INVENTORY OF PEAT RESOURCES

AITKIN COUNTY, MINNESOTA

MINNESOTA DEPARTMENT
OF NATURAL RESOURCES

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INVENTORY OF PEAT RESOURCES AITKIN COUNTY MINNESOTA

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INTRODUCTION

Peatlands are one of Minnesota's many natural resources. Estimates of the area they cover range from 2.4 million hectares (5.9 million acres) to 3.1 million hectares (7.6 million acres), which is about 11 to 16 percent of the state's total area (see fig. 1).

About half of Minnesota's peatlands are state-owned or state-administered land and are presently undeveloped. Recent interest in peatland development by private industry for horticultural and energy use prompted the state to investigate peatland management.

In 1976, the Minnesota State Legislature created the Peat Information Program to study current and potential uses of Minnesota's peatlands and to develop policies concerned with their leasing and development. As a part of this program, the Minnesota Peat Inventory Project (MPIP) was initiated to collect information about the location, quality, and quantity of Minnesota peat to aid in future decisions regarding peatland management.

Funded by the Legislative Commission on Minnesota Resources and the Minnesota Legislature early inventory work began in Lake of the Woods, Koochiching, Aitkin, and St. Louis counties. The first report published was *Inventory of Peat Resources in Southwest St. Louis County, Minnesota.*

In 1979, the U.S. Department of Energy (DOE) and the Gas Research Institute (GRI) awarded the State of Minnesota a grant to determine the location and amount of fuel-grade peat in Minnesota that could potentially be harvested and utilized for energy production in an environmentally acceptable manner. This grant enabled the MPIP to accelerate the existing state-funded survey and to collect additional baseline data. A reconnaissance-level peatland survey of Koochiching County was completed, and *Inventory of Peat Resources, Koochiching County, Minnesota* was published with DOE/GRI funding.

The subject of this report is the MPIP reconnaissance-level peatland survey of Aitkin County, which contains 170,050 ha (420,160 ac) of peatland (see fig. 1). The main objectives of this study were to map the resource and to determine the quality, quantity, and energy potential of peat in the county. The report consists of (1) a text that discusses the resource and the survey and (2) a map of the peat resources in Aitkin County.

The survey was completed by the MPIP staff with the assistance of the Minnesota Geological Survey (MGS). The MGS provided the MPIP with a surficial geology map of the county (Hobbs 1981), an accompanying geologic history, assistance with the field work and field data compilation, and cartographic services.

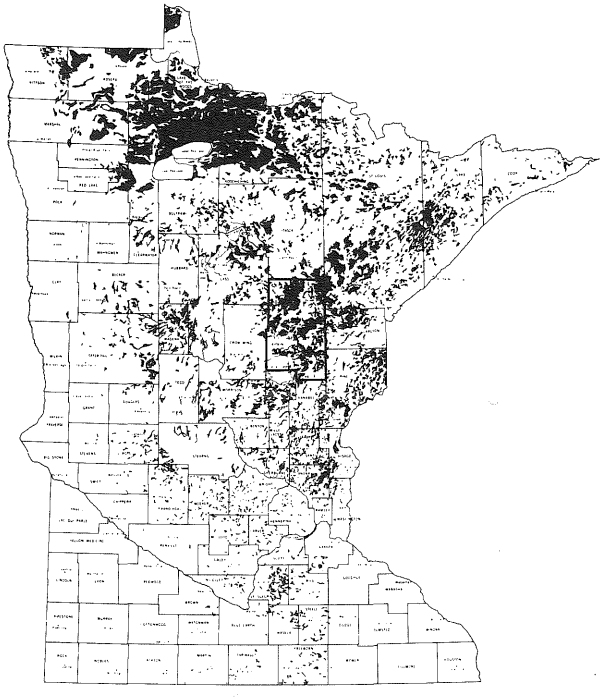


Fig. 1. Distribution of Peat Resources in Minnesota

INTRODUCTION TO PEATLANDS

PEATLAND FORMATION

Requirements for Peat Formation

Peat is an organic soil composed of partially decomposed plant matter. It forms in an unbalanced system where the rate of accumulation of organic materials exceeds the rate of decomposition (humification). Peat formation usually occurs in water-saturated environments, where the wet condition limits the supply of oxygen and, therefore, limits the population of aerobic microorganisms that digest plant remains. These anaerobic conditions greatly reduce the decomposition rates and allow the plant matter to accumulate as peat (Kavanagh and Herlihy 1975).

Peat formation depends on an interaction of climatic and topographic factors, which determine where and to what extent peatlands will occur. Cool, humid climates, where precipitation exceeds evapotranspiration, are generally most favorable to peat accumulation.

Peat deposits are usually found in areas with low, flat, poorly drained topography that allows water-saturated conditions to persist. Peatlands in Minnesota formed primarily in areas that were modified by glacial processes. Glacial landscapes on which peatlands occur include glacial lake plains, ground moraine, end moraine, pitted outwash plains, and outwash plains. Glacial lake plains are large, flat expanses that are usually covered with laminated fine sand, silt, and clay, which restrict drainage. Ground moraine is characterized by poorly sorted deposits and an undulating surface with immature drainage that may slow water movement in some areas. End moraines and pitted outwash plains contain numerous depressions and basins, called kettles, formed when blocks of ice within the glacial drift melted, allowing the overlying sediment to collapse. These kettles often filled with water creating lakes and ponds that are suitable sites for peat accumulation. Outwash plains, generally composed of stratified coarse sand and gravel, are usually characterized by good drainage; however, if a high water table is present they may be suitable sites for peat accumulation.

Peatland Formation Processes

There are two major processes by which peatland formation can occur: lakefill and paludification.

Lakefill is the filling in of lakes and ponds by vegetation (see fig. 2). Following the formation of a lake, deposition of limnic sediment, composed mainly of aquatic plants, begins in the basin. As aquatic sedimentation and infilling from the uplands make the lake shallower around the margins, plants adapted to the wet environment, such as reeds and sedges, become established. These plants die and accumulate as peat around the fringe of the lake forming a surface on which other plants can grow. Gradually the vegetation migrates toward the center of the basin, eventually dies, and accumulates as peat. During the process the peat may initially accumulate as a floating mat around the margin of the lake; however, the peat eventually fills the basin.

Paludification, also called swamping, is the process of peatland expansion caused by a gradual raising of the water table due to peat accumulation (Heinselman 1963) (see fig. 3). It occurs on level or gently sloping terrain and begins with the growth of plants adapted to wet conditions in low areas. The plants die and accumulate as peat under saturated conditions that inhibit decomposition of plant materials. This peat accumulation impedes drainage, raises the water table, and allows the plants to migrate farther from the original area, further impeding drainage and continuing the cycle. Peat expansion from low areas may slowly move upslope and cross drainage divides and may eventually form a continuous blanket of peat over the landscape.

CLASSIFICATION

Peat Classification

Numerous peat classification systems exist, each designed for specific uses. The purpose of the systems vary from classification of the resource for soil scientists and geologists to classification solely for the horticultural peat industry. Most users adopt a combination of classification systems that incorporates criteria that pertain both to the degree of decomposition and to the botanical origin of the soil.

In the United States, systems developed by the Swedish scientist von Post, the USDA Soil Conservation Service (SCS), and the International Peat Society (IPS) are widely used. In the 1920s, von Post developed a system used for assessing the degree of decomposition of undisturbed, undrained peat (Puustjarvi and Robertson 1975). It is a ten-point scale based on physical properties of peat that are observed as a small sample is squeezed in a clenched fist. The amount and the turbidity of the water that is released as the sample is squeezed and the amount of peat that is extruded between the fingers are the classification criteria. The scale ranges from H1 for undecomposed peat to H10 for completely decomposed peat (Table 1).

The Soil Conservation Service developed a system for classifying organic soils that is based on the fiber content of the soil. A fiber is defined as a fragment or piece of plant tissue, excluding live roots, that is large enough to be retained on a 100-mesh sieve (openings 0.15 mm in diameter) and that retains the recognizable cellular structure of the plant from which it came (Soil Survey Staff 1975). This system classifies peat according to a three-grade scale: fibric, peat that contains more than

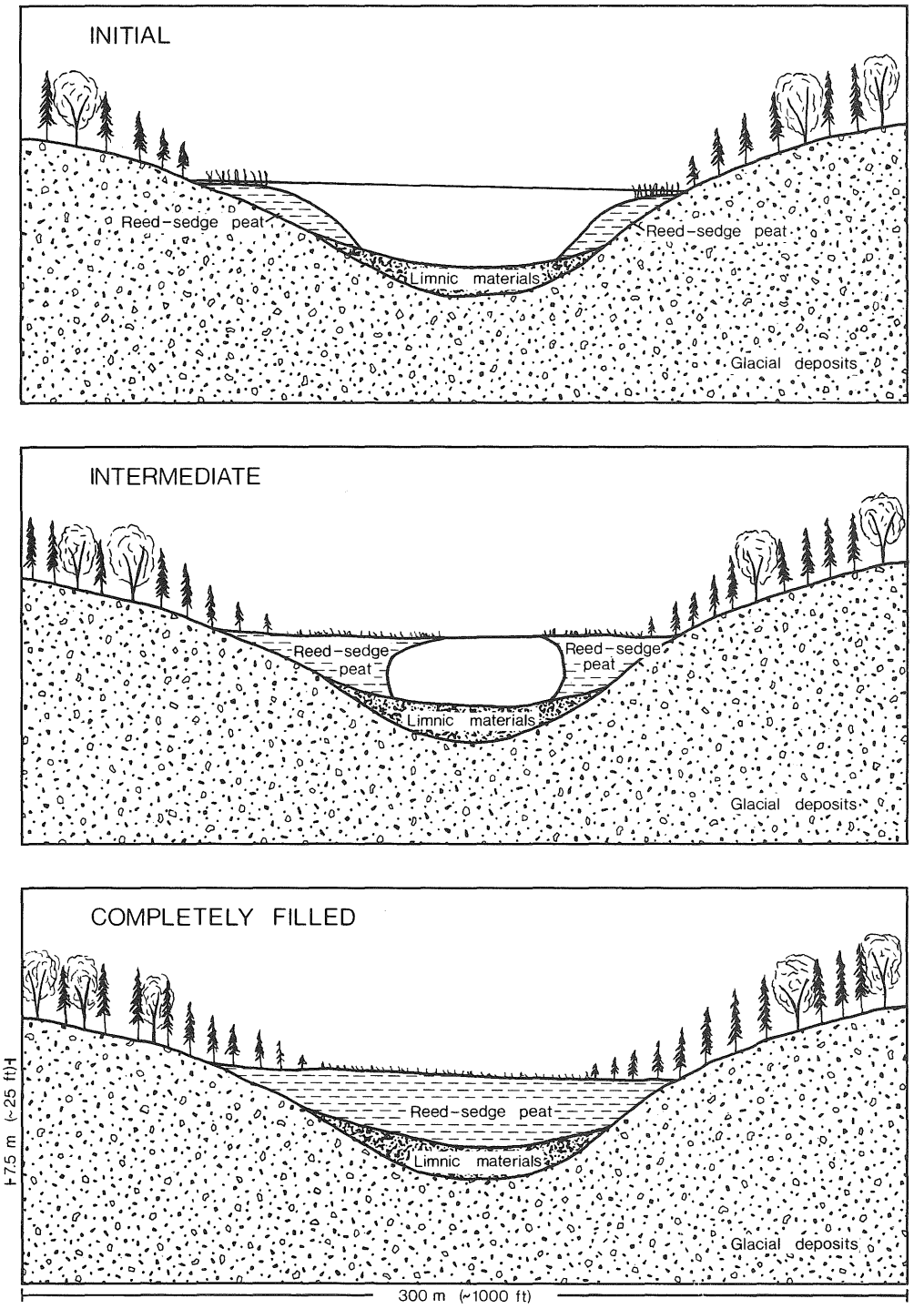


Fig. 2. Lakefill Process of Peatland Formation

66% fiber by volume; hemic, peat that contains from 33% to 66% fiber by volume; and sapric, peat that contains less than 33% fiber by volume. The percentage of fiber is used as a direct measure of the degree of decomposition.

In 1976, the International Peat Society, in an effort to standardize peat classification systems worldwide, published its classification proposal (Table 2). It collapsed the ten-point von Post system into three categories: R1 includes H1-3, R2 includes H4-6, and R3 includes H7-10. The proposal also classifies peat by its botanical origin. The groups include (1) moss peat, composed of plant remains derived from sphagnum and other mosses; (2) herbaceous peat, composed of plant remains derived from sedges, reeds, grasses, and related species; (3) wood peat, containing plant remains from trees and woody shrubs; and (4) mixed groups. Table 3 correlates the von Post, SCS, and IPS classification systems.

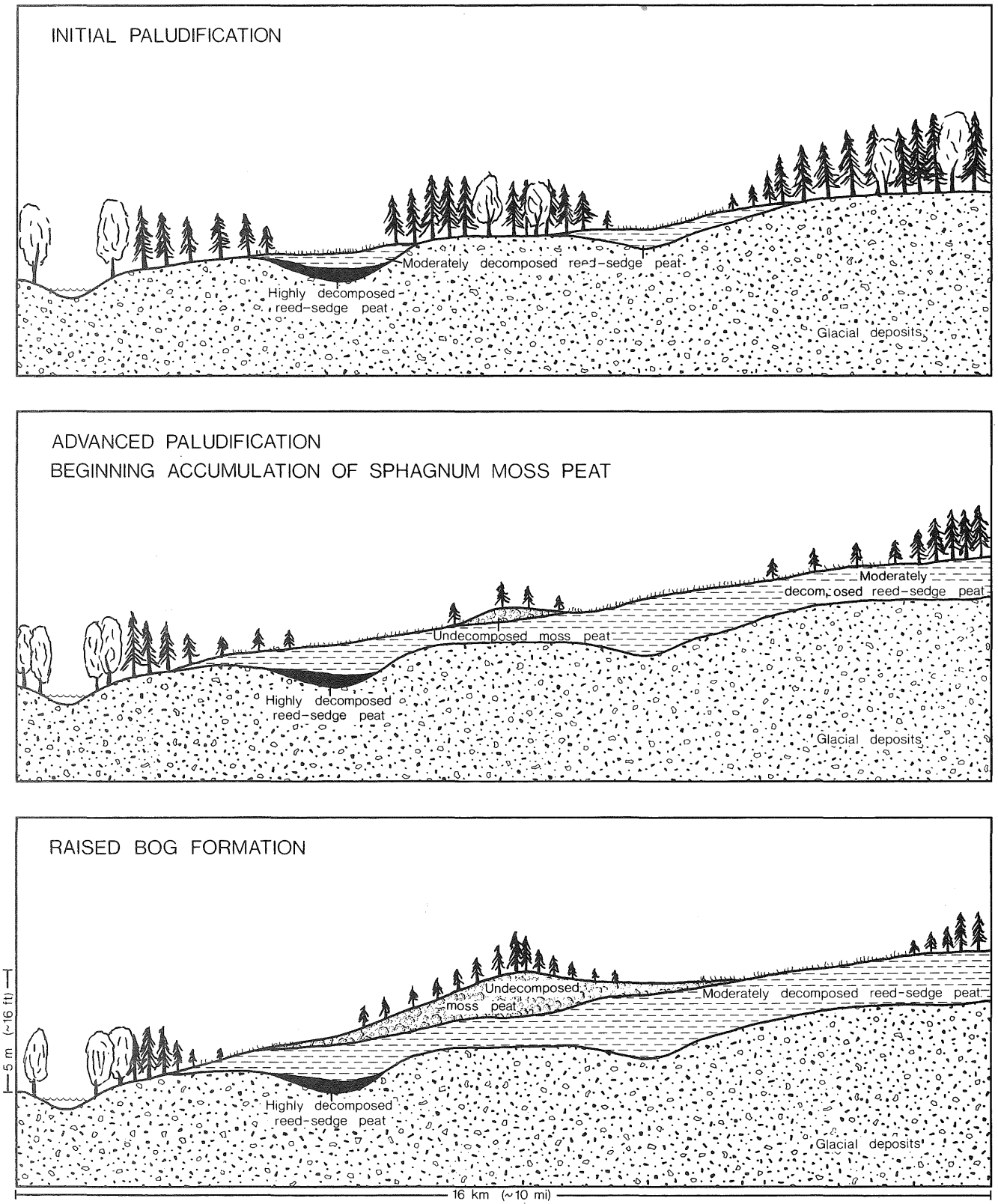


Fig. 3. Paludification Process of Peatland Formation

TABLE 1

MODIFIED VERSION OF THE VON POST SCALE FOR ASSESSING THE DEGREE OF DECOMPOSITION OF FRESH PEAT

Degree of decomposition	*Nature of water expressed on squeezing*	*Proportion of peat extruded between fingers*	*Nature of plant residues*	*Description*
H1	Clear, colourless	None	Unaltered, fibrous, elastic	Undecomposed
H2	Almost clear, yellow-brown	None	Almost unaltered	Almost undecomposed
H3	Slight turbid, brown	None	Most remains easily identifiable	Very slightly decomposed
H4	Turbid, brown	None	Most remains identifiable	Slightly decomposed
H5	Strongly turbid, contains a little peat in suspension	Very little	Bulk of remains difficult to identify	Moderately well decomposed
H6	Muddy, much peat in suspension	One third	Bulk of remains unidentifiable	Well decomposed
H7	Strongly muddy	One half	Relatively few remains identifiable	Strongly decomposed
H8	Thick mud, little free water	Two thirds	Only resistant roots, fibres and bark, etc., identifiable	Very strongly decomposed
H9	No free water	Almost all	Practically no identifiable remains	Almost completely decomposed
H10	No free water	All	Completely amorphous	Completely decomposed

SOURCE: Puustjarvi and Robertson, Peat in Horticulture.

