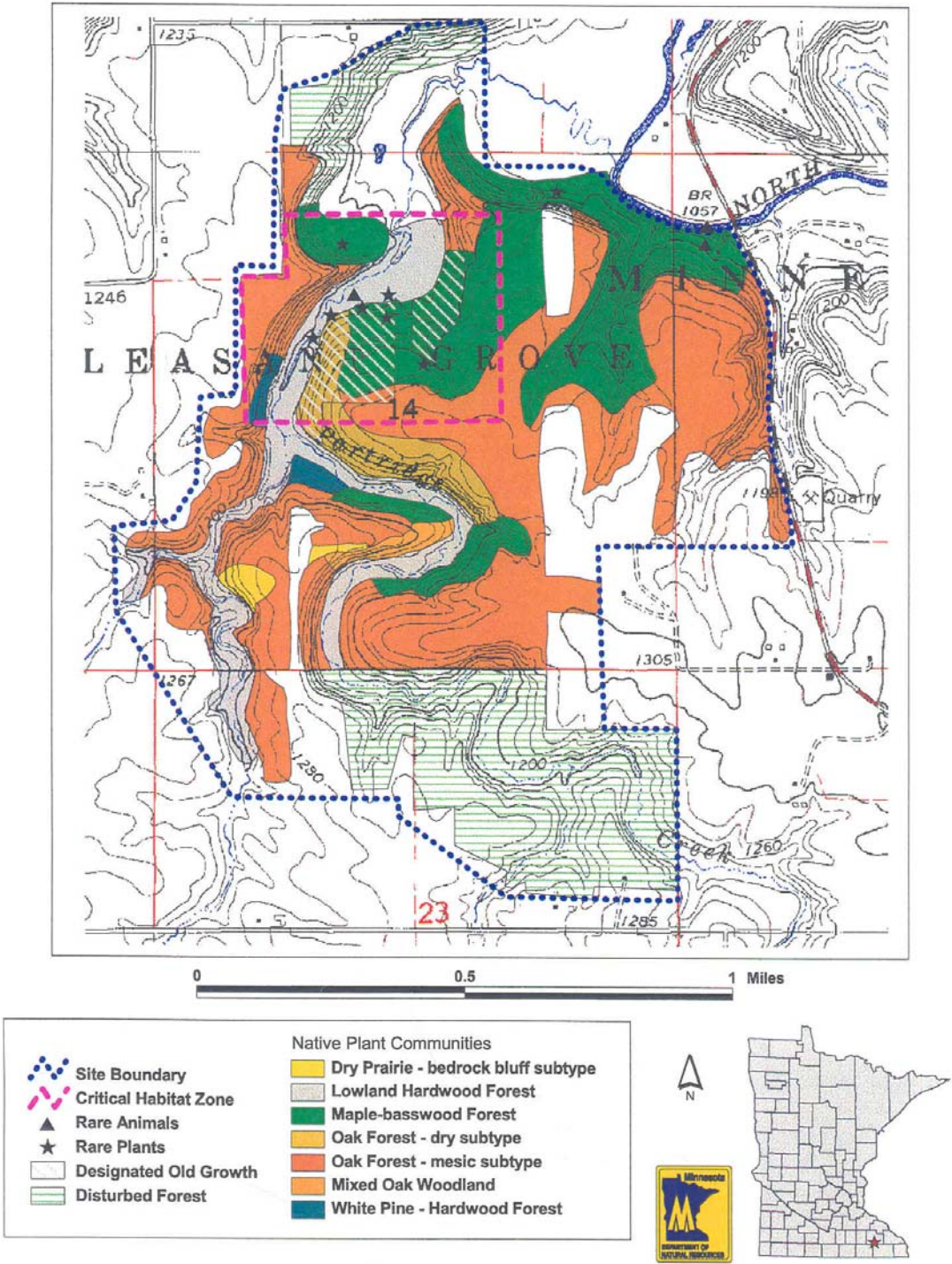
Options to minimize any intrusion through the maple-basswood communities should include the following:

- A search for any pre-existing old homestead roads or trails that could be used for access and whether exotic species are present in the area which might be introduced along such a corridor if made active again;
- List alternate means to access the white pine such as through private land, through other disturbed communities, etc; and
- Timing of access whereby any mechanical scarification would take place during fall or early winter, reducing the “footprint” upon the trail used to access such stands. The department believes such efforts to maintain or increase the native white pine acreage in this landscape outweigh the minor impacts to surrounding northern hardwood communities.

