A Resource Inventory

for

Purvis Lake - Ober Foundation Scientific and Natural Area

NW¼ NW¼ of Section 33,

W½ SW¼ of Section 28,

and the SW¼ NW¼ of Section 28

(excluding the area occupied by Purvis Lake)

Township 62 North, Range 13 West

Eagles Nest Quadrangle

St. Louis County

Minnesota

Prepared by

The Scientific and Natural Areas Program

Division of Fish and Wildlife

Minnesota Department of Natural Resources

May, 1981

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PREFACE

This report documents the information collected during a 1980 inventory of the Purvis Lake - Ober Foundation Scientific and Natural Area. The inventory was designed to collect information on the physical and biological resources of the site, including its geology, soils, climate, water resources, flora and fauna. The land use history of the site was also investigated in an attempt to understand how such practices may have altered the resources of the natural area. The report will be a valuable aid for individuals responsible for future management decisions as well as for scientists, educators and others interested in the area.

The inventory of the Purvis Lake - Ober Foundation Scientific and Natural Area was part of a larger effort in which eleven natural areas in northwest, northeast and east-central Minnesota were surveyed. Inventory team members were: Lee Pfannmuller, SNA Planning Coordinator; Carmen Converse, Jane Cross-Cella, Sue Cutler, Ted Petron, Vicki Phelps and Marianne Severson, botanists; Tony Busche, Joel Jokela, Jim Lynch, Jim Pertz, Dan Schneider and Jim Ziegler, soologists; Larry Killien and Dianne Wade, land use history researchers; and Jim Strudell, geologist. Gerald Jensen, Supervisor, Scientific and Natural Areas Section and Barbara Coffin, Coordinator, Minnesota Natural Heritage Program, served as inventory advisors. Several individuals and supporting institutions have given freely of both their resources and time in helping the inventory effort at Purvis Lake, in particular: Welby Smith and Henry Woolsey of the Minnesota Natural Heritage Program; and Dr. Elmer Birney, Bell Museum of Natural History.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

DESCRIPTION OF STUDY AREA

The Purvis Lake - Ober Foundation SNA is a 54.7-hectare (135-acre) unit in northeastern St. Louis County, approximately sixteen km (10 miles) southwest of Ely, Minnesota. The site is located within the Border Lakes Landscape Region (Fig. 1), where numerous glacial advances have produced a pattern of alternating lakes, bogs and rocky ridges. All of these regional features are represented by the diverse topography of the Purvis - Ober site. Purvis Lake occupies an area northwest of the tract and is drained by a small stream that crosses the study area. The Beaver River also passes over the property near its southern boundary.

While most of the surrounding land has been logged, the mixed upland forest of the Purvis - Ober SNA has remained largely untouched. Dominated by aspen, birch and pine, the forest is supported by thin, poorly developed soils overlying glacial materials. Occasional boggy areas, characterized by sedges, Labrador tea, black ash and black spruce, interrupt the upland forest. Flora and fauna on the tract are typical of the mixed upland forest and bog environments of northeastern Minnesota.

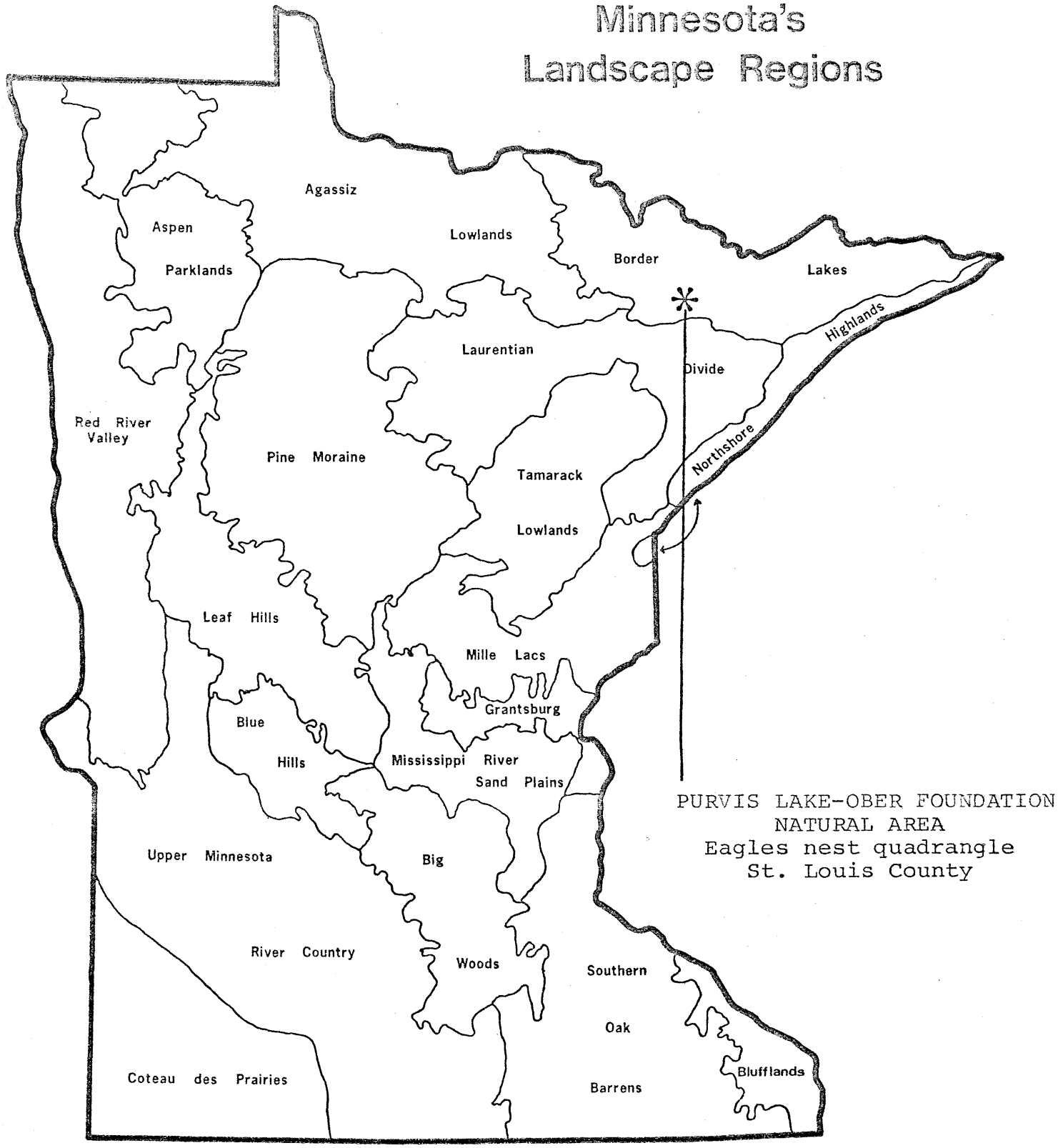


Figure 1. Purvis Lake-Ober Foundation Natural Area in relation to Minnesota's landscape regions. Adapted from T. Kratz and G.L. Jensen, an ecological geographic division of Minnesota (Unpublished, 1977).

HISTORY OF PRESERVATION EFFORT

The Purvis Lake - Ober Foundation SNA receives part of its name from Charles Sumner Purvis, who homesteaded and lived on the site from the early 1900's until the mid-1960's. Mr. Purvis was quite protective of his property; his vigilance kept trespassing to a minimum, and prevented any major logging activities. After his death in 1971, The Nature Conservancy expressed an interest in preserving the site. Rather than purchasing it directly, The Conservancy arranged a three-way agreement between the Department of Natural Resources (DNR), a private group known as the Ober Foundation, and the administrators of the Purvis' estate. By the terms of the agreement, the Ober Foundation donated to the DNR enough money to purchase the Purvis property.

The document confirming the sale of the property to the Minnesota DNR required that the land be permanently designated a "Scientific and Natural Area." According to this document, "said lands shall be clearly marked or posted with signs stating, 'No hunting, no trapping, no commercial activity of any kind or nature and no operation of any type or nature of motorized propelled vehicle including but not limited to snowmobiles, minibikes, all-terrain vehicles (ATV) permitted at any time'." Only by agreement of The Nature Conservancy can the above-mentioned conditions be breached.

In accordance with the document confirming the land sale, the Commissioner's Advisory Committee recommended that the tract be designated as a Scientific and Natural Area (SNA) in November 1972. The site was then officially established as the Purvis Lake - Ober Foundation SNA in August 1974.

LAND USE HISTORY

The ownership and land use history of the Purvis - Ober SNA is directly related to the life of one man, Charles Sumner Purvis. Stories abound about "old man Purvis" in northern St. Louis county. Although his strict vigilance over the property helped in many ways to protect the land, it made it difficult for him to gain the friendship of neighbors. As a result, there were few people in the area that knew him well. Nevertheless, accounts indicate that Purvis initially arrived in the region near the turn of the century, seeking work as a blacksmith or cook in a lumber camp. For several years he was a squatter on the land, until in 1913 he obtained an official patent (Appendix I.) for the 55-hectare tract that was to remain his permanent home for over 60 years. When Charlie became ill in 1965 neighbors moved him to a nursing home in the nearby town of Ely where he passed away in 1971. Although his exact age was not known, and was often exaggerated by Purvis himself, he was probably in his late eighties at the time of his death.

During Charlie's residence on the property there were few disturbances to the tract. He took care to harvest and clear only a small portion of land to sustain himself, leaving the remainder undisturbed. Those few signs of this activities that still remain visible are illustrated in Figure 2. These features, as well as interviews with past acquaintances and a check through state and county records, were used to recontruct many aspects of the preserve's land use history.

The most conspicuous features on the natural area are the remains of Purvis' homestead, all located in the clearing near the center of the tract (Fig. 2). Six structures, including an icehouse, outhouse, barn, cabin, smokehouse, and logger's quarters, were built by Purvis between 1907 and 1910. A second outhouse was constructed several years later while a blacksmith shop, reportedly built by loggers working in the area, was later remodeled by Purvis. Although they are in very poor condition, the house, barn and outhouses are still standing, the other buildings having either fallen or burned down.

A small portion of the clearing around the homestead was also used for a garden and as a pasture for two horses and several pigs. An apple tree, plum tree, lilac bush and grape vine can still be found growing near the house. Southwest of the homestead is another, much larger, clearing that was also used as a garden. In order to keep deer out, the area was surrounded with an electric fence. Built about 1915, the fence was extended over the trail that led from the homestead to the river and a gate was installed to keep unwanted visitors out (Fig. 2). Sometime after Purvis vacated the property pine and spruce seedlings were hand-planted in the south half of the clearing, apparently in an attempt to hasten reforestation. The trees now stand approximately 2 meters tall. A third clearing, locating southeast of the homestead, was used exclusively for grazing Purvis' team of horses as well as some pigs. The animals were not confined by a fence but were free to roam the entire property.