Peatland Classification

Peatlands can be classified by their vegetation, which is a reflection of the water chemistry of the peatland, into fens and bogs. Fens support a wide variety of vegetation, including sedges, cattails, mosses, willow, bog birch, alder, numerous ericaceous shrubs such as swamp laurel and leatherleaf, and tree species such as tamarack, northern white cedar, and black spruce. Fens receive water from precipitation and from ground water that has percolated through mineral soil. The water is usually neutral or slightly acidic and is rich in nutrients.

Bogs support a very limited flora. Sphagnum mosses usually dominate the ground cover, and various densities of ericaceous shrubs are present. Scattered, often stunted, black spruce are common, but dense stands occur locally. Bogs are isolated from the influence of mineral soil and receive water and nutrients solely from precipitation. Bog waters are usually very acidic and nutrient poor.

Raised bogs are a type of bog characterized by a dome-shaped accumulation of fibric sphagnum moss peat usually overlying herbaceous or woody peat (see fig. 3). They begin to form on local watershed divides within peatlands where isolation from mineral-rich water favors sphagnum moss growth (Heinselman 1970; Hobbs 1980). Typical raised bog vegetation patterns can be interpreted from aerial photographs as lines of black spruce radiating outward from a central point or axis. Unforested openings between these lines of spruce are bog drains, where runoff is channelled away from the bog crest (Glaser et al. 1981).

PEAT STRATIGRAPHY

A typical cross section of a Minnesota peatland consists of a thin basal layer of sapric peat, covered by a relatively thick layer of hemic peat, overlain locally by fibric peat (Severson et al. 1980; Olson et al. 1979). The layers within a deposit, which can be differentiated by degree of decomposition and botanical origin, reflect the hydrologic conditions and vegetation cover that existed when the peat was laid down.

Initial peat accumulation is fairly decomposed (sapric) because the aerobic conditions at the surface of a deposit favor a rapid rate of decomposition. As peat continues to accumulate, the resultant rise in the water table produces saturated, anaerobic conditions causing a slower rate of decomposition that is more conducive to

TABLE 2

IPS THREE-GRADE SCALE OF PEAT DECOMPOSITION

Scale grade	*Percent of fibers*	*Structure and look of the peat bulk*	*Presence and look of humus*	*Amount and look of water*
R1 Weakly decomposed peats	>70%	Spongy or fibrous, built of plant residues tied with one another. For separation tearing off the plant residues is required. Easily recognizable plant residues (well preserved). Elastic, compact.	Not visible or occurs in little amounts as a dispersed dark mass, saturating and coloring plant residues.	Great amount of water, which can be easily pressed out and pours as a streamlet. Almost totally pure or slightly brownish. May contain dark humus spots.
R2 Medium decomposed peats	70-40%	Amorphous-fibrous, grass and moss peats contain numerous plant residues of various size; woody peats are more friable due to the presence of wood residues in amorphous humus. When pressed in fingers, transforms into an amorphous, plastic mass.	Distinctly discernible against which plant residues are visible. Humus can be pressed out between fingers of the clenched fist but not more than 1/3 of the taken sample.	Can be pressed out or flows by few drops; usually thick and of dark color/humus. In drained peat slightly colored with humus coagulated in consequence of partly drying.
R3 Strongly decomposed peats	<40%	Lumpy-amorphous, consisting in main part of humus. In lumpy-amorphous peat greater fragments of plant residue/wood, rhizomes, greater rootlets/occur. Friable, disintegrates under pressure. Amorphous peat strongly plastic, with sporadic greater plant residues.	Uniform mass, can be pressed out between fingers of the clenched fist in the amount of a half or the whole of the taken sample.	Cannot be pressed out, instead the humus mass is squeezed.

hemic peat accumulation. Further accumulation of peat can elevate the peat surface above the influence of mineral water. This nutrient-poor environment favors the growth of sphagnum mosses, which modify the environment further by increasing the acidity of the water and by drawing up the water table by capillary action. These conditions further limit the rate of decomposition and fibric peat accumulates.

Variations in this typical cross section can occur. Sapric and fibric peat may be interlayered throughout a profile since short-term climatic changes, such as drought or excessive moisture, affect the water table and, therefore, the degree of decomposition. Man-induced changes, such as ditching, may also affect the rate of decomposition.

USES OF PEAT

The type of peat within a peatland and the extent and depth of a peat deposit are factors that may determine its use. For example, extensive areas of hemic herbaceous peat are necessary for large-scale energy operations because this type of peat has the highest heating value per pound. On the other hand, fibric sphagnum moss peat deposits, which occur in raised bogs, have a high value in the horticultural industry as a soil amendment due to their high water-holding and cation exchange capacities.

A third use of peat is as a chemical raw material for the production of industrial commodities such as peat coke, waxes, and yeasts. The yield of these products is dependent on the botanical origin and degree of decomposition of the peat. For example, sphagnum moss peats yield greater quantities of carbohydrates, used in the production of yeasts, than other peat types (Fuchsman 1978).

In addition to these extractive uses of peat, there are several nonextractive uses of peatlands. These include agriculture, forestry, sewage treatment, preservation, recreation, and the production of energy crops. For a detailed discussion of peat uses, see *Minnesota Peat Program Final Report* (MDNR 1981).

TABLE 3

CORRELATION OF PEAT CLASSIFICATION SYSTEMS

IPS	*von Post*	*SCS*
R1	H1-H3	Fibric
R2	H4-H6	Hemic
R3	H7-H10	Sapric

AITKIN COUNTY PEATLANDS

DEVELOPMENT OF THE PRESENT LANDSCAPE

Glacial

The topography of Aitkin County is mainly the result of glaciation during the most recent glacial period, the Wisconsinan Stage, when glaciers periodically entered Minnesota from the north, northeast, and northwest. The ice advanced in lobes, which protruded off the main ice sheet that covered a large portion of Canada, and followed the preglacial lowlands. As the glaciers advanced, they incorporated rock, previously deposited glacial drift, and soil, depositing this material as they stagnated and retreated.

Three phases of the Wisconsinan Stage affected Aitkin County prior to the Alborn phase (see fig. 4). The Alborn phase (see fig. 5), which reached its maximum about 12,000 years ago, was the last phase of the Wisconsinan Stage to affect Aitkin County. During this phase, the St. Louis sublobe of the Des Moines lobe advanced into the county from the northwest through a topographic low. As the ice lobe flowed through the low, it

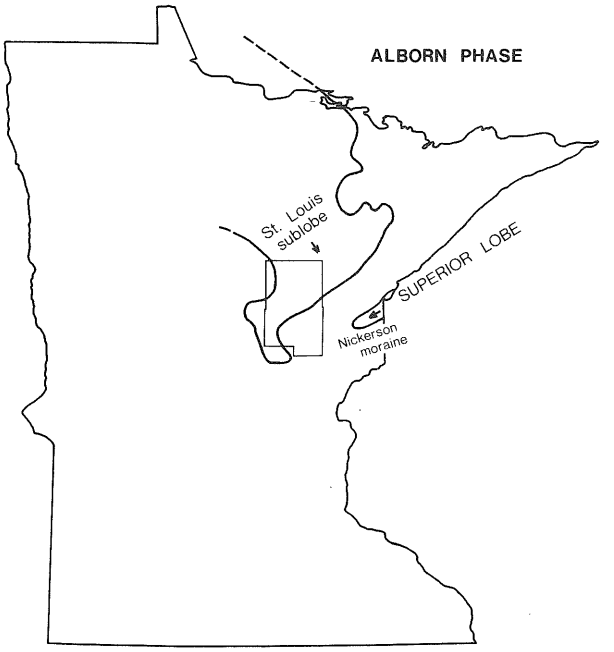


Fig. 5. The Alborn Phase in Relation to Aitkin County (based on Wright 1972*a*)

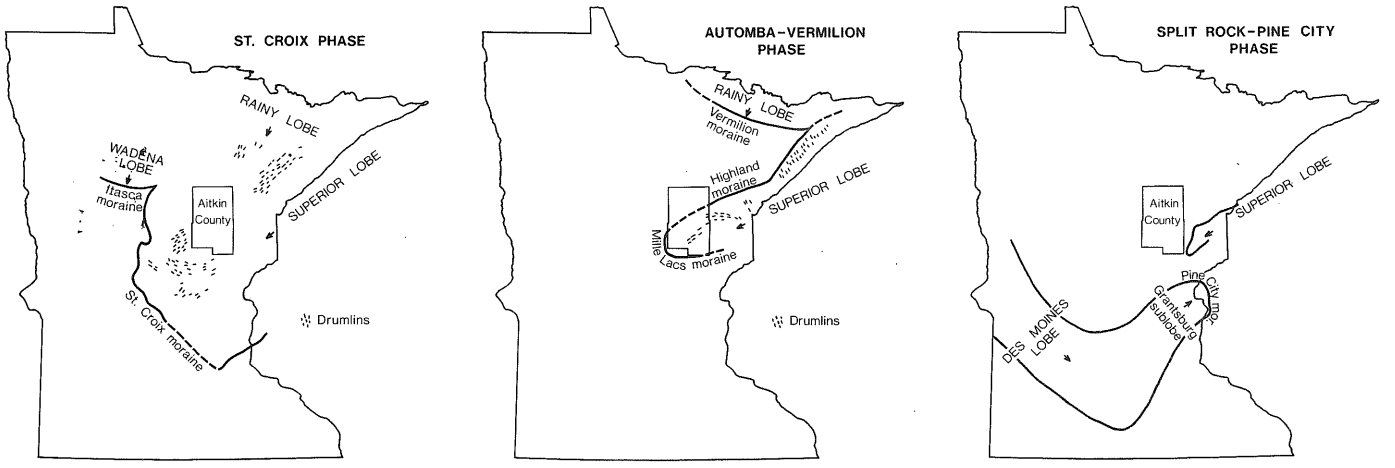


Fig. 4. Wisconsinan Glacial Phases that Affected Aitkin County Prior to the Alborn Phase (based on Wright 1972*a*)

expanded, covering the lowland roughly delimited by the Mesabi Range and the Mille Lacs-Highland moraine system, which was deposited during a previous phase of the Wisconsinan Stage.

Evidence suggests that the ice temporarily advanced beyond the Mille Lacs moraine to the northern and possibly to the southern shore of Mille Lacs Lake. The ice front then retreated and stabilized, depositing an end moraine on top of the Mille Lacs-Highland moraine (Hobbs 1981). Ice apparently remained at this position for some time, resulting in the formation of an outwash plain between the end moraine and Mille Lacs Lake.

As the Ice Age waned, the St. Louis sublobe stagnated and thinned. The ice in the center of the lobe melted relatively rapidly, while in the end moraine around the perimeter of the lobe a debris cover insulated the ice, preventing rapid melting. Glacial Lakes Aitkin and Upham formed within the lobe, dammed by the ice-cored moraine. The lakes subsequently went through a complicated history of subsiding lake levels, controlled by successively lower outlets formed as the ice front withdrew and the ice within the moraine melted.

Glaciation created an irregular land surface in Aitkin County with many poorly drained or saturated areas. Conditions in these areas eventually became conducive to peat accumulation as the climate changed.

Postglacial

Postglacial landscape changes in Aitkin County have been much less dramatic than the changes during glaciation. The major postglacial processes working to modify the landscape have been soil formation, erosion, and vegetational colonization due to climatic changes.

A general climatic warming trend affected Minnesota from the culmination of the Alborn phase, 12,000 years ago, until about 6,000 years ago when the trend reversed. As the glacial ice retreated from Aitkin County, tundra vegetation established itself on the newly exposed land surface. Continued retreat of the ice and warming of the climate allowed a boreal spruce forest to replace the tundra. The boreal forest was present in Aitkin County until about 10,000 years ago when pine, birch, and alder invaded central Minnesota. Further warming and drier conditions led to the invasion of prairie vegetation about 8,000 years ago. The prairie dominated most of Aitkin County until about 6,000 years ago when a climatic reversal led to cooler, more humid conditions and to the reestablishment of forest communities (Wright and Watts 1969). This climatic change also resulted in conditions favorable to peatland formation. Peat composed of reeds, sedges, and woody shrubs began to accumulate on the fringes around lakes and ponds and on glacial lake plains and other poorly drained areas with low relief. By about 4,000 years ago, climatic conditions were conducive to peat accumulation and the margins of the peatlands spread by the paludification process.

Today, peat blankets a large part of the county (see fig. 6). The lake plains of Glacial Lakes Aitkin and Upham, where the largest contiguous peat deposits in the county occur, and scattered areas of poorly drained ground moraine and outwash plains have been covered with peat formed by the paludification process. Within the Mille Lacs-Highland moraine system there are many small peat deposits, some of which formed in kettles by the lakefill process and others that formed on more level terrain by paludification.

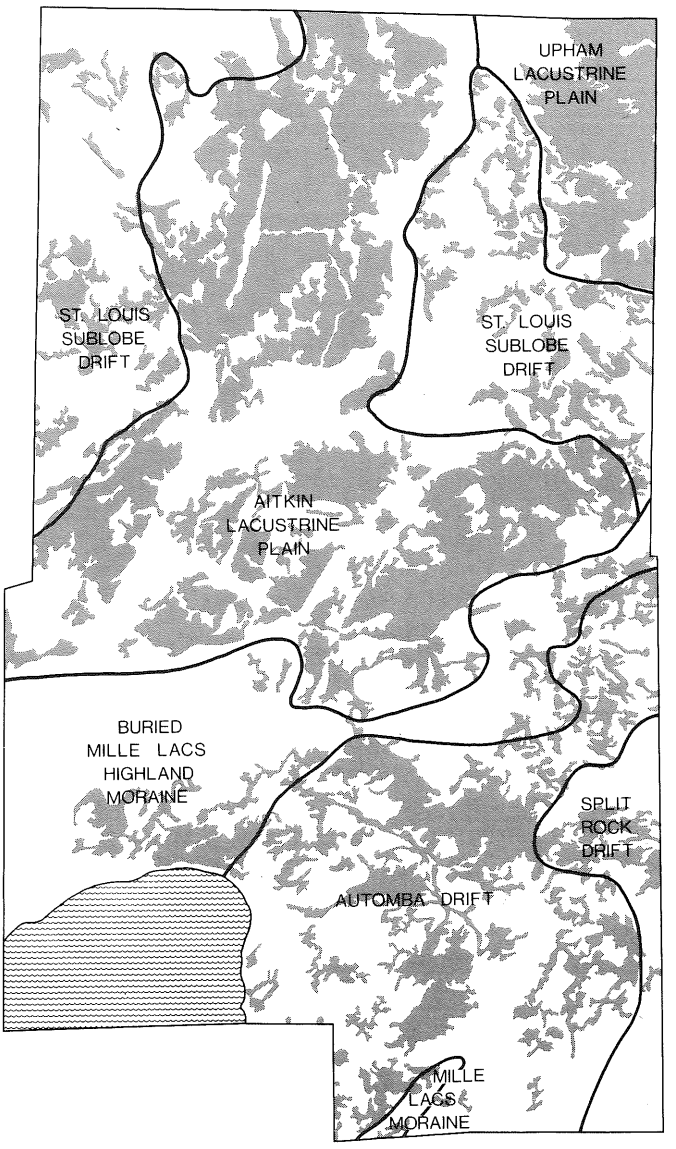


Fig. 6. Peat Distribution in Relation to the Geomorphic Areas in Aitkin County (based on Hobbs 1981)

SURVEY

The MPIP inventoried the Aitkin County peatlands to identify (1) the areal extent, volume, and type of peat found in the county and (2) those peatland areas that meet DOE criteria for fuel-grade peat. Fuel-grade peat (1) has a heating value of 8,000 Btu/lb or more per profile in an oven-dry state, (2) contains less than 25% ash, (3) occurs in deposits that are at least 150 cm (~5 ft) deep,

and (4) covers a cumulative area of more than 32 ha (80 ac) per 2.6 sq km (1 sq mi).

This inventory was a reconnaissance-level survey. In this type of survey, the boundaries between mapping units are based on field observations, aerial photograph interpretation between observed sites, and the general appearance of the landscape (Soil Survey Staff 1951). Reconnaissance-level surveys are useful for large-scale resource management and for locating areas that require more detailed mapping.