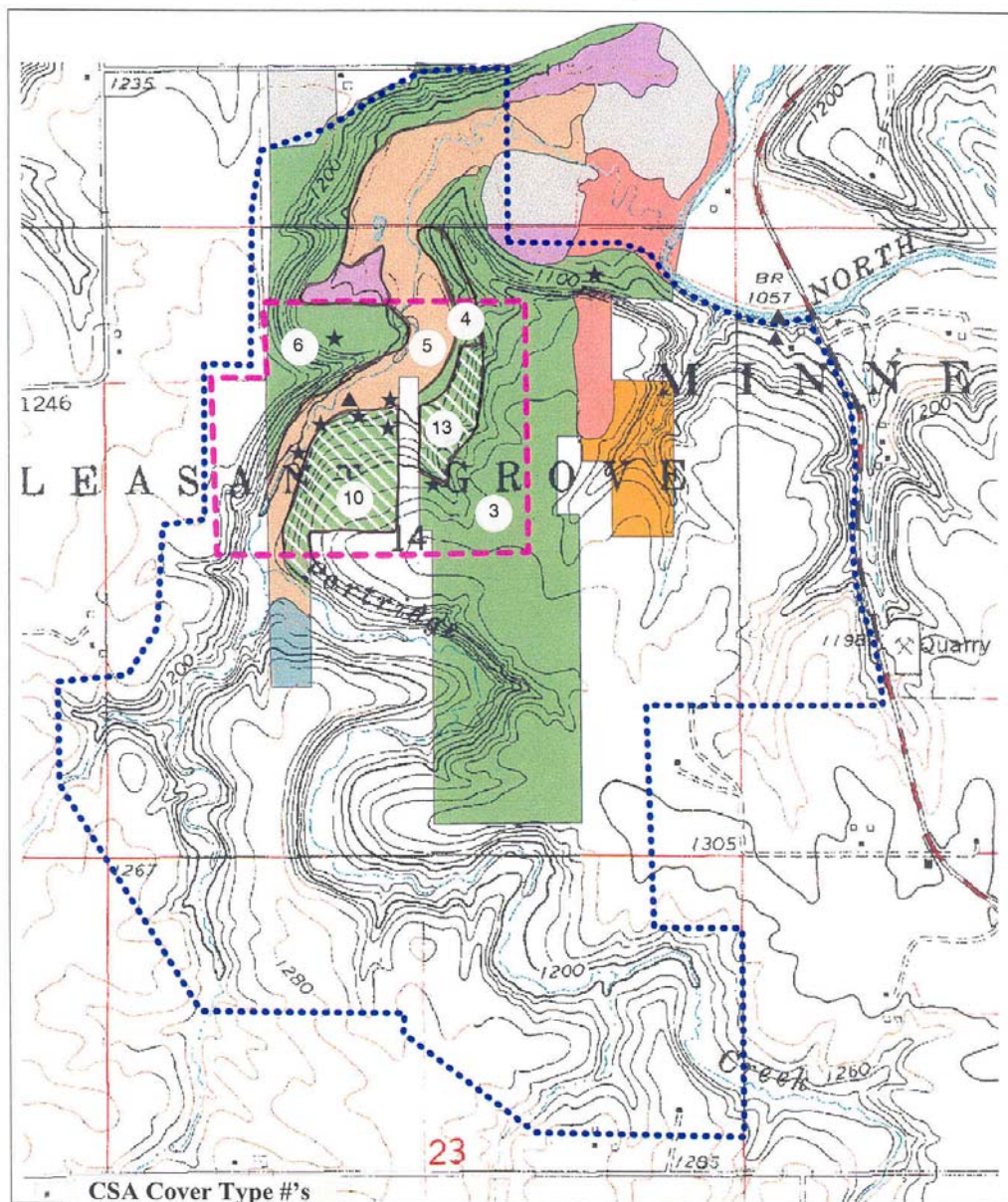
Small aspen clones in high quality sites should only be harvested when a harvest is already planned and approved by the team, at the same time, within the immediately surrounding stand in which the clone is embedded. Other conditions mentioned under the high quality maple-basswood communities section above should also be addressed. If harvest in the stand in which the aspen is embedded is not planned, then a special effort to cut the aspen should not be made.