Several trails also cross the preserve (Fig. 2). Some are believed to have originated as wagon and logging roads that were in use before the property was homesteaded, while others are likely to have originated from Purvis' activities on the tract. Since the property has been left untended many of these trails have gradually become overgrown with herbaceous and shrubby growth. A few trails, however, continue to be used by visitors to the site. For example, the trail which enters the center of the tract from the west is the most frequently used access to the preserve. It is a spur off of the Taconite Corridor Snowmobile Trail which, approximately 1.5 km west of the tract, turns north around Purvis Lake. The snowmobile trail is a state-maintained trail that extends 266 km

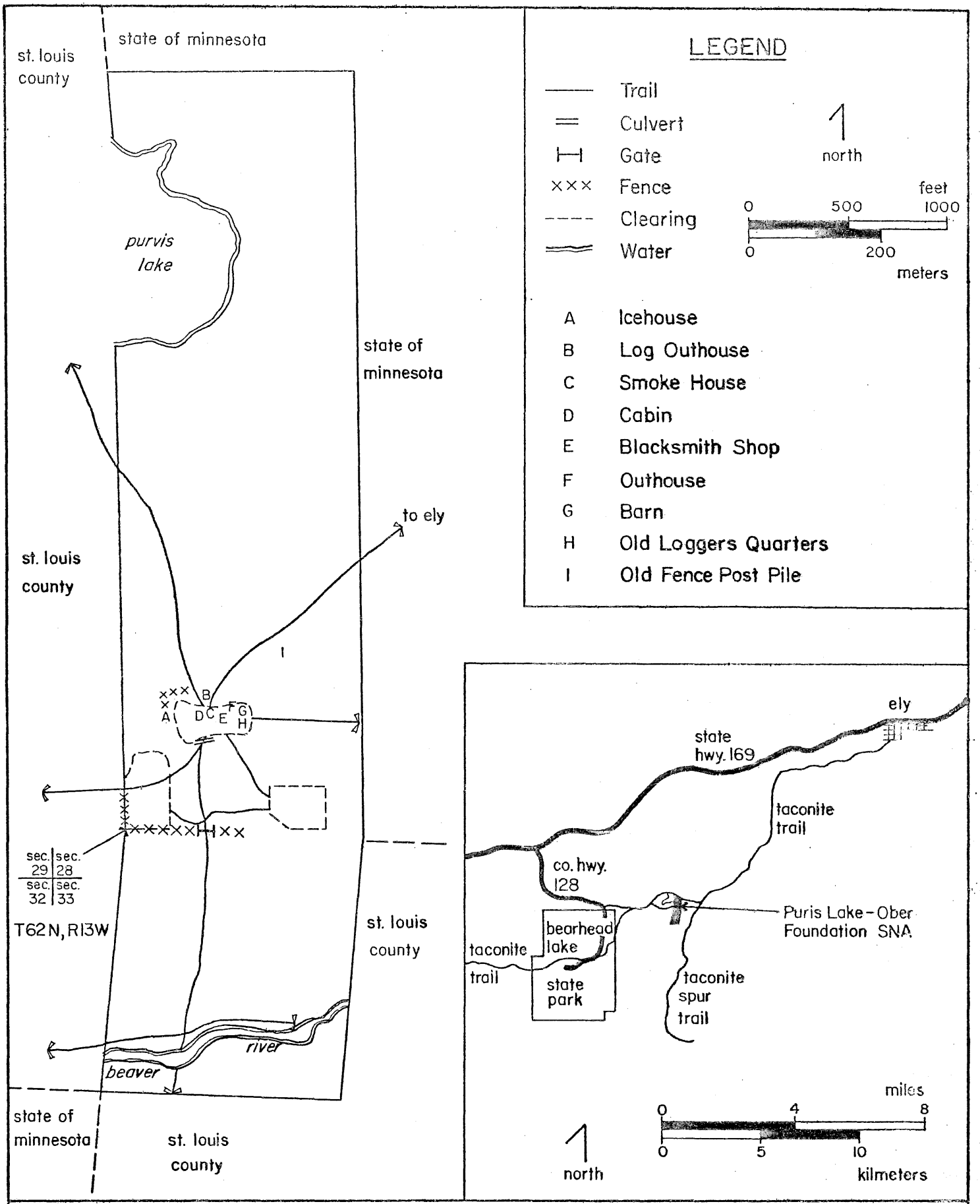


Figure 2

Land Use History and Surrounding Land Use of Purvis Lake-Ober Foundation Natural Area, 1980

from Blackberry (near Grand Rapids) to Ely (Fig. 2). The trail to the Purvis homestead, which continues northeastward from the homestead, was at one time included as part of the state trail. However, after the tract's designation as a Scientific and Natural Area, the state trail was redesignated to bypass the tract in accordance with SNA regulations. Purvis would often use this trail to travel by foot or by horse and wagon to Ely, nearly 16 km away. In addition to the trail off of the Taconite Trail that provides the main access to the preserve, another trail that heads north from the homestead to the south shore of Purvis Lake is also frequently used by visitors to the tract (Fig. 2).

Accounts indicate that, in contrast to the adjacent property, the Purvis-Ober SNA may never have been logged. Although much of the timber throughout this region was harvested in the early 1900's the Purvis tract was spared. Now, approximately 60 to 70 years later, many parcels are again at a harvestable age. For example, county land immediately west of the tract was selectively cut 5 to 10 years ago, while county land south of the preserve was clear cut about 5 years ago. During both projects, a few trees were mistakenly removed from small areas within the preserve's boundaries. Yet, in spite of all the activity around the preserve, the only timber that appears to have been harvested from the Purvis tract included some dead and fallen trees for firewood and some small pole-sized jack pine for use as fence posts.

Fire, on the other hand, has played a significant part in the history of the natural area. According to the original government survey conducted in 1880, fire swept over the entire area in the late 1870's. This corresponds well to the age of several large red pines on the area which, when cored, were found to average approximately 100 years old. The account also suggests that the tract may have been spared from the axe of early loggers because the trees post-dating the fire were still relatively young when logging activity was at a peak in the early 1900's. Other accounts indicate that smaller fires were also reported in the area between 1911 and 1913, in 1918, in 1938 and again, in 1939. The extent of these fires on the natural area, however, is not known. The only recently documented fire was on 4 July 1970, when a ground fire started by a campfire swept east from Purvis Lake.

Since Purvis' departure in 1965 the property has been used for several types of recreational activities. Such activities, including snowmobiling, cross-country skiing, hunting, camping, and occasional dirt-biking, have had little influence on the natural features of the area. Unfortunately, however, many of the buildings have been severly vandalized by those using the area.

This brief review of the land use history of the Purvis-Ober SNA reveals that man's disturbance of the tract has been relatively limited. Those activities which have taken place have had little influence or impact upon the natural resources described in the following pages.

PHYSICAL RESOURCES

OVERVIEW

The physical resources of the study area have been broken down into separate sections on geology, soils, climate and water resources. Geology, generally referring to the study of the earth, forms the first section. It has been further subdivided into two separate sections dealing first with stratigraphy and structural geology, and second with geomorphology. The former discusses the composition and arrangement of the various geologic units underlaying the tract while the latter explains the topographic features of the area. The second major part of the report is devoted to soils. Simply defined, soil is the weathered surface of the earth and essentially represents a transition from the geological to the biological realms of any area. Climate, the third main subdivision, relates to the long-term atmospheric characteristics of an area: principally temperature, precipitation and evapotranspiration. The final section, on water resources, discusses soil moisture, groundwater and surface water features, as well as seasonal variations in the water budget of the tract. In the discussion of these physical resources, particularly of geology, attention is given to historical as well as to purely descriptive aspects. A historical view not only aids understanding of the area, but also helps to identify notable physical features.

GEOLOGY

INTRODUCTION

The geology of the Purvis-Ober SNA exhibits an alternating pattern of ridges and depressions oriented in a northeast-southwest direction. The contact between the Giants Range Granite and the Ely Greenstone crosses the tract, and exposures of both rock formations are frequent. Thin to moderately thick, coarse-grained till overlies the bedrock in nost areas of the tract, while peat and alluvium have accumulated in some of the lower depressions.

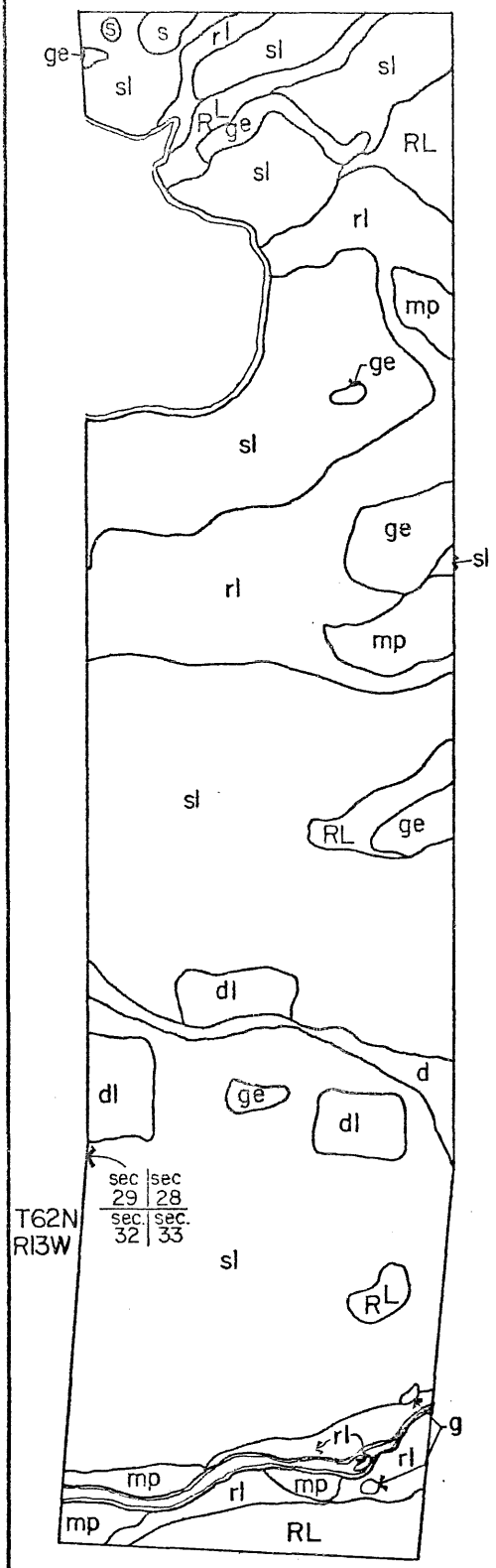
STRATIGRAPHY and STRUCTURAL GEOLOGY

Bedrock is found at or near the surface throughout all of the Purvis-Ober SNA. The outcrops on the property are composed of two igneous rock units, the Ely Greenstone and the Giants Range Granite, both of which cover large areas in this region of northeastern Minnesota. The irregular contact zone between these two formations covers most of the site. An exception is the southernmost portion of the tract, where rock exposures are represented only by Giants Range Granite (Fig. 3).