The inventory data consist of field observations and the results of analysis of peat samples. The map, *Peat Resources, Aitkin County, Minnesota* (in back flap), was compiled from field data, aerial photograph interpretation, and laboratory data.

Field Procedures

The survey began with the interpretation of 1:24,000 United States Geological Survey quadrangle maps and 1:90,000 aerial photographs. The maps and aerial photographs were used to locate peatlands, to determine the relationships between peatlands and the surrounding geomorphic features, and to identify peatland surficial patterns.

The geomorphic features that surround a peatland can indicate the underlying topography, which can provide information on peat depth and the method of peatland formation. The surficial patterns of a peatland, which are variations in vegetation communities, often give clues to the botanical origin and degree of decomposition of the peat.

Observation Sites

Field observation sites were selected, after initial map and air photo interpretation, to provide data on the stratigraphy and thickness of the peatlands. Because of restricted access, sites were limited to those that could be reached by foot when sites were within walking distance from roads, by all-terrain vehicle when sites were near trails, or by helicopter when clearings permitted landing. When an all-terrain vehicle was used, the density of observation sites was increased.

Over 700 sites were visited by the MPIP. At each observation site, the soil profile, natural vegetation, microrelief, and depth to the water table were described. These data appear in a second volume: *Inventory of Peat Resources, Aitkin County, Minnesota, Appendix D; Observation Site Descriptions*. A Davis sampler was used to bring up a small sample at regular intervals in the profile (about every 30 cm) to determine peat thickness, degree of decomposition according to the von Post scale, the botanical origin of each layer within the profile according to the IPS classification, and the texture of the underlying mineral soil.

Sample Sites

The MPIP sampled 188 representative peatland sites for laboratory analysis. Site selection was based on the field observation data in conjunction with information about the peatland topography and landforms, and the relationship between peatland and mineral soil.

The staff used a Macaulay sampler to collect an undisturbed peat sample of known volume at designated intervals in a profile. The samples were placed in plastic bags for later analysis.

At 136 sites, one peat profile was sampled for analysis at the MPIP laboratory in Hibbing. At the remaining sites, two profiles, in close proximity to each other, were sampled at similar intervals. Samples from one profile were analyzed at Hibbing, and samples from the second profile were sent to the DOE Coal Analysis Laboratory in Pittsburgh, Pennsylvania for energy value analysis.

Mapping Procedures

The MPIP field notes and peat information from the Iron Range Resource and Rehabilitation Commission (1965*a*, *b*, *c*, *d*; 1970) were examined and the recorded depths and types of peat were placed into organic soil mapping units. These mapping units differentiate depth, degree of decomposition, and botanical origin of peat. The observation site data were plotted on 1:24,000 scale quadrangle maps. These data, in conjunction with aerial photograph interpretation, were used to draw depth contours at 150 cm (~5 ft) intervals. Next, the areas capped by fibric sphagnum moss peat (raised bogs) were delineated by class intervals showing thicknesses of 20-60, 61-150, and 151-300 cm (~1-2, 2-5, and 5-10 ft). The quadrangles were then reduced to a scale of 1/2 inch: 1 mile, and the peat information was transferred to an overlay, registered to the 1979 highway map of Aitkin County, on which the peat and mineral boundaries were differentiated.

Minor inclusions may occur within each mapping unit due to the effects of generalization during map compilation and production. Two types of generalization that affect the map are (1) the map scale and (2) the number and location of observation and sample sites that served as the control points for drawing the contour lines. The scale of the printed map restricted the size of the mapping unit that could be delineated and labeled to 32 ha (80 ac). The inaccessibility of some peatlands from either ground or air limited the number of observations made.

The mapped information, including both the peat and mineral units at a scale of 1/2 inch: 1 mile, was then manually coded by 40 acre cells and entered into the state's computerized resource information system (Land Management Information Center, Department of Energy, Planning, and Development). The information in this system can be analyzed, combined into selected classes, and output in mapped or tabular form.

Laboratory Analysis

The chemical and physical properties of peat can be used in its classification and to identify use characteristics of a particular type of peat (Walmsley 1977). Peat properties depend largely on the nature and origin of the plant remains composing the peat and the degree of decomposition (Puustjarvi and Robertson 1975).

MPIP Analyses

The MPIP performed ash (mineral) content, moisture content, bulk density, and pH analyses on 872 peat samples from 188 sample sites. These parameters are commonly used to characterize peat. The laboratory methods appear in Appendix A and the data appear in Appendix B.

Ash

Ash is the residue left after a sample is heated to a sufficient temperature to drive off all combustible material. The residue comes from the original peat-forming vegetation as well as from sediment brought into the peatland by runoff from mineral soil and from atmospheric dust. In most peat types, there is a positive correlation between ash content and the degree of decomposition. This is due to the accumulation of mineral matter as a result of mineralization during decomposition (Walmsley 1977).

Moisture Content

Peat has the capacity to absorb and retain large quantities of water. The extent of this capacity depends largely on the degree of decomposition and botanical origin of the peat. Relatively undecomposed peats have a greater water-holding capacity than those that are more decomposed. This capacity is increased in peat composed primarily of sphagnum mosses, because of its cellular structure.

Bulk Density

Bulk density is a measure of the weight of a given volume of soil. The given volume of a sample is usually measured wet because soil volume changes with water content (Walmsley 1977). The bulk density depends upon the organic, mineral, and moisture content of the peat. As the mineral content increases, bulk density increases, and as the moisture content increases, bulk density decreases. Bulk density is found to increase with increasing decomposition and, therefore, can be used as an indirect measure of the degree of decomposition.

pH

Hydrogen ion concentration (pH) is used to measure the acidity or alkalinity of a soil. The pH of peat, which is largely affected by the botanical origin of the peat, can influence the rate of decomposition and therefore the rate of accumulation of organic matter. Peat composed of sphagnum mosses is more acidic than other peat types because of the high cation exchange capacity of the mosses. The acidic condition inhibits microbial activity, thereby slowing the rate of decomposition and increasing the rate of peat accumulation.

DOE Analyses

Energy value analysis was conducted by the DOE laboratory on 254 peat samples from 52 sample sites. The analysis consisted of a determination of the potential heating value, proximate analysis, and ultimate analysis. The data appear in Appendix C.

Heating Value

Heating value is a measure of the energy potential of a peat sample expressed in Britsh thermal units per pound of moisture-free peat (Btu/lb). Heating value is measured in Btu's for small areas but is converted to quads of energy (1 quad = 1×10^{15} Btu) for large areas, such as at a regional or national scale.

Proximate Analysis

Proximate analysis is used to characterize peat in connection with its utilization (Ode 1963). Proximate analysis determines the composition of peat in percentages of moisture, volatile matter, fixed carbon, and ash.

Under natural conditions, the moisture content of peat is approximately 90 percent. Dewatering the peat is the most difficult technical obstacle to utilizing peat as an energy source (U.S. DOE 1979). After a peatland is drained, the peat may still contain from 70-90 percent water.

Volatile matter is the gaseous fraction obtained by heating a peat sample. Volatile matter is an excellent indication of the reactivity of peat to chemical processing (U.S. DOE 1979). The higher the percentage of volatile matter, the more reactive the peat is.

Fixed carbon is the nonvolatile fraction of the combustible material in a peat sample. Fixed carbon is determined by subtracting the percentage of moisture, volatile matter, and ash in the sample from 100 percent. This component provides much of the peat's combustion energy.

The ash content of peat also affects the feasibility of its use in energy conversion. The heating value of peat generally decreases with increasing ash content.

Ultimate Analysis

Ultimate analysis determines the composition of peat in percentages of carbon, hydrogen, nitrogen, sulfur, oxygen, and ash. This information can be used to determine the quantity of potential pollutants and valuable byproducts formed during the chemical processing of peat. For example, the sulfur content of peat is low, therefore, during gasification the formation of sulfur dioxide is minimal. On the other hand, peat is fairly high in nitrogen. During gasification, nitrogen combines with hydrogen to form ammonia, which can be used as a fertilizer.

RESULTS

Peat Types

Aitkin County peatlands contain peat types composed of mosses, reeds, sedges, and some woody fragments. These peat types range from slightly to strongly decomposed. The fibric peat is generally composed of sphagnum mosses. The hemic peat is predominantly herbaceous (reed-sedge) peat or moss peat with some woody peat layers. The origin of the sapric peat is probably herbaceous or woody, but it is difficult to determine in the field because of the high degree of decomposition of the peat.

Peatland Formation

The peatlands in Aitkin County developed by both the lakefill and paludification processes. In some instances, peat accumulation began by the lakefill process, but spread beyond the basin by paludification.

A lakefilled peatland, surveyed in the morainic area of southeastern Aitkin County, is shown in Figure 7. The lakefill process can be identified by the accumulation of limnic sediments at the bottom of the basin. Hemic peat dominates the profile, but some sapric peat and fibric herbaceous peat are found within the profile indicating that the amount of decomposition has varied, as a result of changing drainage characteristics of the peatland.

A peatland in north-central Aitkin County that formed on the plain of Glacial Lake Aitkin is an example of a peatland that developed by the paludification process (see fig. 8). Limnic sediments suggest, however, that peat accumulation began by the lakefill process. Hemic peat dominates the profile, with some accumulation of sapric peat.

Peatland Types

Both peatland types, fens and bogs, are found in Aitkin County. A typical fen that was surveyed by the MPIP is located in the northeastern part of the county (see fig. 9). The peatland formed on the lake plain of Glacial Lake Upham. Near the edge of the peatland, where the peat is shallow, the vegetation consists of speckled alder, bog birch, and an abundance of sedges. Toward the center of the peatland, where the peat deepens, the alder is replaced by scattered tamarack. The peat profile is dominated by hemic peat with an interlayering of fibric herbaceous peat, a layering that is typical of wet fens.

An example of a raised bog, which also formed on the lake plain of Glacial Lake Upham, is located in northeastern Aitkin County (see fig. 10). The vegetation consists of a dense stand of black spruce arranged in the typical raised bog pattern, ericaceous shrubs, and a thick carpet of sphagnum mosses. Surrounding the raised bog, the vegetation is more varied and consists of sphagnum mosses, scattered black spruce and tamarack, and a minor amount of alder and bog birch. The peat profile is characterized by a dome-shaped cap of sphagnum moss peat, underlain by hemic herbaceous peat. Sapric peat and limnic sediments are found at the base of the profile.

The southern limit of raised bog formation in Minnesota occurs in Aitkin County. Therefore, the accumulations of sphagnum moss peat are generally less than in other areas of Minnesota.

Laboratory Data

The results of both the MPIP and the DOE analyses of Aitkin County peat are presented in summary form in Tables 4-11. The standard deviation is the amount of variation of individual sample values about the mean, and the coefficient of variation is a measure of the relative variation of the sample values, expressed as a ratio of the standard deviation to the mean.

Samples with greater than 25% ash are not included in the summary analysis because they do not meet the DOE requirements for fuel-grade peat. The majority of the samples containing greater than 25% ash were taken from just above the mineral soil in a profile, where mineral contamination and mineralization due to decomposition had a probably influence. In a few cases, these samples were taken from the topmost layer of the profile, where the ash concentrations may have been affected by water draining directly off of mineral soil.

MPIP Data

The summary data for ash content, moisture content, bulk density, and pH for 736 samples are presented in Tables 4-7. The sample data, by site and depth, are available in Appendix B.

From the summary data, several trends related to the degree of decomposition are apparent (see fig. 11). These trends follow results found elsewhere (e.g., Walmsley 1977); that is, the ash content, bulk density, and pH increase with increasing decomposition, whereas, moisture content decreases with increasing decomposition.

DOE Data

The summary data for heating value, proximate analyses, and ultimate analyses for 213 samples are presented in Tables 8-11. Moisture content is measured as received; other values are based on moisture-free samples. The DOE data, by site and depth, are presented in Appendix C.

From the summary data, it was found that 202 of the 213 DOE samples met the DOE criteria for fuel-grade peat based on heating value and ash content (i.e., a heating value greater than 8,000 Btu/lb and an ash content less than 25%). Eleven samples contain less than 25% ash, but have a heating value less than 8,000 Btu/lb. The heating values of these samples range from 7,686 Btu/lb to 7,943 Btu/lb. Seven of these samples were taken from just above mineral soil in a profile, while the other four were taken from very near the peatland surface.

Resource Estimation

The map, *Peat Resources, Aitkin County, Minnesota*, was designed to emphasize the peatlands meeting DOE criteria for fuel-grade peat by the use of color and patterns. Five types of areas are depicted on the map: peat greater than 150 cm (~5 ft) deep, peat less than 150 cm deep, peat with a variable depth of 0-300 cm (~0-10 ft), areas with sphagnum moss peat caps, and mineral. Since samples of all three peat types, fibric, hemic, and sapric, generally have heating values greater than 8,000 Btu/lb with an ash content less than 25%, depth and size criteria became the factors for determining fuel-grade peat.

Fuel-grade peatlands, shown in dark orange on the map, are greater than 150 cm deep and cover at least 32 ha (~80 ac). Shallow peatlands, peatlands that are less than 150 cm deep and therefore not meeting the DOE fuel-grade peat criterion for depth, are shown in light