Appendix 3: Native Plant Communities

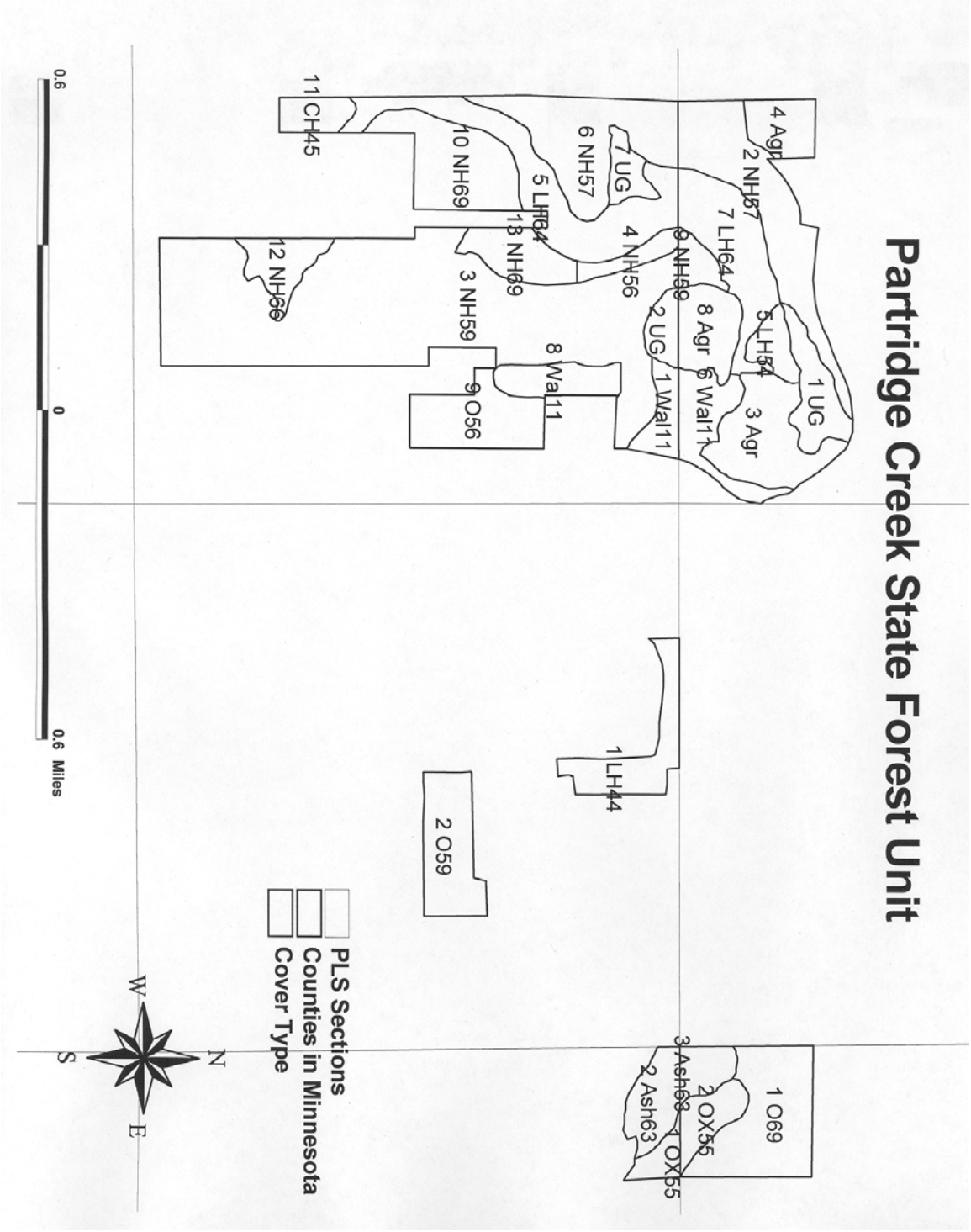
Partridge Creek, Olmsted County, Minnesota
T105N R13W
Minnesota County Biological Survey - Map Version: 24 March, 2000