Dated at 2.6 - 2.7 billion years, the Ely Greenstone is the oldest known rock unit in northeastern Minnesota. The formation consists of a series of metamorphosed volcanic rocks over 6000 meters thick. At some locations in northeastern Minnesota, the Greenstone exhibits pillow structures. These pillows, as well as certain mineral characteristics of the rock, indicate that the sequence formed as a series of submarine lava flows. The lava flows were interrupted occasionally by deposits of ash from volcanic explosions. Simultaneous with the volcanic activity, small volumes of molten rock intruded into lower parts of the cooled rock and crystallized. Although rock composition varies within the Greenstone, the bulk of the rock body is basalt. This finely crystalline igneous rock type is characterized by abundant calcic feldspar and little or no quartz (Sims, 1972).

The Giants Range Granite formed during the late stages of a widespread igneous event known as the Algoman Orogeny. This event lasted some 50 to 100 million years, and occurred relatively soon after the Ely Greenstone had crystallized. The Granite engulfed the lower part of the Greenstone volcanic sequences, and crystallized at a shallow depth beneath the surface of the earth. It was not exposed at the surface until crustal activity in the region had ceased. The Giants Range Granite exposed on the Purvis - Ober site represents part of the formation that lies north of the Waasa Fault. This part of the Granite crystallized from a molten rock body that was at least partially intruded along the fault. The Waasa Fault, which had formed early during the Algoman Orogeny, runs from Embarrass to near Ely, Minnesota (Sims and Viswanathan, 1972). The composition of the Giants Range Granite on the natural area is that of a medium-crystalline igneous rock with a substantial quartz content and a high ratio of calcic to sodic plagioclase. Its dark ferro-magnesian minerals, mostly hornblends, appear to have been altered to chlorite, except in the exposures near the Beaver River (Fig. 3).

The contact of the intrusive Giants Range Granite with the Ely Greenstone is often imprecise due to the presence of large Greenstone fragments engulfed by the Granite. This imprecise rock contact is evident in most of the outcrops on the Purvis - Ober site. The exposures are principally Giants Range Granite containing angular fragments of Greenstone from .1 to 50 meters long.



LEGEND

BEDROCK LOCALLY OVERLAIN BY THIN TILL

Giants Range Granite

- g — excessively drained

Giants Range Granite With Fragments of Ely Greenstone

- ge — excessively drained

MODERATELY THICK TILL UNDERLAIN BY BEDROCK

Silt and Sand With Moderate Content of Course Fragments

- dl — disturbed by human activity; well drained
- sl — relatively undisturbed by human activity; well drained

Silt and Sand with high content of course fragments

- RL — well drained
- rl — poorly drained; locally overlain by peat

ALLUVIUM

Clay, Silt and Sand

- d — very poorly drained

PEAT

Mucky Peat

- mp — very poorly drained

Muck

- s — very poorly drained

NOTE
see appendix I for soil series classifications

north

0 500 1000 feet
0 200 meters

Figure 3

Surficial Geology and Soils of the Purvis Lake-Ober Foundation Natural Area

The emplacement of the Giants Range Granite, during the Algoman Orogeny, was associated with metamorphism on a regional scale. Adjacent to the intrusion, as is the case on the Purvis - Ober tract, temperatures and pressures reached moderately high levels. The resulting changes in the Ely Greenstone formed a particular mineral association known as the amphibolite facies (Sims, 1972b). In a metabasalt such as the Ely Greenstone, this facies is typified by the formation of the minerals dinopyroxene, hornblende and of a high ratio of calcic to sodic plagioclase.

Regional folding and some faulting also took place during the Algoman Orogeny, which was later followed by additional faulting (Sims, 1972b). Due to the scattered distribution of outcrops on the Purvis - Ober property it is difficult to identify any faults; it is likely, however, that some minor faults do cross the site. The rock structure exhibits a prominent series of fractures striking N 55° E and dipping very steeply to the south. This pattern correlates well with the similar alignment of the Waasa Fault to the south and other faulting and folding throughout northeastern Minnesota.

Where bedrock is not exposed it is overlain by glacial till less than three meters thick (Fig. 3). The numerous glacial advances that crossed the area during the past 60,000 years seem to have caused more erosion than deposition. The most recent advance was responsible for laying down the till now found on the tract. This ice flow occurred during the Automba Phase of the Rainy Lobe of the Laurentian Ice Sheet. It advanced over the region from the north between 14,000 and 20,000 years ago (Wright, 1972b).

The till material is dense, hard, firm and brittle; it is sandy and silty with a moderate, ten to sixty percent by volume, to high, sixty to ninety percent by volume, content of coarse fragments (Fig. 3). The boulders, cobbles and pebbles of the till are principally composed of the local bedrock types, Ely Greenstone and Giants Range Granite.

The till is overlain on much of the site by accumulations of alluvium and peat. These deposits have gathered in the topographic depressions since the end of the glacial era. The alluvial deposits are found primarily along the small stream that crosses the center of the tract (Fig. 3). The particle size of the alluvium ranges from clay to sand; its dark color is due to the incorporation of organic matter. The peat deposits are mostly moderately decomposed mucky peat, found along the Beaver River and in two bogs in the north half of the tract. In the northwestern corner of the property there are also two intermittent ponds where highly decomposed muck has accumulated. Most of these organic deposits are between .5 and 5 meters deep. Shallow peat accumulations overlie other low areas of the site mapped as till (Fig. 3).

Geomorphology

The landforms of the Purvis - Ober SNA roughly reflect the rock structure of the area. The numerous glacial advances have produced differential erosion of the bedrock, leaving a pattern of ridges and depressions roughly parallel to the dominant N 55° E orientation of rock structures. The covering of glacial till and the subsequent filling in of topographic depressions has made this pattern somewhat less obvious.

The drainage pattern in the area is not well developed, which is typical of drainage patterns throughout northern Minnesota. This points to the short period of time stream processes have dominated the landscape since the departure of the glaciers 14,000-20,000 years ago. No noticeable floodplains exist on either the Beaver River or the smaller

stream draining Purvis Lake. The drainage pattern in the region as a whole can properly be called rectangular-dendritic, although this is not evident within the small area of the Purvis-Ober site. The control of drainage by rock structure, as within the tract, is termed a "subsequent" stream pattern.

As mentioned above, two streams, the Beaver River and a smaller stream draining Purvis Lake, are found crossing the site. The smaller stream represents the principal outlet for Purvis Lake, which covers about 20 hectares and receives runoff from about 150 hectares of forested land. The northern third of the Purvis - Ober SNA drains into Purvis Lake. An old beaver dam, possibly dating back to before 1940, is located on the lakeshore about 150 meters west of the tract, and marks the starting point of the smaller stream. This stream runs south for a short distance before turning east to cut across the Purvis - Ober SNA (Fig. 4). Streamflow is rapid and is interrupted occasionally by still pools, particularly where logs have fallen across the channel. The stream flows through a small metal culvert just below the Purvis house site. It eventually drains into the Beaver River a short distance east of the study area.

The Beaver River also flows eastward across the Purvis - Ober property, but carries many times the flow of the smaller stream. While the latter at baseflow is up to 1.5 meters wide and .2 meters deep, the Beaver River averages about 20 meters wide. The widest stretch of the river on the tract is a ponded area just upstream from an old beaver dam (Fig. 4) that dates to before 1940. The most active downcutting by the river is occurring east of the dam where rock outcrops are exposed on both sides of the channel; here the stream narrows into rapids, which flow over angular granite cobbles (Fig. 4). The Beaver River drains about 25 square km of forested land west of the tract (Minn. Dept. of Nat. Res., Div. of Waters, Watershed Mapping Project, 1980).