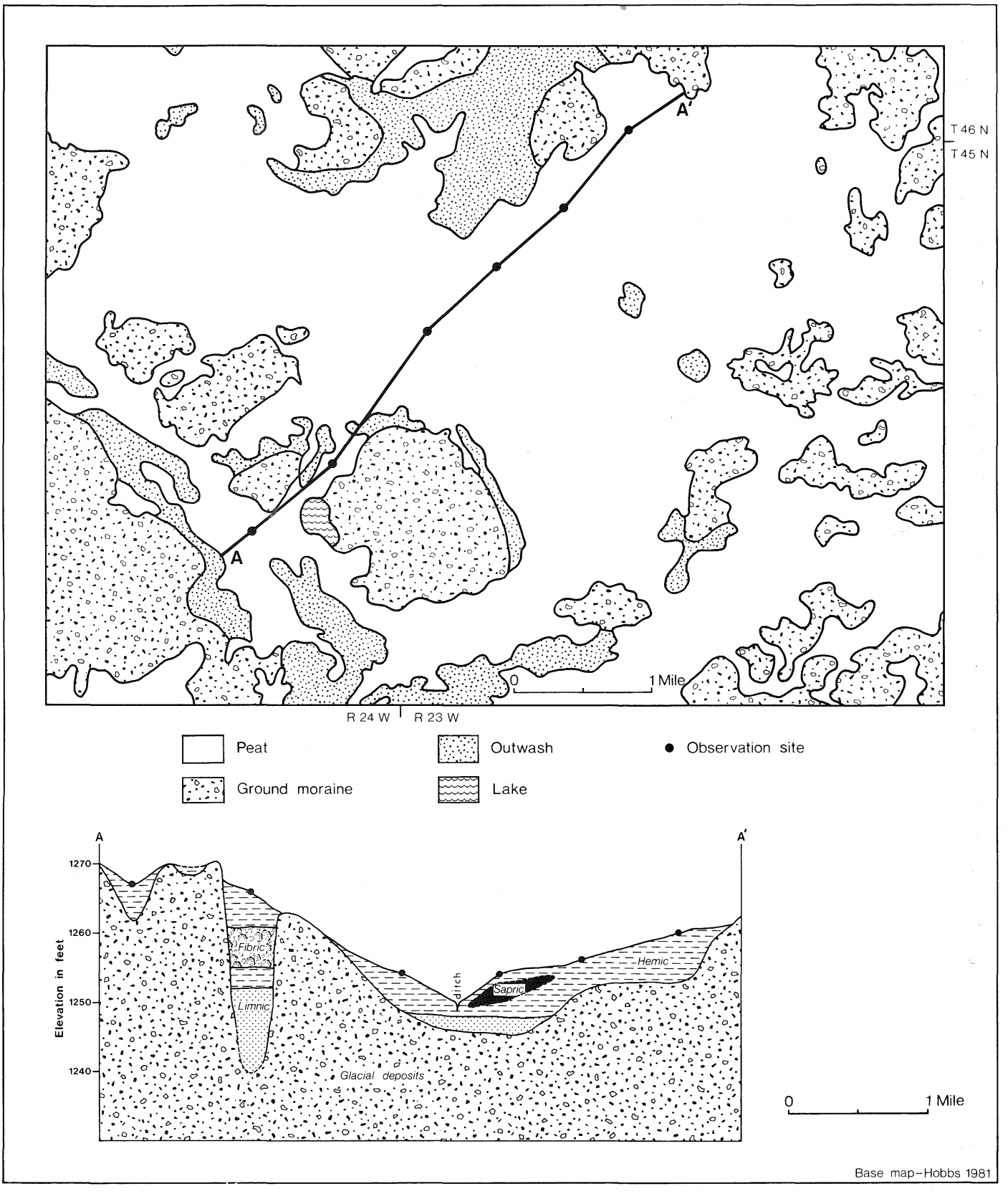


Fig. 7. Peatland in Aitkin County Formed by the Lakefill Process

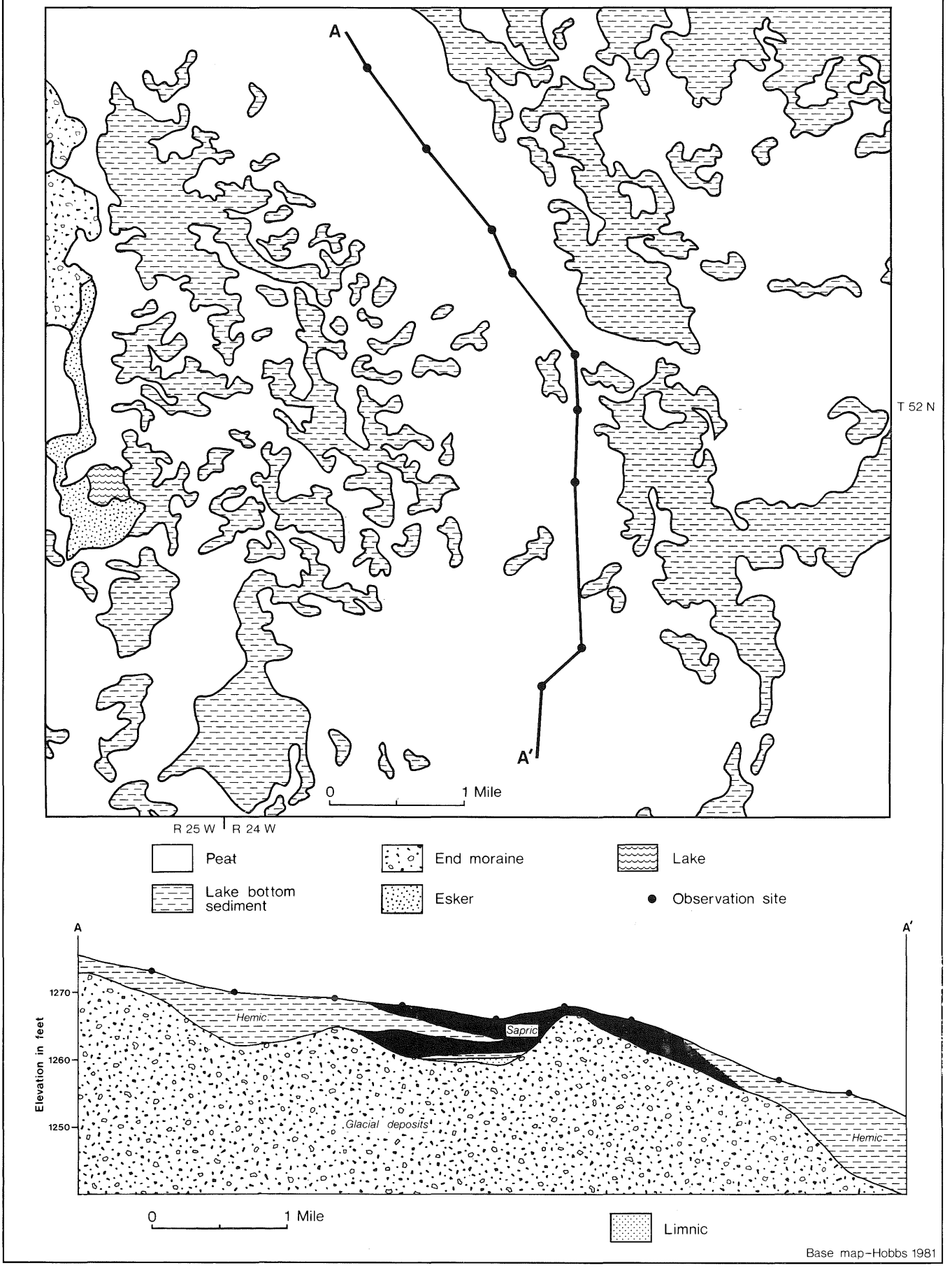


Fig. 8. Peatland in Aitkin County Formed by the Paludification Process

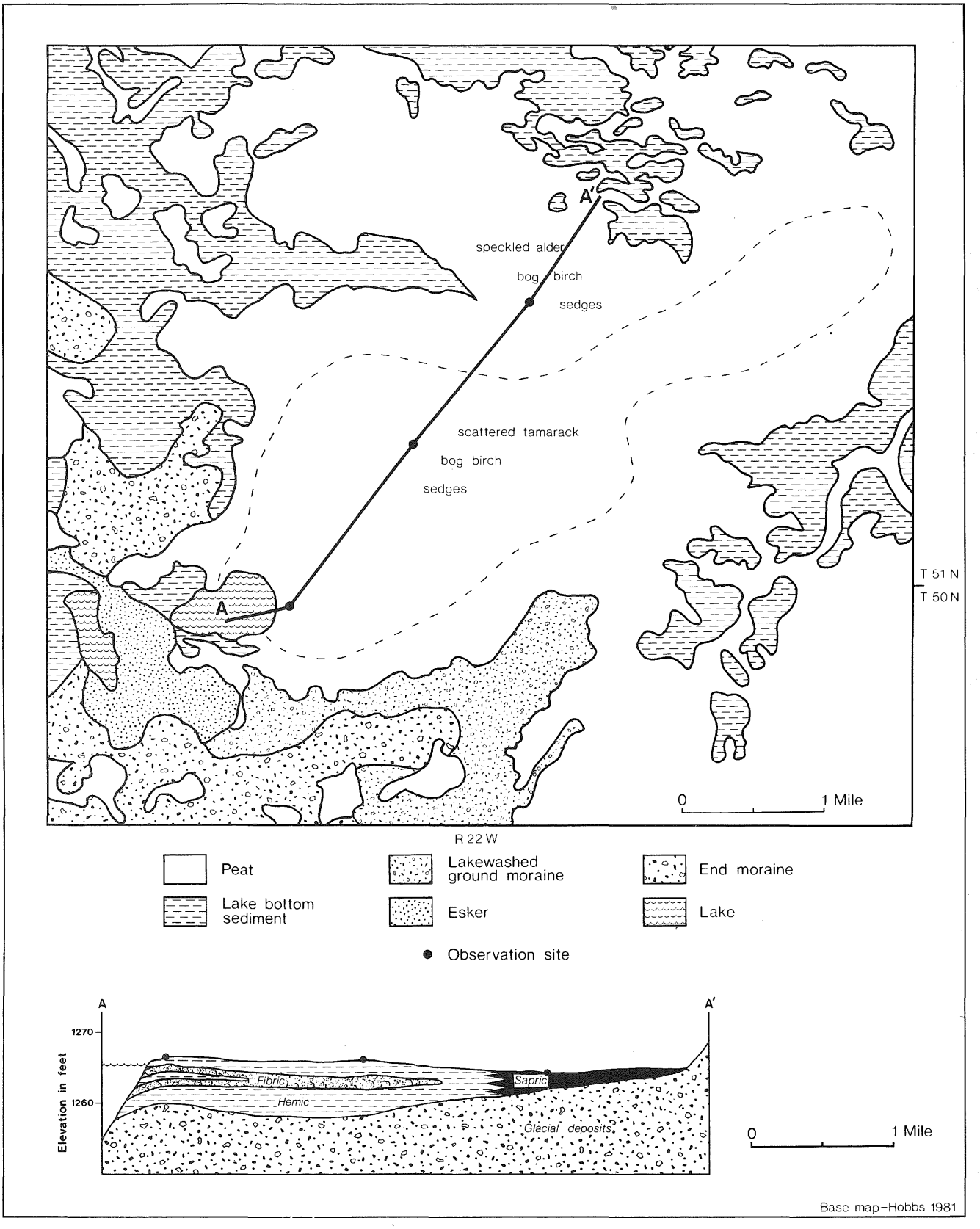


Fig. 9. Fen in Aitkin County

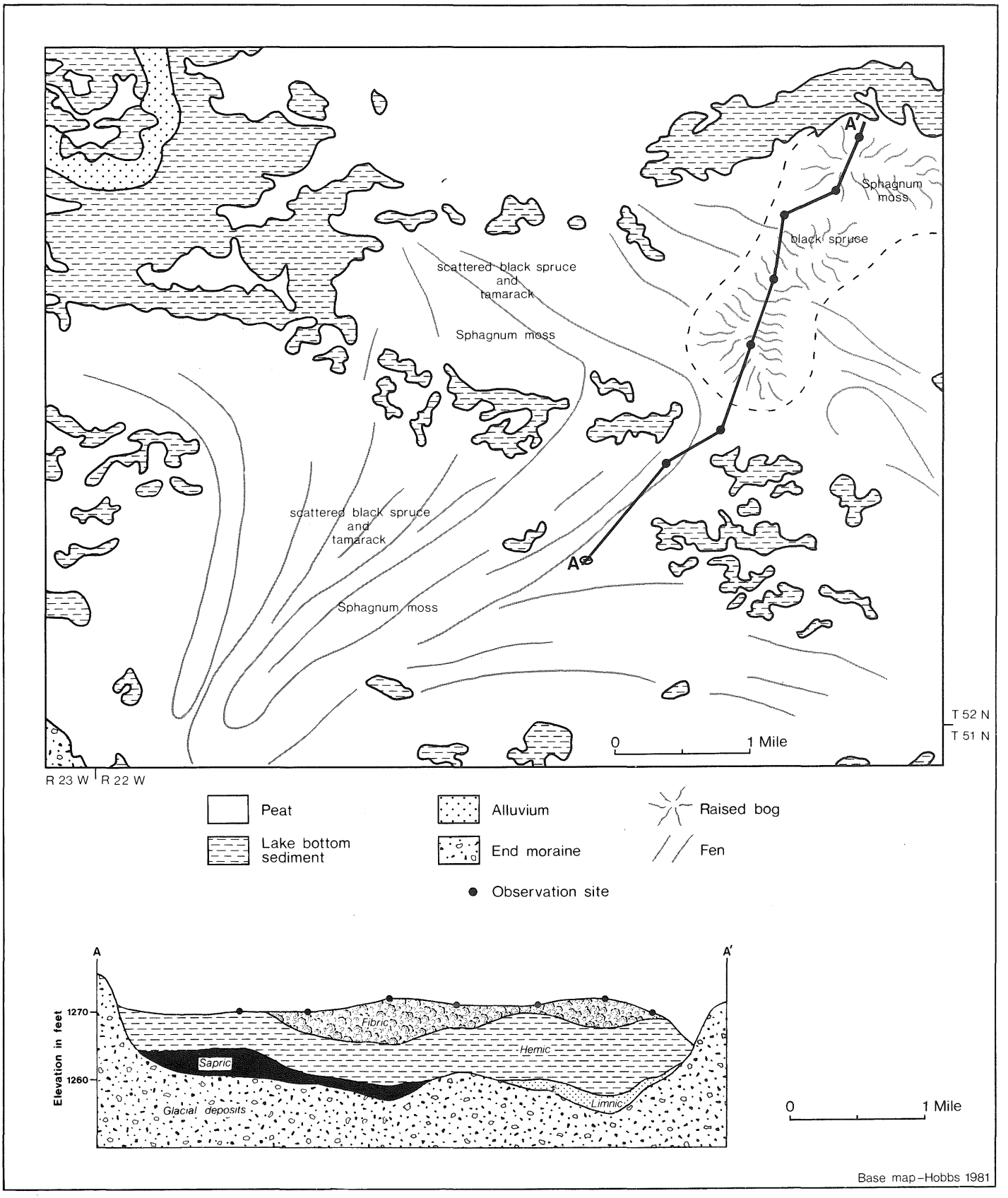


Fig. 10. Raised Bog in Aitkin County

TABLE 4

SUMMARY OF MPIP ANALYSES

	Average	Range	Standard Deviation	Coefficient of Variation
Ash Content (%)	10.9	3.1-24.7	4.63	42.5
Bulk Density (g/cc)	0.13	0.03-0.33	0.40	30.8
Moisture Content (total wt) (%)	87.3	70.8-95.4	3.51	4.0
Moisture Content (dry wt) (%)	752	243-2088	251.66	33.5
pH (H_2O)	5.2	3.2-6.9	0.77	14.8
pH ($CaCl_2$)	4.4	2.4-6.2	0.82	18.6

NOTE: Data from 736 samples containing less than 25% ash.

TABLE 5

MPIP ANALYSIS—FIBRIC SAMPLES

	Average	Range	Standard Deviation	Coefficient of Variation
Ash Content (%)	8.8	3.3-24.7	5.28	60.0
Bulk Density (g/cc)	0.10	0.04-0.18	0.03	30.0
Moisture Content (total wt) (%)	90.3	83.1-95.4	2.80	3.1
Moisture Content (dry wt) (%)	1032	491-2088	377.7	36.6
pH (H_2O)	5.0	3.2-6.9	1.05	21.0
pH ($CaCl_2$)	4.1	2.4-6.1	1.07	26.1

TABLE 6

MPIP ANALYSIS—HEMIC SAMPLES

	Average	Range	Standard Deviation	Coefficient of Variation
Ash Content (%)	10.3	3.1-24.4	4.06	39.4
Bulk Density (g/cc)	0.13	0.03-0.33	0.04	30.8
Moisture Content (total wt) (%)	87.7	70.8-94.0	3.16	3.6
Moisture Content (dry wt) (%)	761	243-1573	218.08	28.7
pH (H_2O)	5.1	3.2-6.5	0.75	14.7
pH ($CaCl_2$)	4.4	2.5-6.0	0.78	17.7

TABLE 7

MPIP ANALYSIS—SAPRIC SAMPLES

	Average	Range	Standard Deviation	Coefficient of Variation
Ash Content (%)	16.3	7.0-24.7	4.39	26.9
Bulk Density (g/cc)	0.18	0.09-0.33	0.03	16.7
Moisture Content (total wt) (%)	82.7	70.8-90.8	2.81	3.4
Moisture Content (dry wt) (%)	495	243-987	106.77	21.6
pH (H_2O)	5.5	4.0-6.6	0.56	10.2
pH ($CaCl_2$)	4.9	3.1-6.2	0.62	12.7

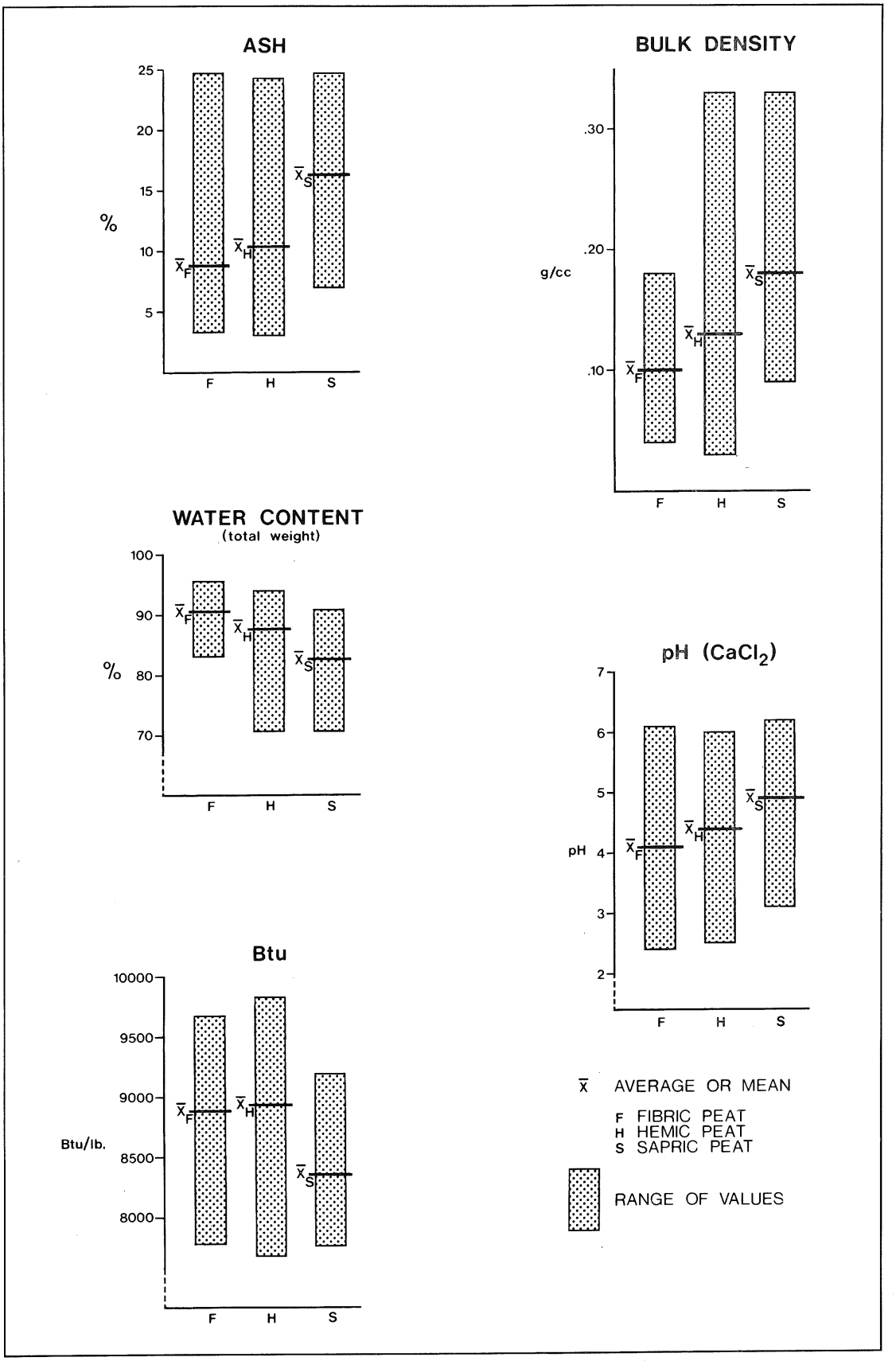


Fig. 11. Degree of Decomposition Versus MPIP Analyses and DOE Heating Value (Btu) Analysis

TABLE 8

SUMMARY OF DOE ANALYSES

	Average	*Range*	*Standard Deviation*	*Coefficient of Variation*
Btu/lb	8874	7686-9839	451.86	5.1
Ash Content (%)	10.6	3.3-24.7	4.74	44.7
Moisture Content (total wt) (%)	88.5	76.1-96.0	3.42	3.9
Volatile Matter (%)	62.9	49.9-74.3	4.76	7.6
Fixed Carbon (%)	26.5	17.3-38.0	2.44	9.2
Hydrogen (%)	5.2	4.2-6.0	0.38	7.3
Carbon (%)	51.8	43.1-55.7	2.44	4.7
Nitrogen (%)	2.5	0.5-4.1	0.62	24.8
Sulfur (%)	0.3	0.1-1.5	0.24	80.0
Oxygen (%)	29.5	22.2-40.6	3.06	10.4
Bulk Density (g/cc)*	0.13	0.05-0.28	0.04	30.8
pH (H_2O)*	5.5	3.8-6.9	0.69	12.5
pH ($CaCl_2$)*	4.6	2.9-6.0	0.78	17.0

NOTE: Data from 213 samples containing less than 25% ash.
* Analysis performed in MPIP laboratory (samples from DOE site, but from a second profile).