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Appendix 5: CSA types in the Partridge Creek State Forest Unit



Appendix 6: MCBS Evaluation of Partridge Creek

DRAFT

An Evaluation of the Ecological Significance of

THE PARTRIDGE CREEK AREA

Paleozoic Plateau ECS Section; Blufflands Subsection

Olmsted County, Minnesota

DNR Quad Code: W20a

T105N R13W: sections 14, 23

Approximate Acres:

Total Site area: 846 acres (state land: 297 acres)

Critical Habitat Zone area: 118 acres (state land: 94 acres)

Prepared by: Fred Harris

Minnesota County Biological Survey

Section of Ecological Services

Department of Natural Resources

Box 25, 500 Lafayette Rd

St. Paul, Minnesota 55155

April 26, 2000

ECOLOGICAL SIGNIFICANCE:

Overview

The Partridge Creek area, with its large area of high quality forests and high diversity of rare species, is among the top four natural areas left in Olmsted County and is an important natural area in southeastern Minnesota. The site consists mostly of little-disturbed, young to mature forest stands with intact canopies and high species diversity. These stands include areas of maple-basswood, lowland hardwood, white pine-hardwood, mesic oak, and dry-mesic oak forest. One mature maple-basswood stand has received Old Growth designation.

These forests contain a high diversity of the native plant species found in southeastern Minnesota forests. Several rare plant species have been documented in the site. These include populations of five species with state endangered or threatened status, three of which are the only locations known in Olmsted County: false mermaid (*Floerkia proserpinacoides*), goldenseal (*Hydrastis canadensis*), James' sedge (*Carex jamesii*), narrow-leaved spleenwort (*Diplazium pycnocarpon*), and spreading sedge (*Carex laxiculmis*). Four other rare plant species present in the site are ginseng (*Panax quinquefolius*), Goldie's fern (*Dryopteris goldiana*), moschatel (*Adoxa moschatellina*), and silvery spleenwort (*Athyrium thelypteroides*).

The large area of continuous forest canopy provides habitat for numerous bird species that require interior forest conditions in unfragmented forest stands. These include the Acadian flycatcher (*Empidonax virescens*), a Special Concern species that breeds within the site. A bald eagle (*Haliaeetus leucocephalus*) nest has also been sighted within the site.

Geologic Features and Context

The Partridge Creek site consists of the lowermost two miles of the Partridge Creek valley and adjacent portions of the North Branch of the Root River valley. The site forms part of the Red Wing-La Crescent Geomorphic Area, a highly dissected portion of the Paleozoic Plateau. Within the site, the creek flows through a narrow, winding, bedrock-controlled ravine, with several small outcrops and escarpments of Galena formation dolomite along the steep valley side-slopes. Several sinkholes, circular depressions connected to fissures in underlying bedrock layers, occur on uplands on the edge of the creek valley.

Soils on the bottomlands in the site consist mostly of poorly-drained silt loams formed in alluvium, with muck spots in areas of groundwater seepage. The valley's steep, highly-drained side-slopes contain shallow, flagstone-laden soils, ranging from silty clay loam to sandy loams, formed predominantly in bedrock residuum. Soils on the more shallow, convex slopes and ridge tops on uplands contain silt loam soils formed in Wisconsin loess deposits of depths varying from a few inches to over 60 inches over underlying shallow till deposits or bedrock.