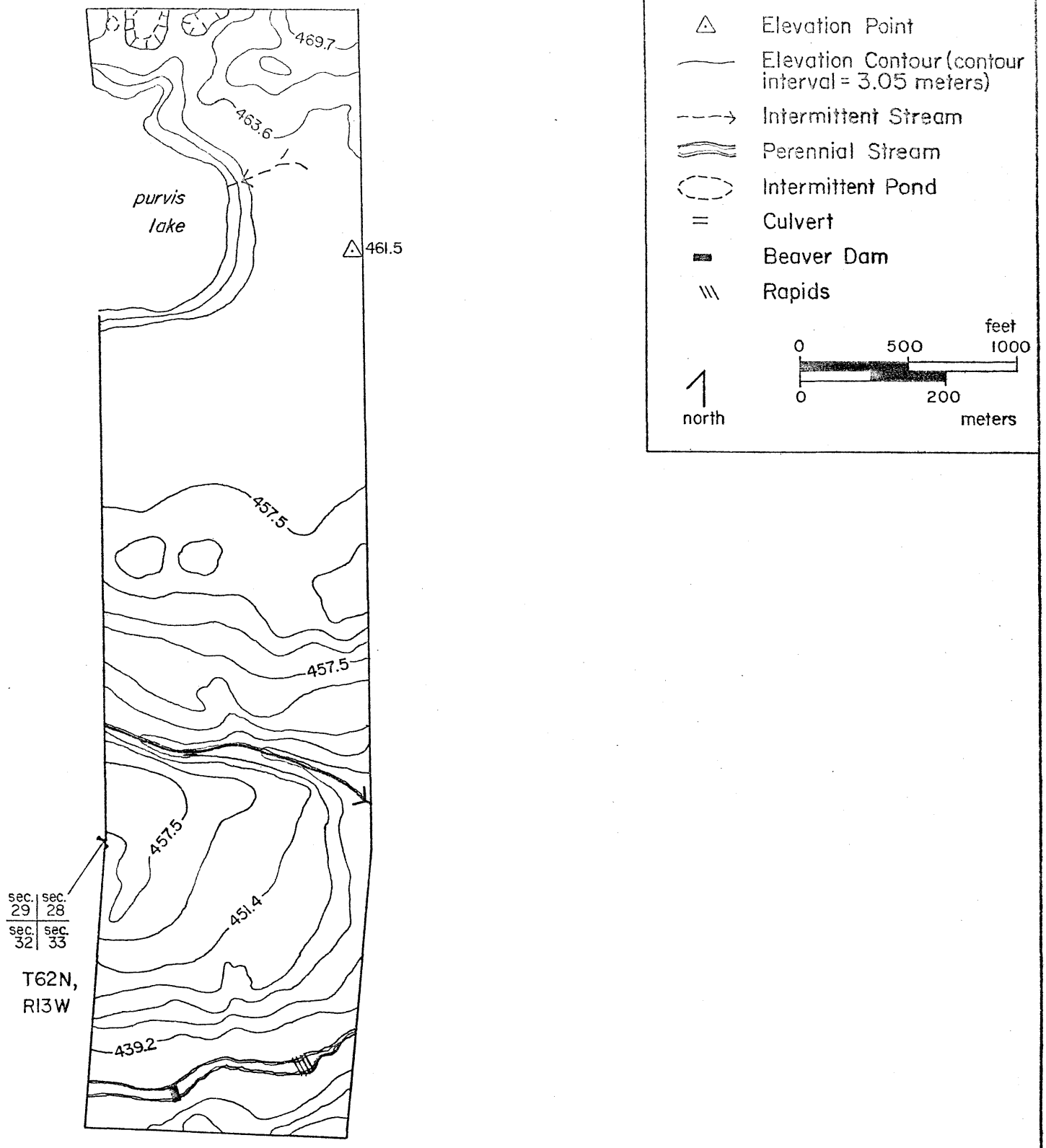


Figure 4

Geomorphology of the Purvis Lake–Ober Foundation Natural Area

SOILS

The soils of the Purvis - Ober SNA are not highly developed. Due to the cold climate and the tundra environment near the glaciers, soil development was very slow until the final retreat of the ice from Minnesota about 11,500 years ago. The tundra has been followed by coniferous forest (Wright, 1972b). In this relatively warm environment, soil development has accelerated; nevertheless, the role of parent material in determining soil type is still predominant. The soils of the site are best described in terms of till-, alluvium- and peat-derived soils, which correspond to the surficial geology (Fig. 3). On the bedrock outcrops there has been little weathering and almost insignificant soil development.

The soils derived from till (Fig. 3) are very strongly acidic in their upper horizons, and become slightly acidic at depth. The lesser acidity with depth indicates the downward movement of carbonates in the soil. Other soluble ions, such as calcium, magnesium, sodium, potassium, iron, aluminum, sulfate and chloride, as well as organic matter and clay, are also extensively leached.

The solum, or principal zone of active soil-forming processes, is up to one meter deep in the soils developed from till. The solum is divided into an upper horizon that has been leached and a lower horizon where some of the leached materials have been redeposited. Much of the leached organic matter, clay and iron have reaccumulated in the lower solum. This process, which occurs in cool forested regions, is known as podzolization. Below the solum the weathering processes have been largely non-biological.

In the till-derived soils, the texture is that of a sandy loam to a silty loam, with a moderate to high content of coarse fragements. The uppermost soil layer is dark brown and grey due to the incorporation of organic matter. Beneath this thin horizon the rest of the upper solum is frequently light-colored due to the leaching of organic matter and iron. Colors become more light yellowish to brown in the lower soil horizons.

Most of the alluvium on the Purvis - Ober SNA (Fig. 3) was deposited so recently that distinct soil horizons have not yet developed. In some places a thin surface layer of muck can be found overlying the dark brown, organic-rich loam of the alluvial deposits. Incipient mottling, an indication of intermittent waterlogging and poor aeration, may also be found in lower soil layers.

The peat-derived soils on the property (Fig. 3) are composed of moderately and highly decomposed organic matter. Much of these soils, particularly in the two bogs, are over a meter deep. The peat has a strongly acidic to neutral soil reaction, and is black to dark reddish brown in color.

Ash from forest fires is common throughout most of the soils, including those derived from peat. It is present in a surface horizon from 0 to .1 meters thick, and probably results from fires that swept the site from the west in the first half of the 20th century.

The most significant human disturbance to affect the soils of the Purvis - Ober SNA was the clearing of three areas (Fig. 3). Cobbles have been removed from the upper soil of each clearing and piled along the edges. The lower soil units remain largely undisturbed.

CLIMATE

The Purvis - Ober SNA has a typical moist continental climate with wide seasonal temperature extremes. Average daily macimum and minimum temperatures in January are -13°C. and -21°C., respectively; in July they are 29°C. and 13°C. The average date of the last spring frost is 22 May, and the average earliest fall frost is 21 September (University of Minnesota, Agricultural Experiment Station, 1971).

The average annual precipitation on the area is 709 mm. About 20 to 25 percent of this amount comes as snowfall from November through March. Precipitation, in the form of rainfall, usually increases in the spring and peaks in May or June. Much of the summer rainfall results from heavy thunderstorms. Precipitation commonly decreases in the fall (Ericson et al., 1976).

The average annual evapotranspiration in the area is estimated at 462 mm. The evapotranspiration rate increases rapidly in the spring from a winter level near zero, and normally peaks in July or August. Like precipitation, evapotranspiration diminishes in the fall (Ericson et al., 1976).

WATER RESOURCES

Soil permeability on the Purvis - Ober property is moderately rapid except where bedrock is at the surface. The permeability of the bedrock is almost completely controlled by the presence of fractures. Despite the ability of water to infiltrate at a moderate rate, much of it remains near the land surface. This is largely due to the poorly developed drainage system of the area (see Geomorphology Section). The soils of the site range from excessively to very poorly drained, with most of the poorer drainage found in the low areas (Fig. 3). The seasonal high water table in these low areas is near the land surface, while it is located at up to two meters depth on the ridges. The direction of groundwater flow in the northern half of the property is generally toward Purvis Lake. In the southern half of the tract subsurface drainage roughly corresponds to the aboveground drainage, and seaps into both the small stream and the Beaver River.

There is no available data on the discharge of the two streams for the stretches in which they cross the site. Flooding on both the small stream and the Beaver River occurs occasionally, but is rarely extensive.

The annual water budget shows a period of moisture accumulation from October to April. Most of this water is stored aboveground as snow and ice; an average of 113 days annually have more than .15 meters of snow cover. From mid-November until late April the soil is typically frozen, preventing groundwater recharge and leading to a slight decline in the water table during late winter. Streamflow in winter is sustained at reduced levels by seep discharge as well as by lake and bog storage. The normal yearly low flows of the Beaver River and the small stream occur in February or March. Snowmelt, thawing, and substantial rainfall in April and May recharge soil moisture and groundwater and increase surface runoff. It is during this period that flooding is most likely to take place. In the spring, water usually accumulates in the very poorly drained areas (Fig. 3). Except when rainfalls are excessive, both water levels and streamflow gradually recede through the summer. In July 1980, for example, the water level in the bogs had declined to .5 meters below the surface. As during the winter, stream discharge is sustained by lake and bog storage and groundwater discharge. Reduced

evapotranspiration rates in the fall eliminate the moisture deficit of late summer. Water levels and streamflow increase at this time, but not to the extent observed in the spring (Ericson et al., 1976).

BIOLOGICAL RESOURCES

OVERVIEW

The description of the biological resources of the Purvis - Ober SNA has been broken into two separate sections. The first section is devoted to vegetation, a major component of the site's ecosystem. Reflecting the combined influences of all the physical factors discussed earlier, the vegetation of the natural area provides the primary energy source for all other living organisms. The primary purpose of this portion of the report is to delineate and describe all the plant communities on the natural area as well as to identify and describe any rare or sensitive plant species. The section begins with a brief overview of the present vegetation, followed by a short discussion of the presettlement vegetation. Next, the vegetative and physical characteristics are thoroughly described for each cover type. Rare species that may occur within each cover type, but which were not documented during the 1980 inventory, are also noted. These species should be searched for during future field work.

The second section of the report characterizing the biological resources describes some of the zoological components of the tract. Two groups of animals - birds and mammals - were inventoried during the 1980 inventory. In addition, notes were made of any amphibian or reptile observations. Clearly, such a survey does not represent a complete inventory of all the animal species of the site. Several factors are responsible for the selectivity of the zoological studies. First, restraints of time, manpower, and equipment simply precluded a study of all the animals present on the tract. Second, those animals chosen for study are those for which the most information regarding biology and distribution is available. Finally, the animals chosen include most of the more visible species. As such, these species are more easily inventoried and can serve as valuable indicator species for those organisms not studied. Following a brief introduction, the animals that were surveyed are discussed in three sections (reptiles and amphibians, birds, and mammals).

VEGETATION

INTRODUCTION

The present vegetation of the Purvis - Ober SNA is a microcosm of the vegetation found throughout much of northeastern Minnesota. Despite its relatively small size, the varied surficial geology of the tract has resulted in a fairly diverse array of community cover-types. The site is dominated by a mixed upland forest, ranging from 40 to 80 years in age. Trembling aspen, paper birch, jack pine, red pine, white pine, balsam fir and white spruce intergrade with one another in the canopy. Occasionally one or more of the species may dominate but, overall, the area can be described as unifromly heterogenerous. Also in the upland, mature red pines, approximately 100 years old dominate a large stand on the east side of Purvis Lake, while white cedar dominates a small stand on the south shore of the Lake. In the lowlands small black spruce bogs are found in the peat-filled depressions of the site while black ash and cedar are limited primarily to the alluvial soils. Three small dreds that were cleared during the time of Mr. Purvis' residence are the only major disturbances.

ORIGINAL VEGETATION

The present vegetation of the Purvis - Ober SNA is, in part, a reflection of the human and natural modifications that have taken place since the area was originally settled. In an attempt to understand what the magnitude of these modifications may have been it is important to know how the vegetation appeared prior to settlement. Tools for reconstructing the past vegetation are available in the records of the General Land Survey office. These records, which constitute the field notes of the men who originally surveyed Minnesota during the late 1800's, provide detailed information regarding the presettlement vegetation.

As the men surveyed each township they walked along the section lines, marking the mile and half-mile intervals by recording tree species, diameter at breast height (dbh), and distance from the survey corner to the nearest tree. Theoretically, the only criteria for selecting these bearing trees was that they had to have a minimum dbh of five inches (Fedkenheurer, 1975). As the surveyors travelled through the townships they also recorded the locations of uplands, swamps, streams, roads, and lakes. Although there are several problems in the use of survey notes for determining past vegetation, including fraud, bias, and species name duplication, the records remain a valuable source of information regarding the nature of the vegetation prior to settlement by European man (Fedkenheurer, 1975). The original survey notes for the general vicinity of the Purvis Lake tract have therefore been transcribed and plotted in Figure 5.