TABLE 9

DOE ANALYSIS—FIBRIC SAMPLES

	Average	*Range*	*Standard Deviation*	*Coefficient of Variation*
Btu/lb	8885	7761-9677	378.40	4.3
Ash Content (%)	9.0	3.3-23.2	4.44	49.3
Moisture Content (total wt) (%)	91.5	86.1-96.0	2.58	2.8
Volatile Matter (%)	66.2	57.2-74.3	5.01	7.6
Fixed Carbon (%)	24.8	17.3-29.4	2.60	10.5
Hydrogen (%)	5.3	4.6-6.0	0.32	6.0
Carbon (%)	51.7	43.1-55.2	2.22	4.3
Nitrogen (%)	2.3	0.5-3.8	0.87	37.8
Sulfur (%)	0.3	0.1-1.5	0.22	73.3
Oxygen (%)	31.3	24.4-40.6	3.86	12.3
Bulk Density (g/cc)*	0.10	0.05-0.15	0.03	30.0
pH (H_2O)*	5.5	4.0-6.9	0.86	15.6
pH ($CaCl_2$)*	4.4	2.9-5.9	0.95	21.6

* Analysis performed in MPIP laboratory.

TABLE 10

DOE ANALYSIS—HEMIC SAMPLES

	Average	*Range*	*Standard Deviation*	*Coefficient of Variation*
Btu/lb	8937	7686-9839	434.15	4.9
Ash Content (%)	10.2	3.5-24.7	4.20	41.2
Moisture Content (total wt) (%)	88.2	76.1-94.3	2.96	3.4
Volatile Matter (%)	62.7	49.9-71.8	4.20	6.7
Fixed Carbon (%)	27.1	20.6-38.0	2.11	7.8
Hydrogen (%)	5.2	4.2-6.0	0.36	6.9
Carbon (%)	52.2	44.0-55.7	2.21	4.2
Nitrogen (%)	2.6	1.0-4.1	0.55	21.2
Sulfur (%)	0.3	0.1-1.1	0.15	50.0
Oxygen (%)	29.5	22.5-36.7	2.49	8.4
Bulk Density (g/cc)*	0.13	0.06-0.28	0.04	30.8
pH (H_2O)*	5.5	3.8-6.5	0.64	11.6
pH ($CaCl_2$)*	4.6	3.0-6.0	0.73	15.9

* Analysis performed in MPIP laboratory.

TABLE 11

DOE ANALYSIS—SAPRIC SAMPLES

	Average	Range	Standard Deviation	Coefficient of Variation
Btu/lb	8356	7761-9192	388.18	4.6
Ash Content (%)	16.6	6.8-23.1	5.05	30.4
Moisture Content (total wt) (%)	84.3	78.3-90.7	2.94	3.5
Volatile Matter (%)	58.1	51.9-67.1	3.86	6.6
Fixed Carbon (%)	25.3	18.6-28.5	2.58	10.2
Hydrogen (%)	4.8	4.4-5.5	0.34	7.1
Carbon (%)	48.9	45.1-53.2	2.58	5.3
Nitrogen (%)	2.7	1.7-3.7	0.45	16.7
Sulfur (%)	0.7	0.3-1.5	0.45	64.3
Oxygen (%)	26.3	22.2-31.6	2.67	10.2
Bulk Density (g/cc)*	0.17	0.09-0.23	0.04	23.5
pH (H_2O)*	5.9	5.1-6.7	0.39	6.6
pH ($CaCl_2$)*	5.2	4.6-5.7	0.32	6.2

* Analysis performed in MPIP laboratory.

orange. Peatlands of variable depth are shown in an alternating pattern of light and dark orange. The black stipple pattern on peatlands designates peatlands covered by an accumulation of fibric sphagnum moss peat (raised bogs). Through the use of labels and contour lines, the areas of peat greater than 150 cm deep and the areas covered by sphagnum moss peat are further subdivided by depth. Mineral soil areas are displayed in gray.

On the map, total depth of peat is indicated by the following designations:

A	0-150cm	(~ 0- 5ft)
B	151-300cm	(~ 5-10ft)
C	301-450cm	(~10-15ft)
D	451-600cm	(~15-20ft)
AB	0-300cm	(~ 0-10ft)

The total depth designations (e.g., A) when used alone, denote a profile composed entirely of hemic peat. A total depth designation used in conjunction with a lower case letter indicates a hemic peat profile with a fibric moss peat cap or a profile composed entirely of sapric peat.

The fibric sphagnum moss peat cap unit is subdivided by depths:

a	20- 60cm	(~1- 2ft)
b	61-150cm	(~2- 5ft)
c	151-300cm	(~5-10ft)

The cap unit designations are always used with a total depth designation (e.g., Aa); the peat unit has a total depth indicated by the first letter (e.g., A 0-150 cm) and has a fibric sphagnum moss peat cap of the depth indicated by the lower case letter (e.g., a 20-60 cm). Hemic peat composes the rest of the profile.

The symbols Ax and Bx designate sapric peat areas on the map. The entire profile, with a total depth of A (0-150 cm) or B (151-300 cm) is a sapric peat.

The total depth unit AB represents a variable peat depth, 0-300 cm, composed of hemic peat. This unit is found in undulating terrain, such as within an end moraine, where peat depths change rapidly, making mapping difficult at the scale of the peat resource map.

The map provides locational information about Aitkin County peatlands and also a means for determining the areal extent and volume of peat in the county. The peat information from the map for Aitkin County was coded and stored in computer-readable form. From this information, the acreages of the various mapping units were determined. Volumes of peat were calculated by multiplying the areal extent by the average depth of each mapping unit. The quantity of oven-dried peat (in tons) was found by multiplying the volumes of peat by the average bulk density value determined for each peat type. These values were then multiplied by the average heating value for each peat type to determine the potential energy available from peat in the county.

Peatland Area

Peatlands cover 170,050 ha (420,160 ac) of a total area of 517,200 ha (1,278,000 ac) in Aitkin County. Hemic peat covers 149,460 ha (369,320 ac) of land, 88% of the peatland area. Sapric peat covers 17,210 ha (42,520 ac), 10% of the peatland area, and areas of hemic peat overlain by a fibric sphagnum moss cap cover 3,380 ha (8,320 ac), 2% of the peatland area.

Areas with peat accumulations greater than 150 cm deep cover 30,390 ha (75,080 ac), or approximately 18% of the total peatland area. The areal extent for each mapping unit is shown on Table 12.

Peat Tonnages

The total quantity of oven-dried peat in Aitkin County is 246,414,000 metric tons (276,237,000 U.S. short tons). Hemic peat comprises 221,541,000 metric tons (248,443,000 U.S. short tons), sapric peat 22,936,000 metric tons (25,664,000 U.S. short tons), and fibric peat 1,937,000 metric tons (2,130,000 U.S. short tons).

TABLE 12

AREAL EXTENT AND VOLUMES OF MAPPING UNITS IN AITKIN COUNTY, MINNESOTA

Map Unit	Peat Type	Percent Peat Area	Area		Average Thickness		Volume	
			ha	ac	cm	ft	ha-cm	ac-ft
Ax	Sapric	9.89	16,820	41,560	75	2.5	1,261,433	103,900
Bx	Sapric	0.23	390	960	225	7.5	87,750	7,200
A	Hemic	67.92	115,480	285,360	75	2.5	8,661,000	713,400
B	Hemic	13.94	23,700	58,560	225	7.5	5,332,500	439,200
AB	Hemic	4.27	7,260	17,920	150	5.0	1,089,000	89,600
C	Hemic	1.54	2,620	6,480	375	12.5	982,500	81,000
D	Hemic	0.24	400	1,000	525	17.5	210,000	17,500
Aa	Fibric				40	1.3	4,000	312
	Hemic				35	1.2	3,500	288
	Total	0.06	100	240	75	2.5	7,500	600
Ba	Fibric				40	1.3	68,000	5,460
	Hemic				185	6.2	314,500	26,040
	Total	1.00	1,700	4,200	225	7.5	382,500	31,500
Ca	Fibric				40	1.3	27,200	2,184
	Hemic				335	11.2	227,800	18,816
	Total	0.40	680	1,680	375	12.5	255,000	21,000
Da	Fibric				40	1.3	6,000	468
	Hemic				485	16.2	72,750	5,832
	Total	0.09	150	360	525	17.5	78,750	6,300
Bb	Fibric				105	3.5	30,450	2,520
	Hemic				120	4.0	34,800	2,880
	Total	0.17	290	720	225	7.5	65,250	5,400
Cb	Fibric				105	3.5	37,800	3,080
	Hemic				270	9.0	97,200	7,920
	Total	0.21	360	880	375	12.5	135,000	11,000
Db	Fibric				105	3.5	2,100	140
	Hemic				420	14.0	8,400	560
	Total	0.01	20	40	525	17.5	10,500	700
Bc	Fibric	0.02	30	80	225	7.5	6,750	600
Cc	Fibric				225	7.5	11,250	900
	Hemic				150	5.0	7,500	600
	Total	0.03	50	120	375	12.5	18,750	1,500
TOTAL			170,050	420,160				

The quantity of peat found in accumulations greater than 150 cm deep is 98,134,000 metric tons (110,012,000 U.S. short tons). Peat tonnages for each mapping unit are presented on Table 13.

Peat Energy Potential

The estimated energy potential for all peat deposits in Aitkin County is 4.91×10^{15} Btu (4.91 quads of energy). The estimated energy potential for peat deposits meeting the DOE fuel-grade criteria is 1.97×10^{15} Btu (1.97 quads of energy).

The estimated energy potential for peat deposits meeting the DOE fuel-grade criteria excluding fibric sphagnum moss peat, which has horticultural value, is 1.93×10^{15} Btu (1.93 quads of energy).

The estimated energy potential of the peat does not consider the amount of energy required to mine, dry, and process the peat and to convert the peat to usable energy. Table 14 is a summary of the quantity and energy potential of peat in Aitkin County.

TABLE 13

PEAT TONNAGE (OVEN-DRIED) PER MAPPING UNIT IN AITKIN COUNTY, MINNESOTA

Map Unit	*Peat Type*	*Metric Tons (×1,000)*	*U.S. Tons (Short) (×1,000)*
Ax	Sapric	21,444	24,001
Bx	Sapric	1,492	1,663
A	Hemic	112,593	126,272
B	Hemic	69,323	77,738
AB	Hemic	14,157	15,859
C	Hemic	12,773	14,337
D	Hemic	2,730	3,098
Aa	Fibric	40	42
	Hemic	46	51
	Total	86	93
Ba	Fibric	680	743
	Hemic	4,089	4,609
	Total	4,769	5,352
Ca	Fibric	272	297
	Hemic	2,961	3,330
	Total	3,233	3,627
Da	Fibric	60	64
	Hemic	946	1,032
	Total	1,006	1,096
Bb	Fibric	305	343
	Hemic	452	510
	Total	757	853
Cb	Fibric	378	419
	Hemic	1,264	1,402
	Total	1,642	1,821
Db	Fibric	21	19
	Hemic	109	99
	Total	130	118
Bc	Fibric	68	81
Cc	Fibric	113	122
	Hemic	98	106
	Total	211	228
TOTAL		246,414	276,237

NOTE: Computed using fibric peat at 10 metric tons/ha-cm (136 U.S. short tons/ac-ft), hemic peat at 13 metric tons/ha-cm (177 U.S. short tons/ac-ft), and sapric peat at 17 metric tons/ha-cm (231 U.S. short tons/ac-ft).

SUMMARY

Over 700 sites were visited by the MPIP to determine peat type and depth. Samples were obtained from 188 selected representative sites for MPIP laboratory analysis. Samples from 52 of these sites were also sent to the DOE laboratory for energy-related analysis.

Peatlands cover 170,050 ha (420,160 ac) or 33% of the total area of Aitkin County. Total oven-dried tons of peat amount to 246,414,000 metric tons (276,237,000 U.S. short tons).

The peatlands meeting the DOE criteria for fuel-grade peat cover 30,390 ha (75,080 ac) or 18% of the county's total peatland area. The quantity of peat in these peatlands is 98,134,000 oven-dried metric tons (110,012,000 oven-dried U.S. short tons). These peatlands cover at least 80 contiguous acres and are composed of peat that (1) has an average energy value of 8,874 Btu/lb (moisture-free), (2) has an average ash content of 10.6%, and (3) is at least 150 cm (~5 ft) deep.

The estimated potential energy of these peat deposits is 1.97×10^{15} Btu (1.97 quads of energy) if all three peat types, fibric, hemic, and sapric, in deposits greater than 150 cm deep are considered.

TABLE 14

QUANTITY AND ENERGY POTENTIAL OF AITKIN COUNTY PEAT

	Hectares	*Acres*	*Tons-Dry Metric (×1,000)*	*Tons-Dry U.S. Short (×1,000)*	*Btu's*	*Quads**
By Depth						
≥150cm Deep	30,390	75,080	98,134	110,012	1.97×10^{15}	1.97
<150cm Deep	139,660	345,080	148,280	166,225	2.94×10^{15}	2.94
TOTAL	170,050	420,160	246,414	276,237	4.91×10^{15}	4.91
By Type						
Fibric			1,937	2,130	0.04×10^{15}	0.04
Hemic			221,541	248,443	4.44×10^{15}	4.44
Sapric			22,936	25,664	0.43×10^{15}	0.43
TOTAL			246,414	276,237	4.91×10^{15}	4.91

* One Quad = 1×10^{15} Btu.

APPENDIX A

LABORATORY METHODS

Moisture Content

To determine moisture content, an as-received sample was weighed, oven-dried to a constant weight (105°C for ~24 hrs), cooled, and reweighed. Moisture content expressed as (1) a percentage of total weight represents the moisture present in the soil, and as (2) a percentage of dry weight represents the water-holding capacity of the soil. Moisture content was calculated as follows:

$$\text{Total wt., percent} = [(A - B) \times 100]/A$$

$$\text{Dry wt., percent} = [(A - B) \times 100]/B$$

where:
A = grams of as-received sample, and
B = grams of oven-dried sample.

Bulk Density

To determine bulk density, an as-received sample of known volume was oven-dried to a constant weight (105°C for ~24 hrs), cooled, and weighed. Bulk density was calculated on an oven-dry weight—wet bulk volume basis as follows:

$$\text{Bulk density, g/cc} = B/C$$

where:
B = grams of oven-dried sample, and
C = volume in cc of as-received sample.

Ash Content

To determine ash content, an oven-dried sample (from moisture determination) was thoroughly mixed in a blender. A one-gram portion was placed in a crucible, ignited in a muffle furnace (500°C for 1 hr), cooled, and reweighed. Ash content was calculated as follows:

$$\text{Ash, percent} = (D \times 100)/E$$

where:
D = grams of ash, and
E = one-gram of oven-dried and mixed sample.

pH

The pH of peat was measured in (1) a suspension of deionized H_2O and (2) in a suspension of 0.01M $CaCl_2$ solution. The procedure for both measurements involved lightly packing 15 cc of an as-received peat sample into a 100 cc container, adding 15 cc of solution, and mixing. Each suspension was set aside for an hour to equilibrate before measuring with a pH meter.

pH was measured both in water and in a calcium chloride solution because the pH readings in water can be modified by salts, whereas the observed pH in calcium chloride solution is virtually independent of the initial amount of salts present in the soil (ASTM 1971). Calcium chloride suspensions are almost independent of dilution because of the release of hydrogen ions through cation exchange, whereas water suspensions have a greater dilution effect, resulting in a slightly higher pH value (Canada Soil Survey Committee 1976).