Plant Communities

Lowland hardwood forest with frequent canopy gaps and dominated by mostly mid-age black ash (*Fraxinus nigra*), basswood (*Tilia americana*) and sugar maple (*Acer saccharum*) predominates on the bottomlands within the site. Box elder (*Acer negundo*) and elms (*Ulmus* sp.) are prevalent as smaller trees in lower canopy layers. Frequent large canopy gaps, numerous deadfalls and occasional standing dead snags are evidence of the past die-off of American elms (*Ulmus americana*) that were once an important component of the community. Some past selective logging has also resulted in a fairly even-aged forest. The herbaceous groundlayer on these bottomlands is continuous and highly diverse, with numerous spring wildflower species. Frequent areas of groundwater seepage occur where the side slopes meet the valley bottoms and are dominated by marsh marigolds (*Caltha palustris*). Few such intact lowland forest communities remain in southeastern Minnesota.

Maple-basswood forests with continuous, dense canopies of mostly sugar maple, basswood and red oak (*Quercus rubra*) dominate most north-facing slopes within the site. A particularly fine example of this community occurs on the gradual to steep slope located just north of the center of section 14. This mature stand contains oaks and maples reaching approximately 120 or more years of age, as determined by a few tree cores, and has been designated an Old Growth stand. Two 80+ centimeter dbh oaks (one red oak and one white oak (*Quercus alba*)) were also recorded within the stand. This stand has a continuous and diverse herbaceous layer that includes a rich diversity of spring ephemeral wildflowers. Downslope to the north, the forest grades into rich, wet-mesic maple-basswood forest at the transition to lowland hardwood forest on the bottomlands.

White pine-hardwood forest prevails as narrow bands on steeper slopes with shallow soils over bedrock on both sides of the creek valley. White pine (*Pinus strobus*) dominates these zones in two recognizable subtypes of this forest type: a mesic variant on east to north-facing slopes in which the pines co-occur with sugar maple, red oak and basswood on east-facing slopes; and a dry variant on steep west to south-facing slopes in which the pines co-occur with bur oak (*Quercus macrocarpa*).

Mesic oak forest dominates the loess-derived soils on the highest uplands. Red oak and basswood predominate in these stands, and co-occur with white oak, sugar maple, and yellow-bud hickory (*Carya cordiformis*). These stands are generally even-aged with oaks averaging approximately 35-40 cm dbh due to past selective logging. A couple of large big-tooth aspen (*Populus grandidentata*) clones are present. It appears that much of the area was grazed many years ago, as evidenced by old barbed wire fencing. These stands have a rich plant species diversity and appear to have recovered from any past grazing. On south to west-facing slopes, the forest grades into a dry-mesic variant of oak forest where sugar maple completely drops out and the herbaceous flora changes to species tolerant of drier soil conditions. On steep south-facing slopes, the forest becomes **mixed oak woodland** dominated by open-grown bur oak.

Rare Animals

The **Acadian flycatcher** is a Special Concern bird species that was recorded within the site during the 1996 breeding bird survey. This bird occupies small stream valleys within unfragmented areas of mature forest. Other non-listed bird species with similar habitat requirements were also recorded in the site, including ovenbird, scarlet tanager, eastern wood-pewee, yellow-throated vireo, red-eyed vireo and wood thrush. The site appears to have excellent habitat for the Louisiana waterthrush (*Seiurus motacilla*), a Special Concern species. A search for this species has not yet been conducted within the site.

Bald eagles, listed as Special Concern, were observed nesting near the Root River within the site in 1995.

Rare Plants

Many of the rare plant species found within the site occur within the older maple-basswood forest stand located north of the center of section 14. Small populations of the **golden-seal** (State Endangered) and **ginseng** (Special Concern) were recorded on upper slopes within this forest. **James' sedge** (Threatened), **spreading sedge** (Threatened), and a rare fern, **silvery spleenwort** (non-listed), were recorded on the lower slopes in the wet-mesic maple-basswood forest and on adjacent bottomlands within the lowland hardwood community. With the exception of the more widespread ginseng, these species are exceedingly rare--their Minnesota distribution is limited to the Paleozoic Plateau region in the southeastern-most portion of the state.