The transcription of the survey notes has been carried one step further by Francis J. Marschner (1930) and James Trygg (1967). Both men have used the records to develop comprehensive maps of the state's original vegetation. By examining Figure 5, as well as the maps prepared by Marschner and Trygg, a general description of the original vegetaion of the Purvis - Ober SNA can be compiled.

Within the 40 km^2 area defined by Figure 5, 32% of the bearing trees recorded by the surveyors were pines, of which at least 39% were red pines, that averaged 33 cm in dbh. Jack pines were less frequent (20%) and were considerably smaller, with an average dbh of 63.5 cm. Small, and presumably young, aspen (average dbh = 13.2 cm) and paper birch (average dbh - 15.5 cm) were the other frequently encountered upland species. In the lowlands spruce and tamarack were most common.

Marschner's interpretation of these notes resulted in his classifying the vegetation of the region as typical of the northern pine woods, with white pine and red pine as the major dominants. Although white pine was not frequently encountered during the survey, Marschner apparently took into account many of the additional comments recorded by the surveyors. These comments indicated that a large fire recently burned much of the area, no doubt decimating many fire-sensitive white pines. Trygg, on the other hand, took a more strict interpretation of the surveyors notes and only delineated a small area of pine forest in the southwest corner of the tract.

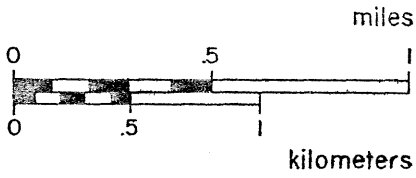
In addition to marking and recording bearing trees, the surveyors wrote a brief description of the section lines they walked. Included in the description were notations of additional trees species encountered, the undergrowth, and the soil of the area. Around Purvis Lake the surveyors noted that the soil was third rate and unfit for cultivation. As mentioned above, the area also showed evidence of a past forest fire. Trees

were entirely absent in some areas while a dense undergrowth of young aspen, birch and alder covered other areas. It seems that fire burned much of the forest in the vicinity of the Purvis tract, accounting for the small dbh of most bearing trees and the absence of pine species that might otherwise be present.

This brief description of the presettlement vegetation provides a setting for the discussion of the present vegetation in the following pages. The most apparent changes in the vegetation over the past century have included the following: an increase in the diversity of species represented in the canopy; a decrease in the importance of red pine and, to an even greater degree, white pine; and the increased prevalence of jack pine. With the exception of fire, disturbances on the Purvis tract have been minimal during the past 80-90 years. These changes, therefore, most likely reflect the influence of past fires.

LEGEND

----	Township Line
	Swamp
	Stream
	Lake
——	Natural Area Boundary
T	Tamarack Swamp
28	Section Number
NP10	Norway Pine 10" Diameter Breast Height



A	Aspen	JP	Jack Pine
a	Ash	NP	Norway
al	Alder	P	Pine
B	Birch	S	Spruce
Ba	Black Ash	T	Tamarack
C	Cedar	WB	White Birch
F	Fir	WP	White Pine

Figure 5

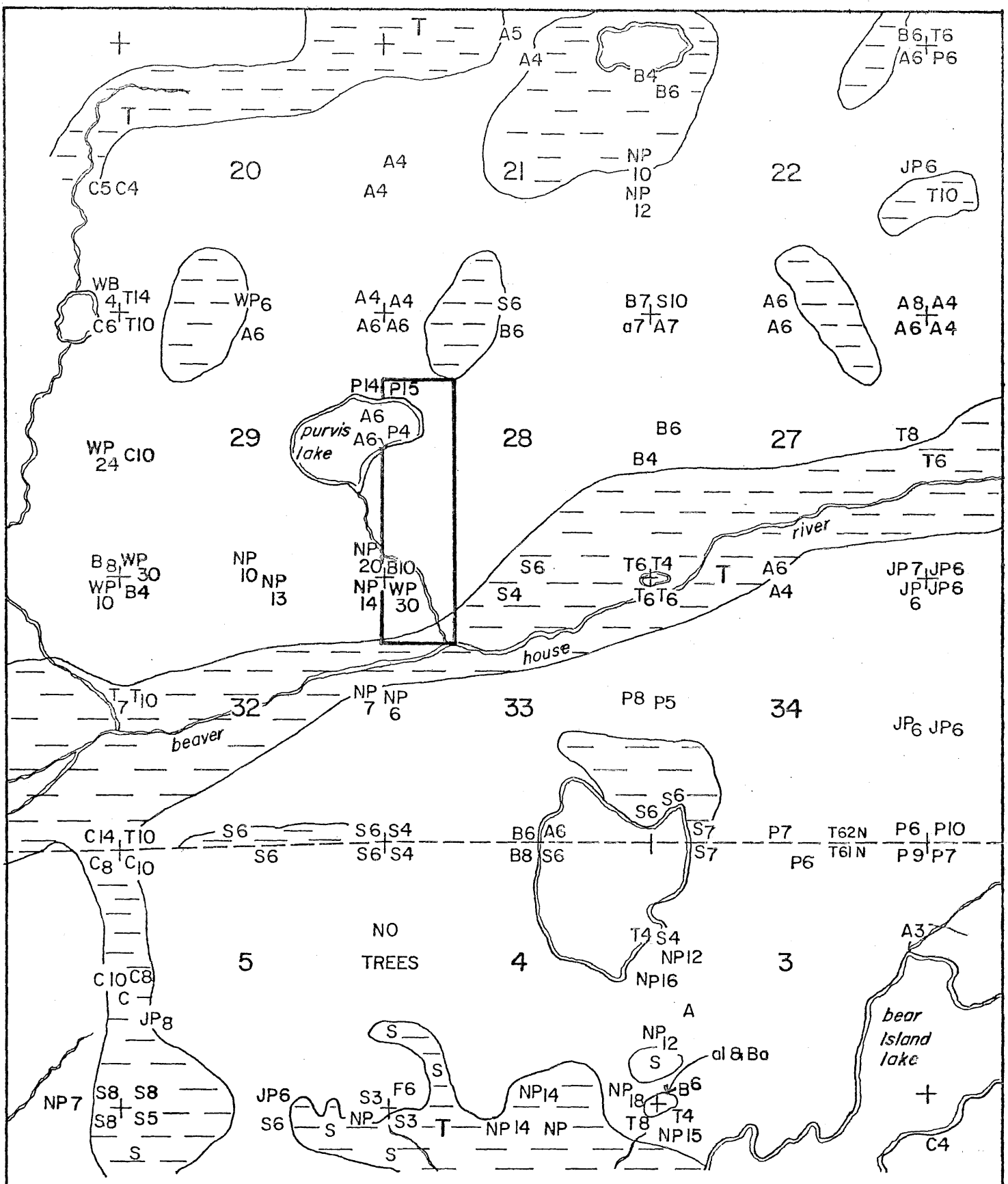


Figure 5

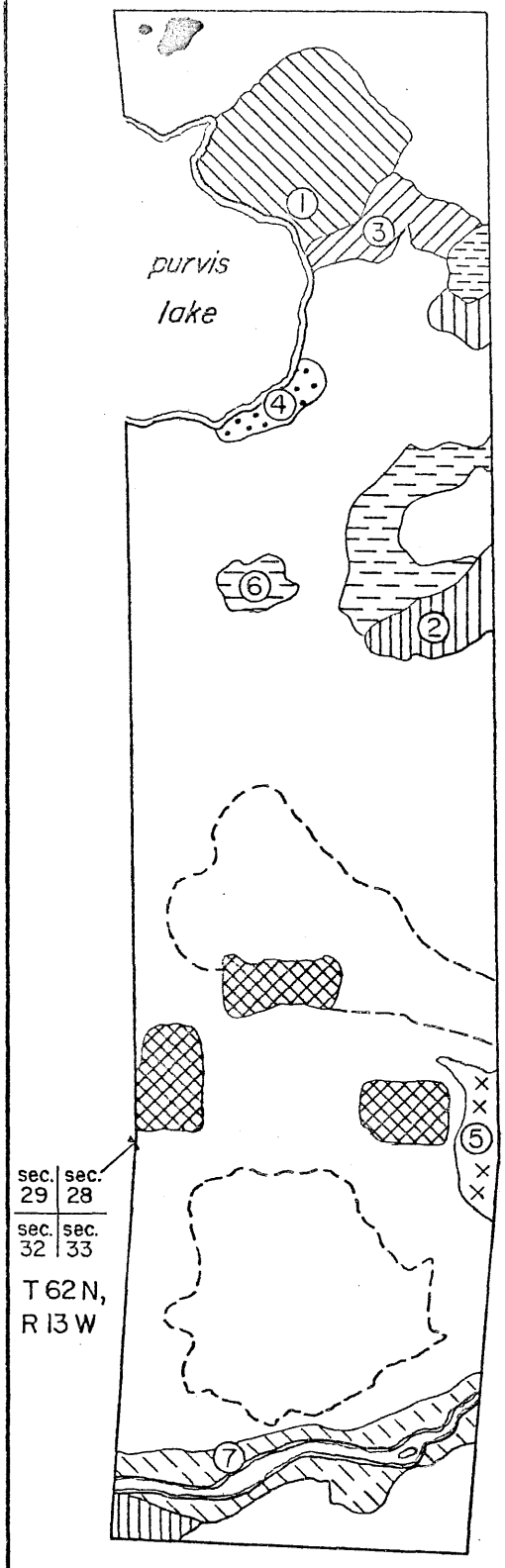
The Original Vegetation of the Purvis Lake-Ober Foundation Natural Area. (adapted from the general land office survey notes, 1880). parts of T 61 N, R 13 W and T 62 N, R 13 W.

METHODS

As stated earlier, field work to qualitatively describe the present vegetation of the Purvis - Ober SNA proceeded in two directions. The first was an attempt to delineate and describe the plant communities of the tract. Communities were initially identified by preparing a cover type map with the use of serial photos and soil maps. During the first trip to the site, on 19 June - 21 June 1980, the map was ground-truthed in order to accurately refine and revise the mapping units. During the second trip on 28 July - 29 July 1980 the releve method of vegetation analysis (Heitlinger, 1979) was used to gather supporting data for describing the major cover-types. Supporting data included sociability, cover abundance, and height classifications for each species identified. General characteristics of the soil were also obtained by taking soil samples in each community. Dominant plant species and soil types determined from these data were used to classify the different vegetation types. The classification scheme used to designate the cover types was provided by the Minnesota Natural Heritage Program (MNHP, 1980a). The releve data sheets comprise Appendix III of this report.