Proximate and Ultimate Analyses

Proximate and ultimate analyses were performed by the DOE Coal Analysis Laboratory using standard ASTM laboratory procedures.

APPENDIX B

SITE DESCRIPTIONS WITH MPIP LABORATORY DATA

Reference Number: 1
Location: 46m (150ft)N and 617m (2025ft)W of the SE corner of Sec. 10, T.51N., R.22W.
Vegetation: Northern white cedar crown cover of about 70%; lush understory consists mostly of speckled alder with some Labrador tea, sedges, grasses, and dogwood; ground cover consists mostly of sphagnum mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on March 19, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 40	35- 50	0.19	82.0	455	6.2	5.7	13.5
Sapric	40-102	85-100	0.20	79.6	390	6.3	5.8	16.8
Silt	102+							

Reference Number: 2
Location: 617m (175ft)N and 629m (2065ft)W of the SE corner of Sec. 12, T.51N., R.22W.
Vegetation: Tamarack crown cover of about 90%; understory consists of Labrador tea and raspberry with some bog birch; ground cover consists mostly of sphagnum mosses.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 19, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 15	35- 50	0.10	90.2	923	5.6	4.9	13.8
Hemic	15-255	85-100	0.13	90.7	979	5.8	5.1	16.1
Sapric	255-314	135-150	0.12	88.8	796	5.8	5.1	14.8
Silt	314+	185-200	0.09	90.1	918	5.9	5.2	16.3
		235-250	0.14	87.2	682	6.1	5.5	23.1
		285-300	0.22	78.9	374	6.3	5.7	14.5

Reference Number: 3
Location: 632m (2075ft)S and 366m (1200ft)E of the NW corner of Sec. 1, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; understory consists of leatherleaf, cotton grass, swamp laurel, bog rosemary, and Labrador tea; ground cover consists mostly of sphagnum mosses with some cranberry and pitcher plant.
Microrelief: 60cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Mellem, and B. Balen on August 2, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 72	35- 50	0.05	95.4	2088	4.1	2.7	5.4
Hemic	72-398	85-100	0.06	93.0	1324	3.8	3.0	8.2
Sapric	398-400	135-150	0.04	93.9	1550	4.6	3.6	4.2
Silt	400+	185-200	0.06	93.1	1358	5.2	4.4	5.2
		235-250	0.07	92.3	1200	5.6	5.0	7.2
		285-300	0.09	91.0	1012	5.9	5.2	8.1
		335-350	0.12	88.8	792	5.9	5.4	11.9
		385-400	0.14	86.2	624	5.8	5.3	13.6

Reference Number: 4
Location: 477m (1565ft)N and 802m (2630ft)E of the SW corner of Sec. 1, T.52N., R.22W.
Vegetation: Tamarack crown cover of about 40% with scattered black spruce; understory consists of bog rosemary, Labrador tea, leatherleaf, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Mellem, and B. Balen on August 2, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 23	35- 50	0.10	90.6	967	6.0	3.8	7.8
Hemic	23-379	85-100	0.08	91.2	1033	6.0	4.4	5.3
Sapric	379-387	135-150	0.08	91.0	1015	6.1	4.6	5.4
Silty	387+	185-200	0.09	89.2	826	6.2	5.0	7.5
clay		235-250	0.14	87.4	694	6.0	3.8	15.4
		285-300	0.12	87.8	717	6.0	4.5	9.6
		335-350	0.17	85.0	566	6.1	4.7	14.8
		370-385	0.17	84.0	524	6.2	5.0	14.8

Reference Number: 5
Location: 244m (800ft)N and 355m (1165ft)E of the SW corner of Sec. 1, T.52N., R.22W.
Vegetation: Scattered black spruce, tamarack, and paper birch; sparse understory consists of some willow, Labrador tea, leatherleaf, swamp laurel, and cotton grass; ground cover consists mostly of sphagmun mosses with some cranberry.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Mellem, and B. Balen on August 2, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-332	35- 50	0.10	90.2	915	5.6	4.9	5.5
Silty	332+	85-100	0.08	92.0	1145	5.7	5.2	6.8
clay		135-150	0.09	90.4	936	6.0	5.3	8.0
		185-200	0.13	86.8	660	6.1	5.5	12.7
		235-250	0.16	86.1	618	6.1	5.4	9.2
		285-300	0.17	83.0	489	6.0	5.4	13.0
		315-330	0.19	82.6	474	5.9	5.4	13.7

Reference Number: 6
Location: 735m (2410ft)N and 477m (1565ft)W of the SE corner of Sec. 1, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 50% with tamarack crown cover of about 45%; understory consists mostly of bog birch with some willow, Labrador tea, leatherleaf, bog rosemary, grasses, dogwood, and ferns; ground cover consists mostly of sphagnum mosses.
Microrelief: 15cm
Depth To Water Table: 10cm
Described And Sampled By: D. Mellem and B. Balen on August 1, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-544	35- 50	0.07	92.3	1200	4.7	4.0	4.7
Limnic	544-575	85-100	0.10	90.9	994	5.2	4.8	6.3
Silt	575+	135-150	0.10	90.6	967	5.7	4.9	7.5
		185-200	0.11	89.1	819	5.9	5.2	10.9
		235-250	0.11	89.9	886	6.0	5.2	11.5
		285-300	0.08	91.4	1061	6.0	5.4	9.6
		335-350	0.12	88.6	775	6.1	5.4	8.4
		385-400	0.10	89.8	883	6.2	5.6	11.8
		400-435	0.18	84.2	533	5.8	5.5	26.6
		485-500	0.11	88.8	793	5.7	5.6	10.4
		528-543	0.14	88.0	733	4.2	4.2	17.8

Reference Number: 7
Location: 479m (1570ft)S and 329m (1080ft)W of the NE corner of Sec. 2, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 30%; understory consists of Labrador tea, leatherleaf, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 48cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling and D. Olson on August 3, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 35	35- 50	0.08	91.5	1082	3.6	2.9	5.6
Hemic	35-429	85-100	0.08	92.0	1150	4.0	3.0	4.1
Silt	429+	135-150	0.06	93.0	1330	4.2	3.5	3.6
		185-200	0.08	90.9	1002	5.1	4.4	6.0
		235-250	0.10	90.4	940	5.2	4.5	7.4
		285-300	0.10	90.6	961	5.7	5.0	9.9
		335-350	0.09	91.3	1047	5.8	5.1	7.6
		385-400	0.15	85.5	591	5.7	5.1	10.0

Reference Number: 8
Location: 507m (1665ft)S and 23m (75ft)E of the NW corner of Sec. 2, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; lush understory consists of bog birch, Labrador tea, leatherleaf, and bog rosemary; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 20cm
Depth To Water Table: 15cm
Described And Sampled By: D. Olson and B. Balen on August 8, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-117	35- 50	0.10	90.3	928	4.8	4.1	7.1
Fine	117+	85-100	0.11	88.9	804	5.2	4.5	8.0
sand								

Reference Number: 9
Location: 549m (1800ft)N and 37m (120ft)E of the SW corner of Sec. 2, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 75%; lush understory consists of Labrador tea, leatherleaf, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 30cm
Depth To Water Table: 20cm
Described And Sampled By: D. Olson and B. Balen on August 8, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 41	35- 50	0.12	87.6	705	3.8	2.8	5.8
Fibric	41- 65	85-100	0.08	91.9	1136	3.8	2.8	3.8
Hemic	65- 78	135-150	0.09	91.2	1038	4.0	3.2	3.1
Fibric	78- 93	185-200	0.09	90.9	997	4.3	3.4	5.2
Hemic	93-114	235-250	0.10	90.2	918	4.5	3.7	10.3
Fibric	114-142	285-300	0.11	88.9	798	4.8	4.0	8.5
Hemic	142-475	335-350	0.12	88.8	792	4.8	4.2	6.1
Sapric	475-489	385-400	0.11	88.8	794	5.0	4.4	15.0
Very fine sandy loam	489+	435-450	0.15	86.3	632	5.0	4.5	17.6

Reference Number: 10
Location: 148m (485ft)N and 56m (185ft)E of the SW corner of Sec. 2, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; lush understory consists of Labrador tea and leatherleaf with some cotton grass; ground cover consists mostly of sphagnum mosses.
Microrelief: 35cm
Depth To Water Table: 5cm
Described And Sampled By: D. Olson and B. Balen on August 8, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 24	35- 50	0.08	91.7	1100	4.0	2.9	5.2
Fibric	24- 48	85-100	0.08	92.3	1199	4.4	3.4	5.1
Hemic	48-370	135-150	0.08	92.2	1178	4.5	3.6	5.7
Silt loam	370+	185-200	0.10	90.4	946	4.9	4.2	7.0
		235-250	0.11	89.5	854	5.1	4.4	7.7
		285-300	0.11	89.6	857	5.2	4.6	10.2
		335-350	0.11	89.4	847	5.2	4.6	11.0

Reference Number: 11
Location: 610m (2000ft)N and 69m (225ft)W of the SE corner of Sec. 2, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; understory consists of Labrador tea, leatherleaf, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses with some cranberry.
Microrelief: 24cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling and D. Olson on August 3, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-383	35- 50	0.09	91.0	1013	3.8	2.8	6.0
Sapric	383-388	85-100	0.08	92.4	1214	4.1	3.1	9.1
Hemic	388-523	135-150	0.07	92.9	1310	4.5	3.2	5.0
Limnic	523-548	185-200	0.07	92.1	1166	5.3	4.5	5.8
Silty clay	548+	235-250	0.11	89.3	837	5.4	4.8	7.5
		285-300	0.12	88.2	751	5.6	5.0	11.9
		335-350	0.12	89.0	810	5.8	5.1	11.4
		385-400	0.14	86.0	615	5.7	5.2	16.4
		435-450	0.14	86.9	660	5.9	5.2	13.3
		485-500	0.15	85.9	608	5.6	5.2	13.4

Reference Number: 12
Location: 53m (175ft)N and 785m (2575ft)W of the SE corner of Sec. 2, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 50% with scattered tamarack; lush understory consists of speckled alder, bog birch, leatherleaf, swamp laurel, and Labrador tea; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 26cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling and D. Olson on August 3, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-395	35- 50	0.12	88.6	777	4.3	3.6	6.2
Silty clay	395+	65- 80	0.09	91.0	1008	5.0	4.2	6.0
		135-150	0.11	89.5	855	5.4	4.8	7.3
		185-200	0.12	88.7	784	5.5	5.0	9.5
		235-250	0.16	85.0	569	5.5	4.9	15.6
		285-300	0.14	86.2	622	5.7	5.0	8.8
		335-350	0.18	83.8	517	5.5	5.0	11.1
		370-385	0.18	81.2	432	5.5	5.1	13.0

Reference Number: 13
Location: 43m (140ft)N and 76m (250ft)W of the SE corner of Sec. 2, T.52N., R.22W.
Vegetation: Tamarack crown cover of about 20%; sparse understory consists of some grasses and sedges; ground cover consists mostly of sphagnum mosses.
Microrelief: 22cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling and D. Olson on August 3, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-266	35- 50	0.11	88.8	795	5.0	4.4	7.2
Silty	266+	85-100	0.10	89.7	875	5.6	5.0	6.6
clay		135-150	0.12	88.3	756	5.8	5.1	11.9
		185-200	0.12	88.3	753	5.6	5.0	10.8
		235-250	0.21	82.9	486	5.6	5.1	12.3

Reference Number: 14
Location: 38m (125ft)S and 759m (2490ft)W of the NE corner of Sec. 2, T.52N., R.22W.
Vegetation: Scattered black spruce; understory consists of sedges, leatherleaf, and bog rosemary; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on August 4, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 15	35- 50	0.06	92.7	1261	4.3	3.0	7.2
Hemic	15-425	85-100	0.08	91.7	1103	4.4	3.3	3.8
Sapric	425-438	135-150	0.08	92.0	1152	4.7	3.6	5.2
Fine	438+	185-200	0.08	91.8	1119	5.2	4.2	6.0
sand		235-250	0.13	88.1	740	5.3	4.5	11.9
		285-300	0.11	89.0	808	5.4	4.6	8.6
		335-350	0.09	90.1	907	5.5	4.7	13.0
		385-400	0.12	88.4	758	5.4	4.8	8.1
		420-435	0.17	84.8	556	5.6	4.9	25.3

Reference Number: 15
Location: 30m (100ft)S and 241m (790ft)E of the NW corner of Sec. 2, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of bog birch with some leatherleaf, swamp laurel, and grasses; ground cover consists mostly of sphagnum mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on August 4, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-195	35- 50	0.12	87.8	718	4.4	3.7	6.2
Very	195+	85-100	0.08	91.3	1048	4.8	4.0	6.1
fine		135-150	0.11	89.3	839	5.2	4.5	7.6
sand		180-195	0.17	83.6	511	5.6	4.9	43.8

Reference Number: 16
Location: 622m (2040ft)N and 46m (150ft)E of the SW corner of Sec. 4, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 45% with scattered tamarack; lush understory consists mostly of Labrador tea with some swamp laurel, leatherleaf, bog rosemary, sedges, cotton grass, and blueberry; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 45cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer, B. Leuelling, and B. Balen on July 26, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 70	35- 50	0.10	90.1	909	3.2	3.0	7.4
Fibric	70- 80	85-100	0.07	92.3	1200	3.2	3.0	4.4
Hemic	80- 85	135-150	0.09	91.4	1056	3.9	3.7	4.3
Fibric	85-103	185-200	0.08	91.3	1047	4.4	4.2	4.9
Hemic	103-360	235-250	0.11	89.0	805	4.9	4.6	11.1
Sapric	360-390	285-300	0.10	89.6	865	5.2	5.0	8.7
Hemic	390-488	335-350	0.12	87.9	729	5.1	5.0	14.2
Limnic	488+	385-400	0.15	85.5	588	5.3	5.2	14.4
Bottom		435-450	0.14	87.0	670	5.4	5.4	11.6
unknown		472-487	0.11	88.7	783	5.4	5.0	13.5

Reference Number: 17
Location: 137m (450ft)N and 58m (190ft)W of the SE corner of Sec. 4, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 95%; lush understory consists mostly of Labrador tea with some leatherleaf and cotton grass; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on July 31, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 17	35- 50	0.12	89.2	823	3.2	2.8	7.4
Hemic	17-382	85-100	0.10	90.4	940	3.7	3.4	8.0
Sapric	382-415	135-150	0.10	90.5	955	4.0	3.6	8.0
Fine	415+	185-200	0.10	89.8	881	4.3	3.8	7.1
sand		235-250	0.11	90.0	902	4.5	4.0	8.6
		285-300	0.12	88.3	756	4.7	4.2	8.7
		335-350	0.13	88.0	736	4.9	4.4	9.3
		385-400	0.19	83.2	496	5.0	4.6	15.2

Reference Number: 18
Location: 320m (1050ft)S and 76m (250ft)W of the NE corner of Sec. 9, T.52N., R.22W.
Vegetation: Scattered tamarack and black spruce; lush understory consists mostly of bog birch with some cotton grass, Labrador tea, leatherleaf, and willow; ground cover consists mostly of sphagnum mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on July 31, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-376	35- 50	0.10	90.9	997	4.8	4.5	6.4
Sapric	376-441	85-100	0.09	91.0	1005	4.7	4.5	7.2
Loamy	441+	135-150	0.10	91.0	1005	4.8	4.5	5.8
fine		185-200	0.10	90.3	927	5.2	4.9	9.8
sand		235-250	0.12	89.3	831	5.2	4.9	9.5
		285-300	0.12	88.6	781	5.4	5.2	11.4
		335-350	0.13	87.9	728	5.4	5.2	14.1
		385-400	0.17	83.8	517	5.4	5.2	18.6

Reference Number: 19
Location: 558m (1830ft)N and 169m (555ft)W of the SE corner of Sec. 9, T.52N., R.22W.
Vegetation: Scattered tamarack and black spruce; lush understory consists mostly of bog birch with some cotton grass and horsetails; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on July 31, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-332	35- 50	0.14	87.3	685	4.7	4.0	7.4
sand	332+	85-100	0.10	90.2	917	5.0	4.2	10.8
		135-150	0.09	91.0	1010	5.2	4.2	6.5
		185-200	0.12	88.4	758	5.1	4.4	11.3
		220-235	0.14	87.3	685	5.2	4.5	9.3