Two other rare ferns, **Goldie's fern** (a Special Concern species) and **narrow-leaved spleenwort** (a Threatened species), were recorded from mesic white-pine hardwood forests on a steep, sheltered northeast-facing slope in an adjacent portion of the Root River valley.

Thousands of plants of the Special Concern species, **moschatel**, were recorded on cool, sheltered north-facing slopes within maple-basswood forests in several parts of the site.

A large, robust population of **false mermaid**, a Threatened species, occupies over a quarter mile of seepage zones located on the edge of the Partridge Creek bottomlands at its juncture with steep valley side slopes. This early spring ephemeral is known from very few locations in the state.

RECOMMENDATIONS:

The Partridge Creek Area is a significant area with natural features of statewide importance due to the high-quality condition of its forests and its high diversity of native plant and animal species. This area merits special consideration for protection and management.

Several very rare plant species occur on north-facing slopes and valley bottomlands in the north half of section 14. These species require moist, highly-shaded, interior forest conditions. The

primary area of concern for protection of these species is identified as a Critical Habitat Zone on the maps accompanying this report. To maintain these species, this portion of the site should be protected from disturbance, including logging. Much of this area has been designated as Old Growth forest, which is an excellent step toward maintaining this high-quality forest habitat.

As a whole, the site is one of the largest areas of unfragmented, continuous-canopied forest to be seen in Olmsted County. Portions of the forest are in excellent condition, whereas other parts are in moderate condition due to past land uses. These lesser-quality areas generally have an excellent diversity and abundance of native plants, and few exotic species, and so should greatly improve in condition in the future. If it is allowed to remain as a large, unfragmented block of mature forest, this site will continue to be an excellent refuge for forest songbirds, many of which have been documented in the site.

The remaining private lands within the site boundaries should be protected by fee title acquisition or conservation easements. Given the high natural area value of the site, there should be many public and private organizations interested in assisting with the site's protection. Protection of the rest of the site is particularly urgent as the site is within easy commuting distance of Rochester and is vulnerable to housing developments.

In summary, the Partridge Creek Area is a large, high-quality forested site containing one of few old-growth forest stands in southeastern Minnesota and occurrences of several very rare species. The site merits a high level of protection for its natural area values.

INFORMATION SOURCES:

Minnesota County Biological Survey (1995-1996) field data from: Fred Harris

Minnesota Forest Bird Survey (1996) Carol Pearson

University of Minnesota Agricultural Experiment Station (1973) Minnesota Soil Atlas - St. Paul Sheet

USDA-SCS (1980) Soil Survey of Olmsted County

**Partridge Creek
ELEMENT SUMMARY:**

	<u>Status*</u>	<u>Rank@</u>	<u># Statewide EOs</u>	<u># EO's in Paleoz. Plat.</u>
Plant Communities				
Lowland hardwood forest	S4	C	91	33
Maple-basswood forest (southeast)	S2	AB,B	186	179
Oak forest (southeast) mesic subtype	S2	BC	298	258
Oak woodland-brushland (southeast)	S4	BC	53	42
White pine-hardwood forest (southeast) dry subtype	S2	B	7	4
White pine-hardwood forest (southeast) mesic subtype	S2	B	26	25
Animals				
Acadian flycatcher (<i>Empidonax vireescens</i>)	SC		58	35
Bald Eagle (<i>Haliaeetus leucocephalus</i>) T	SC		1218	63
Black Redhorse [fish] (<i>Moxostoma duquesnei</i>)	NON		40	37
Plants				
Moschatel (<i>Adoxa moschatellina</i>)	SC		103	74
Silvery spleenwort (<i>Athyrium thelypteroides</i>)	NON		41	41
James' sedge (<i>Carex jamesii</i>)	T		14	14
Spreading sedge (<i>Carex laxiculmis</i>)	T		19	19
Goldie's fern (<i>Dryopteris goldiana</i>)	SC		48	37
Narrow-leaved spleenwort (<i>Dyplazium pycnocarpon</i>)	T		19	19
False mermaid (<i>Floerkea proserpinacoides</i>)	T		12	10
Golden-seal (<i>Hydrastis canadensis</i>)	E		15	15
Ginseng (<i>Panax quinquefolius</i>)	SC		225	115