The result of the field methods outlined above was the preparation of a vegetation cover type map for the natural area (Fig. 6). Each of the communities delineated on the map will be described in detail in the following pages.

The second direction in which the field work proceeded was to determine the likelihood of rare plant species (as defined by the Minnesota Natural Heritage Program, 1980b) occuring in the study area and to determine which habitats and species may require further searching following a preliminary survey. The investigation was carried out by Welby Smith, staff botanist for the Natural Heritage Program, who visited the site on 28-29 July 1980. Although no rare plants species were previously known to occur at the site, and none were found during the initial survey, the investigation revealed that any of several rare species may be discovered and should be searched for during future field work. These species are presented in the discussion of the herbaceous flora under each appropriate community description.



LEGEND

- Mixed Northern Forest
- Higher Jack Pine Density
- Mature Red Pine
- Upland White Cedar
- Black Ash
- Black Ash-White Cedar
- Black Spruce – Labrodor Tea
- Black Spruce – Alder
- Shrub Thicket
- Seasonal Pond
- Clearing
- (X) releve number and location

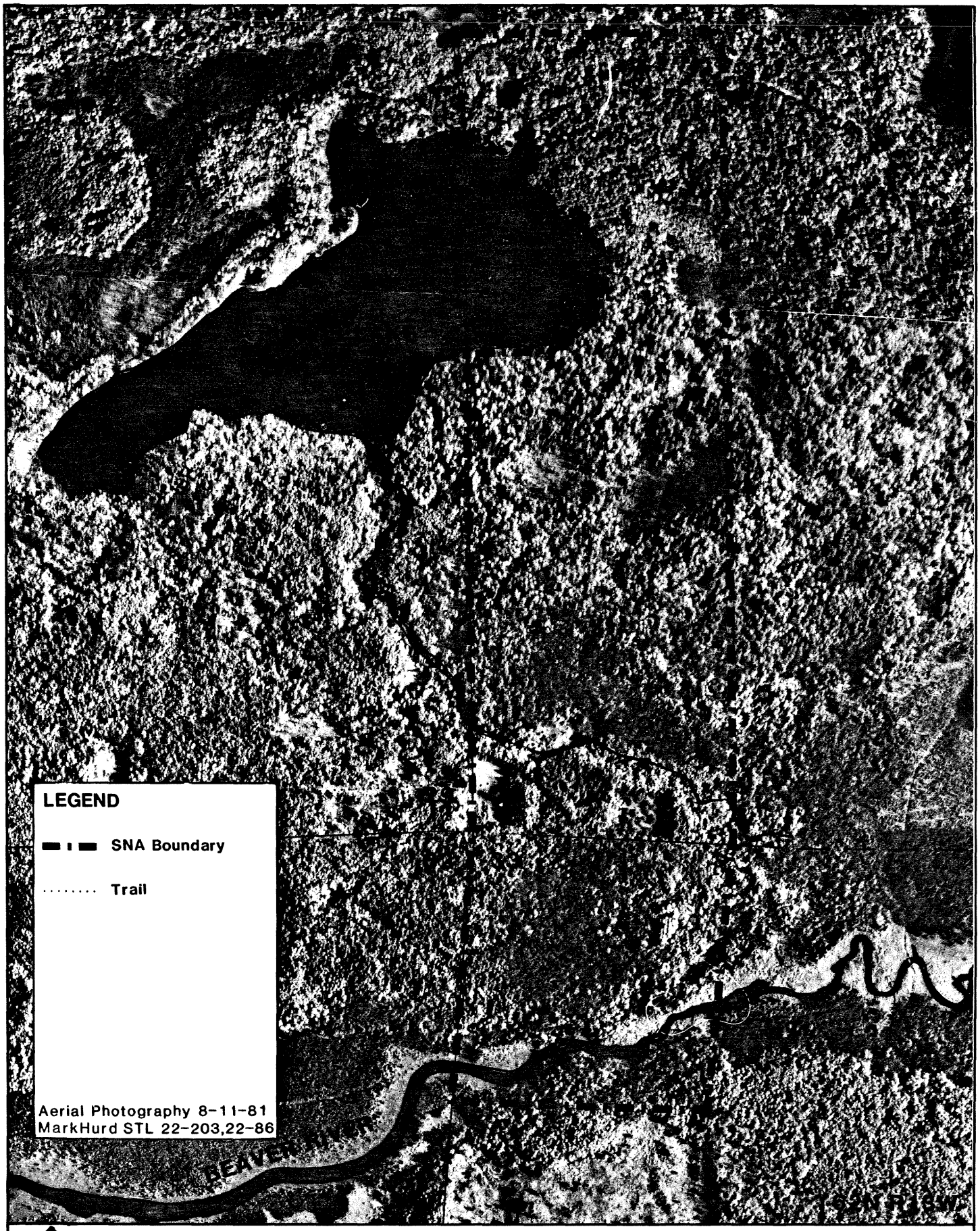
north

0 500 1000 feet

0 200 meters

Figure 6

Plant Communities of the Purvis Lake – Ober Foundation Natural Area



PURVIS OBER SNA

Mixed Northern Forest: 39.3 hectares, 72.9% of the study area.

The majority of the SNA is classified and mapped as Mixed Northern Forest. The canopy is co-dominated by Populus tremuloides, Betula papyrifera, Populus grandidentata, Abies balsamea and Pinus banusiana, Pinus strobus, Pinus resinosa and Acer rubrum occurs as scattered groups or individuals. Within this covertype are smaller areas largely dominated by one or two of the above species. Pinus banksiana, for example, dominates the canopy in two areas; on the south facing slope just north of the Beaver River, and in an area north and east of the homestead. Aspen and birch with a balsam fir understory dominate the north facing slope south of the river.

The understory vegetation of this cover class is generally similar throughout. The tall shrub layer is quite sparse with only an occasional Corylus cornuta, Acer spicatum or Abies balsamea. Lower shrubs, however, are more prominent and include Vaccinium angustifolium, Lonicera canadensis and Viburnum rafinesquim.

Typical of most northern upland stands, the herbaceous layer is dominated by such species as Aster macrophyllus, Pteridium aquilinium, Cornus canadensis and Aralia nudicaulis. Additional herbaceous species that are abundant in the community in the NW¼ SW¼ SW¼ of Section 28 are Habenaria orbiculata, Carex intumescens, Rubus parviflorus, Cinna latifolia and Lycopodium complanatum. Rare species that prefer this habitat type and are known to occur in the vicinity of the study area include: Carex ormostachya, Waldsteinia fragarioides and Ophioglossum vulgatum var. pseudopodum. These species should be searched for during future trips to the Purvis tract.

Scattered throughout the cover type are old charred stumps, many presumably red pine and white pine. No doubt these are remnants of the large fires that swept through the area in the latter half of the nineteenth century and the early years of the twentieth century (see Land Use History). Although there may have been smaller fires in subsequent years, for example during the late 1930's, the general absence of fire-scarred trees throughout the stand suggests that most of the community post-dates these large, earlier fires. This is further supported by increment cores taken from a red pine and an adjacent balsam fir which reveal ages of approximately 76 and 40 years, respectively. The only exceptions noted are two red pines found at the base of the south-facing slope north of the river. Both are considerably larger than other red pines on the tract (the dbh of one tree was 63 cm) and both have prominent fire-scars.

There is very little evidence of any recent human disturbance since the stand's origin. Only a small number of jack pine trees, both north and south of the old homestead, have been cut apparently for fence posts.

Red Pine: 2.8 hectares, 5.0% of the study area.

Bordering the northeast shore of Purvis Lake is a mature red pine (Pinus resinosa) stand. Like the mixed northern forest, this community is supported by moderately thick till deposits of silt and sand. Most of the stand is situated on a 15° southwest-facing slope that gradually levels out to the east. Dominated by mature trees of Pinus resinosa, the stand also includes scattered, smaller trees of Populus tremuloides, Acer rubrum,

Picea glauca and Pinus strobus. Barring any future disturbance, the dominance of red pine in the canopy will be relatively short-lived; red pine is not present in any stratum below 10 meters in height. An increment core taken from a dominant tree indicates an age of approximately 100 years. The growth of this tree, and perhaps of the entire stand, appears to have significantly decreased during the last 50 years.

The understory of the community is dominated by a very dense cover of Acer spicatum. Scattered Abies balsamea and Corylus cornuta are also present. Some of the typical herbaceous species include Aster macrophyllus, Cornus canadensis, Pteridium aquilinum, Chimaphila umbellata, Pyrola secunda and Pyrola elliptica.

White Cedar Upland: 1.6 hectares, 2.8% of the study area.

A small upland stand of white cedar (Thuja occidentalis) is located on the southeast shore of Purvis Lake. Situated on a gentle north-facing slope, the stand occurs on a very shallow organic soil underlain by gravelly till. Although the canopy is dominated by Thuja occidentalis, averaging 15.2 cm in dbh, scattered Betula papyrifera and Populus tremuloides trees are also present. Increment cores taken from two T. occidentalis trees indicate that the stand is approximately 80-90 years old.

The understory is relatively open and free of either tall shrubs or deadfall. The only canopy species reproducing in the understory is Populus tremuloides, and then only in the openings. Acer rubrum and Abies balsamea are represented by a few seedlings as are the tall shrubs Corylus cornuta, Amelanchier sp. and Sorbus americana. These seedlings, together with a samll collection of herbaceous species and low shrubs, cover approximately 25% of the forest floor.

BLACK SPRUCE COMMUNITIES

The Purvis - Ober tract contains several small, poor-drained depressions that support bog vegetation (Fig. 6). Covering approximately 7% of the natural area, this vegetation can be classified into two types of black spruce (Picea mariana) communities. The first, the Picea mariana - Ledum groenlandicum (Black Spruce - Labrador Tea) cover type, is characterized primarily by a dense canopy of P. mariana and a very open understory. By contrast, the second community, the Picea mariana - Alnus rugosa (Black Spruce - Alder) cover type, is characterized by an open canopy of P. mariana and a very dense tall shrub layer.

Picea mariana - Ledum groenlandicum: 1.6 hectares, 2.9% of the study area.

North of the Beaver River the eastern boundary of the natural area bisects two small black spruce bogs. The two stands are nearly identical in their structure and composition. Both are uniform, even-aged stands with canopies composed entirely of Picea mariana. With the exception of the height stratum from the ground level to approximately .5 meters, the understory vegetation beneath the black spruce canopy is very sparse, with only an occasional Betula papyrifera or P. mariana sapling. The ground stratum consists of a thick carpet of Sphagnum and is further characterized by the presence of the following species: Chamaedaphne calyculata, Kalmia polifolia, Habeneria obtusata, Monotropa hypopithys, Carex disperma, Carex aenea, Eriophorum spissum and Vaccinium vitis-idaea var. minus. Rare species that prefer this habitat type and are known to occur in the vicinity of the study area include: Geocaulon lividum, Habenaria clavata, Pyrola minor and Ranunculus laponicus. Again, these species should be searched for during future field work.