Reference Number: 20
Location: 436m (1430ft)N and 535m (1755ft)E of the SW corner of Sec. 10, T.52N., R.22W.
Vegetation: Tamarack crown cover of about 50%; lush understory consists mostly of bog birch and leatherleaf with some ferns; ground cover consists of some feather mosses.
Microrelief: 10cm
Depth To Water Table: 10cm
Described And Sampled By: D. Olson, D. Mellem, and B. Balen on July 28, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 30	35- 50	0.09	90.6	958	4.2	3.6	7.6
Hemic	30-303	85-100	0.12	88.7	781	4.6	3.9	9.9
Fine	303+	135-150	0.12	88.9	798	4.9	4.2	6.7
sandy		185-200	0.13	87.8	721	5.1	4.6	10.3
loam		235-250	0.17	85.4	586	5.1	4.6	9.6
		285-300	0.15	84.3	538	5.2	4.8	10.5

Reference Number: 21
Location: 443m (1455ft)N and 658m (2160ft)W of the SE corner of Sec. 10, T.52N., R.22W.
Vegetation: Paper birch crown cover of about 45% with scattered black spruce and aspen; lush understory consists mostly of grasses with some raspberry, dogwood, gooseberry, and bog birch.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem, B. Balen, and D. Olson on July 28, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-203	35- 50	0.15	84.5	544	5.0	4.6	15.8
Silty	203+	85-100	0.09	90.2	916	5.9	5.6	12.5
clay		135-150	0.13	88.4	758	5.4	4.8	7.0
		185-200	0.19	82.9	484	5.5	5.1	25.8

Reference Number: 22
Location: 402m (1320ft)N and 157m (515ft)W of the SE corner of Sec. 11, T.52N., R.22W.
Vegetation: Scattered black spruce; understory consists of leatherleaf, sedges, Labrador tea, and swamp laurel; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 20, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 55	35- 50	0.10	90.6	961	3.3	2.6	5.2
Hemic	55-160	85-100	0.08	91.3	1050	3.4	2.8	5.3
Mineral	160+	135-150	0.14	86.4	634	3.4	2.9	6.4
soil								

Reference Number: 23
Location: 457m (1500ft)N and 599m (1965ft)E of the SW corner of Sec. 12, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 40%; understory consists of Labrador tea, leatherleaf, swamp laurel, bog rosemary, and grasses; ground cover consists mostly of mosses with some cranberry.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 20, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 33	35- 50	0.09	91.2	1035	3.4	2.6	7.7
Hemic	33-300	85-100	0.06	93.8	1524	3.5	2.8	3.3
Sapric	300-340	135-150	0.08	91.8	1121	3.6	3.0	4.5
Silty	340+	185-200	0.07	92.4	1216	4.4	3.3	5.5
clay		235-250	0.14	86.5	642	5.0	4.0	9.2
		285-300	0.17	83.6	510	5.0	4.4	12.4
		307-322	0.23	80.1	402	4.8	4.4	15.6

Reference Number: 24
Location: 61m (200ft)S and 543m (1780ft)E of the NW corner of Sec. 13, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 40%; understory consists of leatherleaf, swamp laurel, Labrador tea, and sedges; ground cover consists mostly of sphagnum mosses.
Microrelief: 45cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 20, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-140	35- 50	0.05	94.7	1772	3.6	2.5	4.4
Hemic	140-440	85-100	0.05	93.3	1395	3.8	2.7	5.4
Limnic	440-520	135-150	0.09	90.4	944	3.8	2.8	5.0
Fine	520-540	185-200	0.06	93.9	1550	4.0	3.0	4.7
sand		235-250	0.12	88.4	760	4.5	3.8	7.3
Sandy	540+	285-300	0.13	87.3	687	4.9	4.3	10.2
clay		335-350	0.14	86.8	658	5.1	4.5	11.4
		385-400	0.08	91.3	1048	5.4	4.8	7.8

Reference Number: 25
Location: 617m (2025ft)S and 437m (1435ft)E of the NW corner of Sec. 13, T.52N., R.22W.
Vegetation: Scattered black spruce; lush understory consists mostly of sedges with some willow, leatherleaf, swamp laurel, bog rosemary, and cotton grass; ground cover consists mostly of sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 20, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-240	35- 50	0.06	92.6	1246	4.6	4.1	12.5
Sapric	240-250	85-100	0.07	91.4	1056	3.8	3.2	7.3
Silty	250+	135-150	0.10	90.6	965	4.5	3.6	5.1
clay		185-200	0.11	89.1	815	5.0	4.2	9.6
		235-250	0.15	85.3	578	4.7	4.4	13.7

Reference Number: 26
Location: 162m (530ft)S and 244m (800ft)W of the NE corner of Sec. 14, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of sedges with some leatherleaf, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 20, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 40	35- 50	0.10	90.1	905	3.6	2.7	5.8
Hemic	40-255	85-100	0.09	90.0	896	3.7	2.8	4.8
Sapric	255-330	135-150	0.11	89.4	841	3.9	3.1	4.4
Limnic	330-380	185-200	0.11	88.1	743	4.2	3.6	6.4
Fine	380+	235-250	0.16	85.2	577	4.7	4.3	8.0
sand		285-300	0.23	79.2	381	5.2	4.7	18.0
		335-350	0.15	85.6	592	5.0	4.8	21.1

Reference Number: 27
Location: 652m (2140ft)S and 15m (50ft)E of the NW corner of Sec. 14, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of sedges and leatherleaf with some swamp laurel and bog birch; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 25, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 10	35- 50	0.09	91.0	1015	4.3	3.3	12.1
Hemic	10- 95	85-100	0.13	85.8	604	4.8	4.0	11.2
Sapric	95-185	135-150	0.16	84.2	533	5.2	4.5	13.9
Silty	185+	170-185	0.26	77.1	337	5.6	4.9	41.8
clay								

Reference Number: 28
Location: 130m (425ft)N and 30m (100ft)E of the SW corner of Sec. 14, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; sparse understory consists of some leatherleaf and swamp laurel; ground cover consists of some sphagnum mosses and cranberry.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 25, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 30	35- 50	0.09	91.1	1027	3.8	2.8	6.3
Hemic	30-238	85-100	0.10	89.8	876	3.9	3.0	4.9
Sapric	238-278	135-150	0.12	88.6	776	4.4	3.7	7.9
Very	278+	185-200	0.14	86.3	627	5.0	4.4	12.8
fine		235-250	0.17	84.8	558	5.3	4.6	9.3
loamy		261-276	0.21	81.5	441	5.4	4.8	16.8
sand								

Reference Number: 29
Location: 515m (1690ft)N and 363m (1190ft)W of the SE corner of Sec. 14, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 70%; understory consists of Labrador tea, leatherleaf, swamp laurel, sedges, and grasses; ground cover consists mostly of sphagnum mosses.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 24, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-100	35- 50	0.04	95.0	1899	3.8	2.8	6.4
Hemic	100-305	85-100	....	94.3	1646	3.8	3.0	3.8
Fine	305+	135-150	0.08	91.7	1101	4.3	3.6	5.1
sand		185-200	0.11	88.9	802	5.0	4.4	7.0
		235-250	0.10	90.2	923	5.3	4.6	8.5
		285-300	0.15	85.1	569	5.4	4.8	12.4

Reference Number: 30
Location: 210m (690ft)S and 631m (2070ft)W of the NE corner of Sec. 23, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 35%; understory consists of Labrador tea, leatherleaf, swamp laurel, and sedges with some blueberry; ground cover consists mostly of sphagnum mosses.
Microrelief: 45cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 24, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 40	35- 50	0.05	94.3	1643	3.3	2.4	6.8
Hemic	40-100	85-100	0.07	93.1	1354	3.6	2.5	4.5
Fibric	100-218	135-150	0.08	91.3	1053	3.6	2.7	4.7
Hemic	218-395	185-200	0.06	93.7	1490	3.9	3.0	3.5
Sapric	395-470	235-250	0.08	91.5	1082	4.5	3.7	6.4
Limnic	470-485	285-300	0.09	90.6	964	5.7	4.4	12.2
Fine	485+	335-350	0.13	87.5	702	5.7	4.7	9.7
sand		385-400	0.18	82.3	464	5.4	4.8	17.2
		435-450	0.19	82.7	479	5.6	4.9	22.9

Reference Number: 31
Location: 671m (2200ft)S and 219m (720ft)W of the NE corner of Sec. 23, T.52N., R.22W.
Vegetation: Scattered black spruce; sparse understory consists of some Labrador tea, leatherleaf, sedges, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 24, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-100	35- 50	0.08	91.9	1130	3.2	2.5	6.1
Hemic	100-210	85-100	0.07	91.2	1036	3.6	3.0	4.7
Very	210+	135-150	0.10	90.8	981	3.8	3.4	7.2
fine		185-200	0.09	91.6	1094	4.2	3.8	12.8
sand								

Reference Number: 32
Location: 210m (690ft)S and 140m (460ft)E of the NW corner of Sec. 23, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 60% with scattered tamarack; understory consists of sedges and Labrador tea; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 25, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 15	35- 50	0.07	92.3	1193	3.7	2.9	7.2
Hemic	15-310	85-100	0.08	92.3	1202	3.9	3.2	4.8
Sapric	310-340	135-150	0.10	89.8	876	4.4	3.8	7.2
Silty	340+	185-200	0.10	89.5	852	5.0	4.2	8.8
clay		235-250	0.12	88.9	801	5.0	4.4	9.8
		285-300	0.13	87.3	685	5.2	4.5	10.8
		315-330	0.18	82.9	484	5.3	4.8	15.5

Reference Number: 33
Location: 419m (1375ft)N and 607m (1990ft)E of the SW corner of Sec. 23, T.52N., R.22W.
Vegetation: Scattered black spruce; understory consists of sedges, Labrador tea, leatherleaf, swamp laurel, and bog rosemary; ground cover consists mostly of sphagnum mosses with some cranberry.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 25, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-105	35- 50	0.08	92.2	1183	4.1	2.8	6.9
Hemic	105-285	85-100	0.08	91.6	1086	4.3	3.8	5.8
Sapric	285-320	135-150	0.10	90.4	943	5.2	4.8	7.8
Very	320+	185-200	0.12	88.6	776	5.5	5.1	7.3
fine		235-250	0.16	85.9	610	5.4	5.2	11.6
sand		285-300	0.20	81.2	434	5.6	5.4	19.8

Reference Number: 34
Location: 404m (1325ft)N and 58m (190ft)W of the SE corner of Sec. 23, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; understory consists mostly of sedges with some cotton grass, Labrador tea, leatherleaf, and swamp laurel; ground cover consists mostly of sphagnum mosses.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 24, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 40	35- 50	0.09	90.5	947	3.7	3.1	7.5
Hemic	40-460	85-100	0.11	89.8	883	4.5	4.0	6.5
Limnic	460-466	135-150	0.08	91.0	1014	5.3	4.6	6.1
Very	466+	185-200	0.09	90.8	982	5.4	4.7	7.6
fine		235-250	0.10	89.4	847	5.3	4.7	10.2
sand		285-300	0.12	88.2	751	5.5	4.9	9.6
		335-350	0.19	82.9	484	5.3	4.9	23.1
		385-400	0.14	86.2	623	5.6	5.0	10.0
		435-450	0.14	87.4	694	5.2	5.0	10.2

Reference Number: 35
Location: 373m (1225ft)N and 610m (2000ft)W of the SE corner of Sec. 23, T.52N., R.22W.
Vegetation: Scattered black spruce and tamarack; understory consists of leatherleaf, sedges, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses with some cranberry.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 24, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 80	35- 50	0.03	94.0	1573	4.5	3.5	8.9
Hemic	80-100	85-100	0.10	89.1	817	4.6	4.1	29.0
Fine sand	100+							

Reference Number: 36
Location: 480m (1575ft)S and 381m (1250ft)E of the NW corner of Sec. 26, T.52N., R.23W.
Vegetation: Scattered black spruce, tamarack, and paper birch; understory consists of speckled alder, Labrador tea, and grasses; ground cover consists mostly of sphagnum mosses with some lady-slippers.
Microrelief: 28cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 7, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 30	35- 50	0.16	85.4	583	5.2	4.6	13.9
Hemic	30-112	85-100	0.16	84.8	559	5.5	4.9	18.3
Sapric	112-154	135-150	0.13	87.3	686	5.4	4.8	15.7
Silt loam	154+							

Reference Number: 37
Location: 465m (1525ft)S and 716m (2350ft)W of the NE corner of Sec. 27, T.52N., R.23W.
Vegetation: Scattered aspen, black ash, and river birch; understory consists of dogwood, bog birch, grasses, and ferns; ground cover consists of sphagnum mosses.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 7, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-136	35- 50	0.19	81.6	443	6.4	5.8	18.4
Loam	136+	85-100	0.18	81.1	428	6.4	5.8	20.8
		115-130	0.22	80.1	402	6.8	6.3	47.2

Reference Number: 38
Location: 175m (575ft)N and 50m (165ft)E of the SW corner of Sec. 5, T.48N., R.24W.
Vegetation: Recently burned with a sparse cover of sedges and grasses.
Microrelief: Negligible
Depth To Water Table: 30cm
Described And Sampled By: D. Mellem and B. Balen on June 19, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 33	35- 50	0.10	90.1	907	3.7	3.1	3.4
Fibric	33- 80	85-100	0.11	89.4	842	4.0	3.4	7.2
Hemic	80-210	135-150	0.14	87.2	684	4.5	4.0	11.1
Medium sand	210+	185-200	0.14	86.1	618	5.1	4.4	14.5

Reference Number: 39
Location: 785m (2575ft)S and 655m (2150ft)W of the NE corner of Sec. 6, T.48N., R.24W.
Vegetation: Burned area—lush understory consists mostly of grasses with some Labrador tea, leatherleaf, and aspen.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 19, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-130	35- 50	0.21	80.7	417	4.3	3.8	9.3
Fibric	130-141	85-100	0.20	80.7	418	4.7	4.2	7.1
Silt	141+							

Reference Number: 40
Location: 460m (1510ft)S and 514m (1685ft)E of the NW corner of Sec. 6, T.48N., R.24W.
Vegetation: Consists mostly of grasses.
Microrelief: 12cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 19, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-140	35- 50	0.18	82.3	466	4.6	4.2	11.0
Sapric	140-150	85-100	0.16	84.7	551	5.1	4.6	16.1
Medium sand	150+	135-150	0.33	70.8	243	5.0	4.8	....

Reference Number: 41
Location: 495m (1625ft)N and 302m (990ft)W of the SE corner of Sec. 6, T.48N., R.24W.
Vegetation: Burned area—consists of Labrador tea, leatherleaf, swamp laurel, sedges, and mosses.
Microrelief: Negligible
Depth To Water Table: 30cm
Described And Sampled By: D. Mellem and B. Balen on June 19, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-168	35- 50	0.23	77.7	349	3.8	3.2	5.7
Medium	168+	85-100	0.20	80.5	412	4.3	3.7	8.9
sand		135-150	0.30	73.8	282	4.9	4.3	14.7
		152-167	0.20	82.1	459	5.0	4.5	19.7

Reference Number: 42
Location: 162m (530ft)S and 491m (1610ft)E of the NW corner of Sec. 6, T.48N., R.24W.
Vegetation: Consists mostly of grasses with some sedges.
Microrelief: 5cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 19, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-92	35-50	0.17	80.3	404	6.1	5.0	21.0
Sapric	92-94	77-92	0.27	73.5	277	5.7	5.1	22.4
Silt	94+							

Reference Number: 43
Location: 457m (1500ft)S and 774m (2540ft)W of the NE corner of Sec. 8,T.48N., R.24W.
Vegetation: Consists mostly of grasses with bog birch and leatherleaf; ground cover consists of sphagnum mosses.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on June 15, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-41	26-41	0.14	87.2	682	3.8	3.5	17.8
Fine	41+							
to								
medium								
sand								

Reference Number: 44
Location: 792m (2600ft)S and 427m (1400ft)W of the NE corner of Sec. 8, T.48N., R.24W.
Vegetation: Consists of bog birch, leatherleaf, sedges, and cotton grass; ground cover consists mostly of sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on June 15, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-71	55-65	.....	82.5	470	4.2	3.9	14.7
Mineral	71+							
soil								

Reference Number: 45
Location: 137m (450ft)S and 415m (1360ft)E of the NW corner of Sec. 8, T.48N., R.24W.
Vegetation: Burned area—consists mostly of grasses with scattered aspen.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on June 15, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Hemic Sandy clay loam	0-20 20-61 61+	35-50	0.17	82.4	469	3.7	3.2	9.0

Reference Number: 46
Location: 497m (1630ft)N and 69m (225ft)W of the SE corner of Sec. 8, T.48N., R.24W.
Vegetation: Consists of bog birch and cotton grass; ground cover consists mostly of sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on June 15, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-155	35- 50	0.16	84.0	524	4.1	3.3	7.9
Sapric	155-172	85-100	0.12	87.5	700	4.6	4.0	9.9
Medium sand	172+	135-150	0.16	85.6	592	5.1	4.4	15.0