***Status:**

For Rare Species

E = endangered
T = threatened
SC = special concern
NON = no legal status
but tracked in NHP
database

For Natural Communities

(program-defined; no legal status)
S1=critically endangered
S2=endangered
S3=threatened
S4=special concern
S5 = demonstrably secure

@ Element ranks are given where available

Appendix 7: Habitat Needs for Cerulean Warblers & Acadian Flycatchers

Habitat Needs for Cerulean Warblers & Acadian Flycatchers

Jaime Edwards – 3/22/04

- **Need large tracts (100ac+) of bottomland hardwoods and mesic slopes**
- **Need a close canopy and an open understory**
- **Canopy closure should be a minimum of 60% over a 200 acre parcel, but prefer up to 85% canopy and larger dbh trees should create the canopy – so a mature forest**
- **Zonation of canopy to show horizontal layers ~ mixed age forest**
- **Small canopy gaps are preferable ~ indicating select harvest may be a preferred management technique for these species**
- **Select harvest should retain a percentage (1-2 “taller than surrounding stand” trees per acre) of tall, large, mature trees (i.e. if the majority of stand trees are 10” dbh, it would be good to leave a few trees with dbh greater than 10”). This will insure that some of the highest canopy trees remain for nesting and cover.**
- **Retain snags for foraging – snags of 6” or greater dbh**

Appendix 8: October 2000 Aerial Photo of Partridge Creek



Appendix 9: CSA Key for Partridge Creek State Forest Unit

CSA cover types on maps and in the plan are identified with a code (e.g., NH57) comprised of three components:

- Main cover type code. This identifies the main type, based on predominant cover or tree species, indicated by a series of letters or abbreviations (e.g., **NH**57).
- Main cover type size class, based on predominant diameter of main species. This is the first numeric digit in the code (e.g., NH**5**7).
- Main cover type density, based on the number of stems, cords or board feet per acre. This is the second numeric digit in the code (e.g., NH5**7**).

Main Cover Type Code

Symbol	Type	Description
Ash	Ash	A bottomland type composed of ash.
LH	Lowland hardwoods	Bottomland hardwoods (ash, elm , Balm of Gilead, silver maple, etc.)
NH	Northern hardwoods	Northern or upland hardwood species
Wal	Walnut	Walnut predominating
O	Oak	Oak species predominating
CH	Central Hardwoods	Dense hardwoods with oak , hickory, cherry, butternut
OX	Offsite oak	Scrubby oak type below site index 40.
UG	Upland grass	An upland grass or weed area less than 10% stocked with a commercial tree species
Agr	Agricultural	Land being actively used for agricultural purposed – cropland, orchard, pasture, etc.

Main Cover Type Size Class (Diameter)

Code	Description	Corresponding Density Units
0	Not applicable for the type	
1	0 to .9 inches	Stems per acre
2	1 to 2.9 inches	Stems per acre
3	3 to 4.9 inches	Stems per acre
4	5 to 8.9 inches	Cords per acre
5	9 to 14.9 inches	Cords per acre
6	15 to 19.9 inches	Board feet per acre
7	20 to 24.9 inches	Board feet per acre
8	25+ inches	Board feet per acre

Main Cover Type Density

Code	Stems/Acre	Cords/Acre	Bd. Ft./Acre
0	0-250	0.0-2.9	0-1,250
1	251-750	3.0-7.5	1,251-3,750
2	751-1,250	7.6-12.5	3,751-6,250
3	1,251-1,750	12.6-17.5	6,251-8,750
4	1,751-2,250	17.6-22.5	8,751-11,250
5	2,251-2,750	22.6-27.5	11,251-13,750
6	2,751-3,250	27.6-32.5	13,751-16,250
7	3,251-3,750	32.6-37.5	16,251-18,750
8	3,751-4,250	37.6-42.5	18,751-21,250
9	4,251 and up	42.6 and up	21,251 and up