Both stands are also bordered by a small transition zone (approximately 10-15 meters wide) where the vegetation is characteristic of the Picea mariana - Alnus rugosa cover type discussed below. Occasionally this transition broadens out and covers several hectares (Fig.6).

Although dead - standing and fallen black spruce trees are apparent in both bogs, they appear to be a more prominent feature in the stand located directly southeast of Purvis Lake. It is possible that the stand is approaching the end of its natural longevity and, with the gradual opening of the canopy, new species may soon begin to invade. An increment core taken from a mature black spruce tree reveals that the growth of the stand has decreased significantly over the past 40-50 years. The stand appears to be at least 100 years old.

South of the Beaver River, located in the extreme southwest corner of the tract, is a third example of the Picea mariana - Ledum groenlandicum community type. This stand, however, differs in several respects from the bogs north of the river. Most conspicuous is the addition of occasional Larix laricina trees in the canopy. Although no increment cores were taken, the stand appears to be somewhat younger than those found in the northern part of the tract; the Picea and Larix trees are gradually invading the rather open mat of Ledum, Carex and Sphagnum. Some Picea also has been cut recently from the eastern edge of the stand.

Picea mariana - Alnus rugosa: 2.4 hectares, 3.9% of the study area.

The Picea mariana - Alnus rugosa cover type cover type occurs at three sites north of the Beaver River. The community is characterized by a very open canopy composed of occasional Betula papyrifera, P. mariana and/or Larix laricina trees. The maximum dbh of the trees is approximately 15-18 cm. The understory, on the other hand, is dominated by a dense-to-open cover of Alnus rugosa in the shrub layer. Micro-habitats that receive greater shade have Sphagnum hummocks which support Caultheria hiopidula and Carex trisperma. Areas that are more open in aspect and receive direct sunlight all characterized by Calamagrostis canadensis, Scirpus atrocinctus, Solidago uliginosa, Aster puniccus, Aster umbellatus and Glyceria canadensis. No rare species searching is not needed.

A soil core taken at the site directly south of Purvis Lake reveals a deep deposit of peat. Within the core, two layers of ash from past fires were apparent. Although the sites where this cover type occurs are lowlands, surface water was not present during the July field work.

Among the three sites occupied by the Picea mariana - Alnus rugosa cover type, the two located near the eastern boundary of the tract border other wetland communities, notably the Picea mariana - Ledum groenlandicum and the Fraxinus nigra (Black Ash) cover types. The third site, however, is surrounded on all sides by upland cover types. It is likely that all three sites were previously Picea mariana bogs. One theory for the origin of the Picea - Alnus cover type is that the preexisting canopy of P. mariana was broken up by strong winds that knocked down trees. The tree's shallow root system in these saturated soils no doubt increases a bog forest's susceptibility to this type of disturbance. After the canopy was opened up by wind (and/or fire), there may have been a subsequent rise in the water table (due to a decrease in the transpiration of the vegetaion) which was followed by an invasion of such wetland species as Alnus rugosa and Calamagrostis canadensis.

BLACK ASH: .8 hectares, 2.0% of the study area.

The black ash (Fraxinus nigra) cover type is represented by a single stand located directly east of Purvis Lake. A soil core taken near the center of the community reveals approximately 10 cm of highly organic soil overlying gravel. A small creek, less than 60 cm wide, meanders through the stand, but was dry during July 1980 field work.

The canopy is dominated by a dense cover of Fraxinus nigra, with occasional Abies balsamea and Picea glauca trees also present. Towards the western edge of the stand, near the lake, the canopy becomes more diverse, picking up occasional Ulmus americana and Populus grandidentata trees. The understory is nearly devoid of any shruby vegetation, although scattered Prunus pennsylvanica and Salix sp. are encountered near the lake. In the herbaceous layer Lycopus uniflorus, Galium sp., Scutellaria epilobiifolia and Glyceria sp. are the major species contributing to the dense cover.

BLACK ASH - WHITE CEDAR: .8 hectares, 2.0% of the study area.

Located along the eastern border of the tract, the Fraxinus nigra - Thuja occidentalis (Black Ash - White Cedar) cover type occurs on a mesic-to-wet lowland, approximately .8 hectares of which occurs within the tract. A small creek, draining southeastward from Purvis Lake into the Beaver River, runs through the center of the stand. Unlike other mineral soils on the tract, the soil at this site is a very deep mineral soil with a high content of organic matter. This rich soil supports an interesting diversity of both herbaceous and canopy species.

Although dominated by Fraxinus nigra and Thuja occidentalis, other species present in the canopy include Abies balsamea, Ulmus americana, Betula papyrifera, Tilia americana and Populus balsamifera. The Ulmus, however, is represented primarily by a few large, dead trees. Among the seven canopy species, only Fraxinus and Abies are common in the understory. Of special note is the impressive size of one Thuja occidentalis tree measuring 87.5 cm in dbh. The largest white cedar in Minnesota is located in Koochiching County and measures approximately 104 cm in dbh.

The herbaceous layer in this stand is characterized by many species that are commonly found in "rich woods" characteristic of mesic sites in southern Minnesota. The southern components of the herbaceous flora include: Asarum canadensis, Caulophyllum thalictroides Aralia racemosa, Uvularia grandiflora, Amphicarpa bractrata, Osmorhiza claytoni, and Thalictrum dasycarpum. Although many of these species are not particularly uncommon on rich sites in northeastern Minnesota, the occurrence of one species, Caulophyllum thalictroides, represents a northeastward extension of this species in Minnesota of approximately 110 km. The primary dominants in the understory are Parthenocissus quinquefolia and Athyrium felix-femina. Rare species with southern affinities that may also occur in this habitat and should be searched for are Actaea pachypoda, Claytonia caroliniana and Poa sylvestris.

SEASONAL PONDS: 1 hectare, 2.0% of the study area.

In the northwest corner of the Purvis - Ober SNA there is a small opening in the forest canopy. Orientated on a northeast-southwest axis the southwest one-third of the opening appears to be a very shallow seasonal pond. On the July 28-29 visit to the tract standing water was not present. The mucky peat, however, was saturated with water. Soil cores reveal approximately 60 cm of muck underlain by rocky material. The aquatic plants growing in the center of the opening are Sagittaria latifolia and Nuphar sp. Near the margin of the pond Scirpus sp. is dominant.

The soil of the remaining two-thirds of the opening is a bit more firm and supports a dense cover of sedges, notably Carex projecta, Carex vesicaria and Carex arcta, as well as Scirpus sp. Other species present include Hypericum majus, Hypericum virginicum var. fraseri, Veronica scutellata, Sagittaria cuneata and Glyceria striata. Toward the extreme northeast end of the opening, the surrounding vegetation has begun to encroach upon the pond. Among the species present are Potentilla palustris, Rhus radicans, Cornus rugosa and Illex verticillata. Several aspen have also invaded the area but many have since died. A fair amount of deadfall, presu,ably from the upland, is also present, including both aspen and pine. Rare species that prefer this marsh-like habitat and are known to occur in the vicinity of the study area include Bidens discoidea, Eleocharis olivacea and Sparganium glomeratum.

The opening is surrounded on all sides by a thin zone of Fraxinus pennsylvanica, Tilia americana and Ulmus americana. An occasional Quercus macrocarpa can also be found.

SHRUB THICKETS: 1.6 hectares, 2.8% of the study area.

Bordering both the north and south edges of the Beaver River is a linear shrub community dominated by Spirea alba and Myrica gale. Other co-dominats include Chamaedaphne calyculata, Betula pumila and Carex sp. On both sides, as one moves away from the river, the Spirea-Myrica cover quickly grades into black spruce and alder which in turn grades immediately into the upland cover type. Scattered throughout the transition to the upland are very small pockets of Abies balsamea. This appears to be a more prominent feature along the south edge of the river where the trees are growing on a north-facing slope. Evidence of damage by sawfly larvae is apparent in all the pockets.

CLEARINGS: 2 hectares, 3.7% of the study area.

As stated earlier (see Land Use History) Mr. Purvis cleared three small areas on his property during the 60 years he resided there. In the ten years since he has left the tract very few shrubs or trees have invaded these openings. The only exception is near the western boundary of the tract, in the clearing which Mr. Purvis used for his garden. Although the site has become overgrown primarily by dogbane (Apocynum androsaemifolium) some pine and spruce seedlings were planted in the south half of the clearing. The trees now stand approximately two meters tall. It is thought that once Purvis left the property, someone planted the seedlings in an attempt to hasten restoration.

SPECIALIZED HABITATS

In addition to the communities described above there are three much smaller and specialized habitats that could be searched for rare plants during future field work: aquatic habitats, the lake shoreline and rock outcrops. The only truly aquatic habitat where rare species may potentially occur is the shallow water zone of Purvis Lake. This habitat was sampled at the NW¼ SW¼ NW¼ of Section 28, and the only species observed was Potamogeton spirillus. It is possible that an intensive search of the entire habitat would discover one or more of the following rare species: Callitriche heterophylla, Elatine triandra, Subularia aquatica and Potamogeton vaseyi.

The shoreline vegetation at this site was characterized by Myrica gale, Carex stricta and Carex arcta. The rare species that prefer this habitat are: Carex flava, Carex katahdinensis, Salix pellita and Scirpus pedicellatus.

Exposed rock outcrops occur frequently at several locations withing the study area. The rare species which may occur in association with such features are Deschampsia flexuosa Phacelia franklinii, Agrostis geminata and Allium schoenoprasum var. sibiricum.

ANIMALS

INTRODUCTION

A total of 57 vertebrate animal species were recorded on the Purvis - Ober SNA during the 1980 inventory. Although several species of mammals (12) were reported along with one reptile, birds (44) contributed the largest number of species, accounting for 77% of the vertebrate fauna observed.

Because of the relative inaccessibility of the Purvis - Ober tract it was difficult to collect information on many faunal groups. Birds and mammals were the prime focus of the field work during the three trips taken to the site. If there is an opportunity to conduct more field work in the future, it is recommended that more attention be directed to reptiles, amphibians and butterflies.

REPTILES AND AMPHIBIANS

Incidental reptile and amphibian sightings were recorded whenever observers were on the natural area. During three trips to the site, totalling eight days, only one reptile was observed. A painted turtle (Chrysemys picta) was seen just north of the Purvis cabin on 21 June. Painted turtles are common in wetland habitats throughout Minnesota. On the natural area, Purvis Lake and the slowly meandering Beaver River probably provide suitable habitat for the species.

BIRDS

An inventory of birds was conducted on the Purvis - Ober SNA to document species composition. All birds that were either heard or observed during the three trips taken to the site were recorded. The first trip, on 19-21 June 1980, was planned specifically to coincide with the peak of the breeding season for songbirds in northeastern Minnesota. All the species recorded during this trip are listed in Table 1. No additional species were observed during either of the two subsequent trips to the tract in July and August.

Nearly all of the 43 species listed in Table 1. are typical of the forested uplands and lowlands of northeastern Minnesota. The only notable exception was the pine warbler, Dendroica pinus. Although this species is commonly reported in the coniferous uplands west of St. Louis County it is infrequently reported as a breeding species further east. The pine warbler on the Purvis - Ober SNA, an adult male, was observed singing from the top of a black spruce tree, on the edge of a coniferous bog on 20 June 1980.

Table 1. Birds of the Purvis Lake - Ober Foundation Natural Area

Scientific Name	Common Name	Remarks
Gavia immer	Common Loon	Pair frequently seen on Purvis Lake; also seen flying over the tract.
Buteo platypterus	Broad-winged Hawk	Believed to be nesting on north end of tract.
Bonasa umbellatus	Ruffed Grouse	Female with young observed near homestead.
Ardea herodias	Great Blue Heron	Observed flying over tract.
Bubo virginianus	Great Horned Owl	Heard on tract during the night.
Chordeiles minor	Common Nighthawk	
Archilochus colubris	Ruby-throated Hummingbird	
Megaceryle alcyon	Belted Kingfisher	
Colaptes auratus	Common Flicker	
Sphyrapicus varius	Yellow-bellied Sapsucker	
Myiarchus crinitus	Great Crested Flycatcher	
Empidonax minimus	Least Flycatcher	
Contopus virens	Eastern Pewee	
Cyanocitta cristata	Blue Jay	
Perisoreus canadensis	Gray Jay	
Corvus corax	Raven	Flock observed several times on the tract.
Parus atricapillus	Black-capped Chickadee	
Sitta canadensis	Red-brested Nuthatch	
Certhia familiaris	Brown Creeper	
Troglodytes troglodytes	Winter Wren	
Turdus migratorius	American Robin	

Table 1. Continued

Scientific Name	Common Name	Remarks
Hylocichla ustulata	Swainson's Thrush	
Hylocichla fuscescens	Veery	
Regulus satrapa	Golden-crowned Kinglet	
Vireo solitarius	Solitary Vireo	
Vireo olivaceus	Red-eyed Vireo	
Mniotilta varia	Black-and-White Warbler	
Vermivora ruficapilla	Nashville Warbler	
Parula americana	Parula Warbler	
Dendroica coronata	Yellow-rumped Warbler	
Dendroica virens	Black-throated Green Warbler	
Dendroica fusca	Blackburnian Warbler	
Dendroica pensylvanica	Chestnut-sided Warbler	
Dendroica pinus	Pine Warbler	
Seiurus aurocapillus	Ovenbird	
Oporornis philadelphia	Mourning Warbler	
Wilsonia canadensis	Canada Warbler	
Piranga olivacea	Scarlet Tanager	
Pheucticus ludovicianus	Rose-breasted Grosbeak	
Spizella passerina	Chipping Sparrow	
Zonotrichia albicollis	White-throated Sparrow	
Melospiza georgiana	Swamp Sparrow	
Melospiza melodia	Song Sparrow	

MAMMALS

METHODS

An inventory of large and small mammals was also conducted to document species compostion on the Purvis - Ober SNA. Small mammal populations were sampled during a summer trapping session, while large mammals were recorded by visual observations only. A short, two night trapping session (total trap nights = no. traps x no. nights trapped = 274) was carried out from 26 August to 28 August 1980. An attempt was made to sample all major habitat types on the Purvis - Ober tract while keeping time and manpower constraints in mind.

Three traplines were set consisting of Museum special snap traps and Sherman live traps.[1] The ratio of snap traps to live traps was approximately ten to one. One line of 34 traps, one line of 35 traps, and a third line of 66 traps (total no. of traps = 135) were distributed throughout the natural area. The traps were laid down in a pattern of ten museum specials followed by one Sherman live trap. The distance between consecutive traps was 8-10 meters and the total length of a line was either 350 meters or 700 meters, depending on the number of traps. Traps were baited with a mixture of peanut butter, liver and bacon grease. In addition to the traplines, two leghold traps were used in an attempt to capture larger species such as mink (Mustela vison), beaver (Castor canadensis) or raccoon (Procyon lotor).

All traps were checked and rebaited both mornings of the two night session. All dead captures were assigned a number corresponding to the trap number and retained. Speciments badly damaged by scavengers were disposed of. Information on species and sex was obtained, if possible, and in some cases, measurements were taken prior to disposal of the specimen. Live captures were identified by species and sex and retained only if the animal was in poor condition or if the species was not well documented on the area. An attempt was made to save skins and/or skulls from all members of the family Soricidae so that positive species identification could be made.

In the lab, collected specimens were identified to species and measured. Measurements included weight (grams), total body, tail, ear and hind foot length (millimeters). Other information recorded included the date and location of the capture, type of trap and the sex and age (immature or adult) of the specimen.

Whenever possible, two of each species caught were prepared as voucher specimens and deposited in the collection at the Bell Museum of Natural History, University of Minnesota. Skulls were kept to provide a means of positive identification. A catalogue of species and a trapping journal also accompanied the vouchers to the museum. Copies of the catalogue and journal have been retained for the SNA files. Reproductive information, including measurements of testes and embryos, was obtained for voucher specimens and recorded in the catalogue. Mammals not prepared as vouchers were kept frozen and donated to supporting institutions.

[1]Maps showing locations of traps and traplines plus descriptions of vegetation types traversed are available in the SNA files.

To supplement the trapping data, incidental mammal sightings were recorded whenever possible. Two additional trips were made to the tract earlier during the field season, which increased the chances of encountering uncommon species or larger mammals that could not be effectively trapped. Mammal sign or tracks were also recorded as evidence of an animals presence on the area. To increase the chances of locating tracks, a scent station was set up on the edge of the seasonal pond in the northwest corner of the tract. A commercial wolf/coyote scent was displayed for two nights with no success. A steady rain the first trapping night may have reduced the effectiveness of the lure or wiped clean any tracks that may have been made prior to the rain.

The incidental mammal sightings were recorded with the date, location and details of the observation. These incidentals were added to the existing list of species for the Purvis - Ober ANA. Copies of this information are available in the SNA files.

DISCUSSION

The results of the 1980 mammal inventory are presented in Table 2. The list indicates the method of identification (trapping or sighted/sign) for each species and the number recorded with each method. Overall, a total of twelve species were observed on the Purvis - Ober SNA.

Results of the small mammal trapping are given as total numbers of each species caught. A total of 50 animals were captured during the two night effort, (274 trap nights) representing a trapping success of 18.2%. Eight species were positively identified by specimens and skulls deposited at the Bell Museum. Peromyscus maniculatus and Clethrionomy gapperi were the predominant species trapped, accounting for 86% of the total number of specimens caught. These two species were very common and were found in all of the major habitats sampled.

Other species recorded on the area were found in extremely low numbers. Of the remaining six species trapped, only Microtus pennsylvanicus was recorded more than once. Low numbers may be the result of the shortened trapping session, reduced population levels, or a combination of other factors.

Five additional species were also recorded as incidentals on the Purvis tract (Table 2). Red squirrels (Tamiasciurus hudsonicus) and whitetail deer (Odocoileus virginianus) are common throughout the forested regions of northern Minnesota as are black bear (Urus americanus) and moose (Alces alces). Beaver (Castor canadensis), also frequently encountered in this region, are still active on the Purvis - Ober SNA as evidenced by recent cuttings found on 26 August 1980. The cuttings were found in an aspen-birch stand along the southeast shore of Lake Purvis. A lodge is located across the lake on the north shore, about 300 meters west of the area boundary. An old beaver dam is also present on the Beaver River at the southern end of the tract, although the dam shows no sign of recent upkeep. The lodge for this family of beavers is situated approximately 50 meters west of the dam, on the north edge of the river. It is not known whether the activity on Purvis Lake is the result of a shift by the beaver from the river or if two separate individuals or families are involved. The only observation of a beaver took place on 20 June when, upon approaching the river from the north, the familiar tail slop of the animal was heard on the water.

Table 2. Mammals of the Purvis Lake - Ober Foundation Natural Area

Species		Method	
Scientific Name	Common Name	Trapping	Sighted/Sign
Sorex cinereus	Masked Shrew	1	
Blarina brevicauda	Shorttail Shrew	1	
Tamias striatus	Eastern Chipmunk	1	
Tamiasciurus hudsonicus	Red Squirrel		2
Castor canadensis	Beaver		1 heard on river; many signs.
Peromyscus maniculatus	Deer Mouse	27	
Clethrionomys gappeci	Boreal Redback Vole	16	
Microtus pennsylvanicus	Meadow Vole	2	
Napeozapus insignis	Woodland Jumping Mouse	1	
Ursus americanus	Black Bear		2
Mustela erminea	Shorttail Weasel	1	
Odocoileus virginianus	Whitetail Deer		1
Alces alces	Moose		1

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APPENDICES

APPENDIX I. HISTORY OF OWNERSHIP

Date of Acquisition	Owner	Means of Acquisition
May 1913	Charles S. Purvis	U.S. Government Land Grant
May 1972	Minnesota DNR	Private Sale (by representative of the Estate of Charles S. Purvis)

APPENDIX II. SOIL SERIES CLASSIFICATIONS

Map Symbol on Figure 2	Soil Series Name	Soil Family placement in U.S. Soil Conservation Service Classification
G	Quetico	Lithic Udorthents, loamy, mixed, frigid
	and	
GE	Rock Outcrop	unclassified
DL	Barto,	Lithic Dystochrepts, loamy, mixed, frigid
	Conic,	Typic Fragiochrepts, coarse-loamy, mixed, frigid
	Insula	Lithic Dystochrepts, loamy, mixed, frigid
	and/or	
SL	Mesaba	Typic Dystochrepts, coarse-loamy, mixed, frigid
RL	Rubble Land	unclassified
rl		
a	Alluvium	unclassified
mp	Mucky Peat	Borohemists, euic
S	Seelyeville	Typic Borosaprists, euic