Reference Number: 47
Location: 191m (625ft)N and 271m (890ft)E of the SW corner of Sec. 9, T.48N., R.24W.
Vegetation: Not recorded
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on June 15, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-190	35- 50	0.14	85.5	587	4.2	3.5	6.8
Medium	190+	85-100	0.14	86.3	630	4.6	3.9	7.8
to		135-150	0.16	84.9	562	5.0	4.3	12.2
coarse		172-187	0.17	82.2	460	5.2	4.6	16.8
sand								

Reference Number: 48
Location: 165m (540ft)S and 35m (115ft)W of the NE corner of Sec. 7, T.50N., R.24W.
Vegetation: Consists mostly of grasses with some willow and ferns.
Microrelief: 5cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 11, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Sandy clay	0-30 30+	15-30	0.20	80.9	422	5.9	5.3	24.7

Reference Number: 49
Location: 663m (2175ft)N and 49m (160ft)W of the SE corner of Sec. 7, T.50N., R.24W.
Vegetation: Consists mostly of grasses with some willow.
Microrelief: 5cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 11, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Sandy clay	0-37 37+	15-30	0.20	79.3	383	5.3	4.7	26.6

Reference Number: 50
Location: 206m (675ft)S and 26m (85ft)E of the NW corner of Sec. 16, T.50N., R.24W.
Vegetation: Consists mostly of grasses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer and B. Balen on July 6, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Sapric Clay loam	0-35 35-38 38+	20-35	0.20	79.6	391	3.7	3.3	14.8

Reference Number: 51
Location: 610m (2000ft)S and 38m (125ft)E of the NW corner of Sec. 16, T.50N., R.24W.
Vegetation: Consists mostly of grasses with some dogwood.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer, B. Balen, and B. Leuelling on July 6, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Sapric Clay loam	0-52 52-53 53+	35-50	0.17	84.7	554	3.8	3.2	11.5

Reference Number: 52
Location: 114m (375ft)N and 27m (90ft)E of the SW corner of Sec. 16, T.50N., R.24W.
Vegetation: Consists mostly of grasses and bog birch with some sedges, leatherleaf, and swamp laurel.
Microrelief: 35cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer, B. Balen, and B. Leuelling on July 6, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric Hemic Sapric Clay loam	0- 5 5-50 50-63 63+	35-50	0.18	83.0	488	4.0	3.4	8.6

Reference Number: 53
Location: 56m (185ft)N and 402m (1320ft)E of the SW corner of Sec. 20, T.50N., R.24W.
Vegetation: Black spruce crown cover of about 40% with scattered tamarack; lush understory consists of leatherleaf, Labrador tea, swamp laurel, sedges, cotton grass, and bog rosemary; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 50cm
Depth To Water Table: 10cm
Described And Sampled By: T. Malterer, B. Balen, and B. Leuelling on July 6, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-282	35- 50	0.12	88.2	750	3.8	3.2	7.6
Sapric	282-376	85-100	0.10	90.0	898	4.4	3.9	7.3
Limnic	376-428	135-150	0.10	90.0	902	4.9	4.4	6.9
Silt	428+	185-200	0.12	87.9	728	5.2	4.8	10.9
		235-250	0.12	88.8	789	5.4	4.9	6.2
		285-300	0.16	84.5	543	5.5	5.1	14.1
		335-350	0.20	82.4	467	5.5	5.1	14.5

Reference Number: 54
Location: 56m (185ft)N and 575m (1885ft)W of the SE corner of Sec. 20, T.50N., R.24W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of bog birch and Labrador tea with some leatherleaf, swamp laurel, bog rosemary, and grasses; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 45cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer, B. Balen, and B. Leuelling on July 6, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-170	35- 50	0.14	86.7	651	4.6	4.1	6.8
Clay	170+	85-100	0.12	88.2	750	4.8	4.4	9.3
loam		135-150	0.13	87.2	683	5.1	4.7	9.3

Reference Number: 55
Location: 36m (1185ft)S and 41m (135ft)E of the NW corner of Sec. 21, T.50N., R.24W.
Vegetation: Consists of bog birch, grasses, leatherleaf, and sedges with some willow, Labrador tea, swamp laurel, and bog rosemary.
Microrelief: 40cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer, B. Balen, and B. Leuelling on July 6, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-10	35-50	0.15	85.8	603	4.0	3.2	8.2
Hemic	10-60							
Clay	60+							
loam								

Reference Number: 56
Location: 754m (2475ft)N and 35m (115ft)E of the SW corner of Sec. 21, T.50N., R.24W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of bog birch, Labrador tea, and leatherleaf with some swamp laurel, bog rosemary, and grasses; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 40cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer, B. Balen, and B. Leuelling on July 6, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 22	35- 50	0.15	85.8	603	3.7	2.8	6.6
Hemic	22-255	85-100	0.09	90.3	932	4.1	3.4	5.8
Sapric	255-305	135-150	0.12	88.5	767	4.6	3.8	10.2
Clay	305+	185-200	0.12	87.6	707	5.0	4.2	9.3
loam		235-250	0.17	84.3	535	5.2	4.7	12.4
		285-300	0.23	78.4	363	5.4	4.8	37.9

Reference Number: 57
Location: 302m (990ft)N and 26m (85ft)E of the SW corner of Sec. 21, T.50N., R.24W.
Vegetation: Scattered black spruce; lush understory consists mostly of Labrador tea with some cotton grass, leatherleaf, swamp laurel, bog rosemary, and sedges; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 45cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer, B. Balen, and B. Leuelling on July 6, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 11	35- 50	0.15	85.4	586	3.7	2.8	6.4
Hemic	11-181	85-100	0.11	88.6	778	4.8	4.1	9.2
Sapric	181-230	135-150	0.11	89.3	830	5.0	4.3	7.7
Clay	230+	185-200	0.14	86.0	614	5.5	4.9	9.5
loam		213-228	0.22	80.5	413	5.6	5.0	22.3

Reference Number: 58
Location: 506m (1660ft)S and 52m (170ft)W of the NE corner of Sec. 30, T.50N., R.24W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of bog birch and Labrador tea with some willow and leatherleaf; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 10, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-364	35- 50	0.11	88.4	761	4.0	3.2	5.0
Limnic	364-395	85-100	0.10	89.5	856	4.4	3.6	5.2
Clay	395+	135-150	0.12	88.4	764	5.0	4.0	9.6
		185-200	0.10	89.8	876	5.1	4.2	5.6
		235-250	0.17	85.1	573	5.2	4.4	18.1
		285-300	0.14	86.3	627	5.3	4.6	12.5
		335-350	0.14	87.6	704	4.8	4.4	12.8
		372-387	0.13	86.7	654	4.6	4.3	25.5

Reference Number: 59
Location: 282m (925ft)N and 50m (165ft)W of the SE corner of Sec. 30, T.50N., R.24W.
Vegetation: Scattered black spruce; lush understory consists mostly of bog birch and Labrador tea with some leatherleaf; ground cover consists mostly of sphagnum mosses.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 10, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-328	35- 50	0.11	89.5	848	4.2	3.9	5.7
Clay	328-357	85-100	0.12	88.3	753	4.9	4.5	7.3
Limnic	357-372	135-150	0.12	88.9	800	5.1	4.6	10.6
Silty	372+	185-200	0.12	87.7	715	5.4	5.0	10.2
clay		235-250	0.17	84.6	550	5.6	5.2	17.3
		285-300	0.19	82.1	459	5.7	5.4	32.4
		309-324	0.16	85.1	569	5.1	4.8	21.2

Reference Number: 60
Location: 792m (2600ft)N and 41m (135ft)W of the SE corner of Sec. 31, T.50N., R.24W.
Vegetation: Consists mostly of grasses with some bog birch and ferns; ground cover consists of mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 10, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-187	35- 50	0.12	87.8	722	4.2	3.8	8.6
Clay	187+	85-100	0.13	86.8	659	5.0	4.5	13.7
		135-150	0.13	87.8	717	5.3	5.0	8.1
		172-187	0.18	83.0	489	5.4	5.1	18.5

Reference Number: 61
Location: 620m (2035ft)N and 443m (1455ft)E of the SW corner of Sec. 2, T.51N., R.24W.
Vegetation: Black spruce crown cover of about 95%; lush understory consists mostly of grasses with some Labrador tea and leatherleaf; ground cover consists mostly of sphagnum mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and D. Mellem on June 27, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 40	40- 55	0.13	87.3	685	3.7	2.9	9.4
Hemic	40-135	85-100	0.15	85.5	589	4.3	4.0	9.6
Fine sand	135+	118-133	0.20	81.4	436	4.9	4.6	16.7

Reference Number: 62
Location: 221m (725ft)N and 130m (425ft)E of the SW corner of Sec. 2, T.51N., R.24W.
Vegetation: Black spruce crown cover of about 95%; sparse understory consists of Labrador tea and leatherleaf; ground cover consists mostly of sphagnum mosses with some cranberry and false Solomon's seal.
Microrelief: 25cm
Depth To Water Table: 8cm
Described And Sampled By: D. Olson and D. Mellem on June 27, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 5	35- 50	0.16	84.2	532	3.7	3.2	7.9
Hemic	5- 15	85-100	0.16	84.5	546	4.9	4.6	12.2
Fibric	15- 23	120-135	0.25	77.3	340	5.4	5.0	32.4
Hemic	23-140							
Silt	140+							

Reference Number: 63
Location: 191m (625ft)N and 655m (2150ft)W of the SE corner of Sec. 2, T.51N., R.24W.
Vegetation: Black spruce crown cover of about 95% with scattered tamarack; understory consists of Labrador tea and leatherleaf; ground cover consists mostly of sphagnum mosses with false Solomon's seal.
Microrelief: 10cm
Depth To Water Table: 5cm
Described And Sampled By: D. Olson and D. Mellem on June 27, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-12	35-50	0.16	84.3	535	3.6	3.1	8.1
Hemic	12-55	70-85	0.22	79.4	386	4.6	4.0	17.5
Sapric	55-85							
Silt	85+							

Reference Number: 64
Location: 30m (100ft)S and 340m (1115ft)W of the NE corner of Sec. 2, T.51N., R.24W.
Vegetation: Black spruce crown cover of about 25% with scattered tamarack; lush understory consists of Labrador tea, leatherleaf, swamp laurel, bog rosemary, and cotton grass; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 50cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer and B. Balen on June 27, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 13	35- 50	0.14	87.0	672	3.4	2.6	5.8
Hemic	13-179	85-100	0.14	86.7	652	3.6	3.0	5.2
Sapric	179-190	135-150	0.17	85.4	584	4.3	3.8	7.2
Silt	190+	161-176	0.18	84.2	535	4.6	4.0	8.0

Reference Number: 65
Location: 43m (140ft)S and 796m (2610ft)E of the NW corner of Sec. 2, T.51N., R.24W.
Vegetation: Black spruce crown cover of about 30%; lush understory consists of Labrador tea, leatherleaf, swamp laurel, and bog rosemary; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 50cm
Depth To Water Table: 10cm
Described And Sampled By: T. Malterer and B. Balen on June 27, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-222	35- 50	0.12	87.6	709	4.0	3.4	4.1
Sapric	222-228	85-100	0.11	89.3	833	4.3	3.8	6.7
Silt	228+	135-150	0.15	86.6	645	5.6	5.1	10.8
loam		185-200	0.15	85.3	578	5.6	4.9	13.4
		207-222	0.23	80.1	402	6.2	5.6	38.8

Reference Number: 66
Location: 34m (110ft)S and 143m (470ft)E of the NW corner of Sec. 2, T.51N., R.24W.
Vegetation: Black spruce crown cover of about 25%; lush understory consists of Labrador tea, leatherleaf, swamp laurel, and bog rosemary; ground cover consists mostly of sphagnum mosses with some other mosses and snowberry.
Microrelief: 50cm
Depth To Water Table: 5cm
Described And Sampled By: T. Malterer and B. Balen on June 27, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 5	35- 50	0.13	87.6	706	3.8	3.0	4.4
Hemic	5-271	85-100	0.14	86.7	652	4.0	3.6	8.0
Sapric	271-281	135-150	0.13	88.2	746	4.6	4.3	9.2
Silt	281+	185-200	0.15	85.8	602	5.1	4.8	13.0
loam		235-250	0.18	82.4	468	5.4	5.0	17.0
		262-277	0.22	80.3	407	5.4	5.1	24.4

Reference Number: 67
Location: 143m (2265ft)N and 223m (730ft)W of the SE corner of Sec. 3, T.51N., R.24W.
Vegetation: Black spruce crown cover of about 25%; understory consists of Labrador tea, leatherleaf, cotton grass, and sedges; ground cover consists mostly of sphagnum mosses with some false Solomon's seal.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and D. Mellem on June 27, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 10	35- 50	0.10	89.2	825	3.6	2.7	9.8
Hemic	10-163	85-100	0.17	83.9	521	4.0	3.5	12.4
Very fine sand	163+	135-150	0.18	83.6	510	4.9	4.3	9.9

Reference Number: 68
Location: 18m (60ft)S and 340m (1115ft)W of the NE corner of Sec. 4, T.51N., R.24W.
Vegetation: Scattered speckled alder; lush understory consists mostly of grasses with some sedges.
Microrelief: 20cm
Depth To Water Table: 40cm
Described And Sampled By: T. Malterer and B. Balen on June 26, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-165	35- 50	0.14	86.6	649	5.4	4.8	12.2
Sapric	165-170	85-100	0.15	85.3	580	5.4	4.8	8.9
Silt	170+	135-150	0.20	82.3	464	5.6	5.0	12.7
loam								

Reference Number: 69
Location: 32m (105ft)S and 792m (2600ft)W of the NE corner of Sec. 4, T.51N., R.24W.
Vegetation: Scattered aspen and speckled alder; lush understory consists mostly of grasses with some sedges, gooseberry, dogwood, and sumac.
Microrelief: 20cm
Depth To Water Table: 50cm
Described And Sampled By: T. Malterer and B. Balen on June 27, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-175	35- 50	0.15	86.4	636	5.0	4.6	9.2
Sapric	175-205	85-100	0.14	86.3	629	5.2	4.7	8.7
Silt	205+	135-150	0.20	82.7	477	5.5	5.0	12.2
loam		185-200	0.20	79.6	391	5.7	5.2	15.4

Reference Number: 70
Location: 27m (90ft)S and 79m (260ft)E of the NW corner of Sec. 4, T.51N., R.24W.
Vegetation: Tamarack crown cover of about 40% with scattered black spruce and ironwood; lush understory consists mostly of grasses with some willow, Labrador tea, leatherleaf, gooseberry, goldenrod, water lily, ferns, and speckled alder; ground cover consists mostly of sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem, T. Malterer, and B. Balen on August 9, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 30	35- 50	0.12	87.6	709	5.2	5.0	12.0
Hemic	30-348	85-100	0.11	89.2	826	5.3	5.0	11.1
Fine	348+	135-150	0.10	90.1	909	5.5	5.2	8.8
sand		185-200	0.12	88.1	741	5.8	5.4	10.0
		235-250	0.17	84.8	556	5.5	5.4	13.6
		285-300	0.20	82.4	468	5.7	5.4	15.2
		333-348	0.26	76.7	334	5.6	5.4	34.0

Reference Number: 71
Location: 38m (125ft)S and 575m (1885ft)W of the NE corner of Sec. 5, T.51N., R.24W.
Vegetation: Scattered tamarack and black spruce; lush understory consists mostly of speckled alder and grasses with willow and some raspberry.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem, B. Balen, and T. Malterer on August 9, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-128	35- 50	0.11	88.4	764	5.4	5.2	9.3
Sapric	128-133	85-100	0.10	89.7	869	5.7	5.3	12.4
Silty	133+	113-128	0.17	85.1	569	5.6	5.2	36.1
clay								

Reference Number: 72
Location: 24m (80ft)S and 381m (1250ft)E of the NW corner of Sec. 5, T.51N., R.24W.
Vegetation: Scattered black spruce and tamarack; lush understory consists of bog birch, Labrador tea, leatherleaf, willow, and grasses; ground cover consists mostly of sphagnum mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem, B. Balen, and T. Malterer on August 9, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-300	35- 50	0.12	88.3	754	5.0	4.1	8.4
Sapric	300-338	85-100	0.09	90.9	997	5.3	4.2	9.8
Silt	338-360	135-150	0.09	91.2	1031	5.4	4.3	8.1
loam		185-200	0.09	90.9	995	5.4	4.6	11.9
Medium	360+	235-250	0.12	89.0	812	5.6	4.9	9.8
sand		285-300	0.16	86.0	615	5.7	4.9	14.6
		308-323	0.17	84.2	531	5.8	5.1	18.0

Reference Number: 73
Location: 27m (90ft)S and 241m (790ft)W of the NE corner of Sec. 6, T.51N., R.24W.
Vegetation: Black spruce crown cover of about 30% with scattered tamarack and balsam fir; understory consists of grasses, Labrador tea, and bog birch; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem, B. Balen, and T. Malterer on August 9, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-215	35- 50	0.13	88.1	438	5.2	4.4	10.6
Medium	215+	85-100	0.10	89.9	885	5.4	4.8	11.9
sand		135-150	0.09	91.0	1017	5.2	4.8	8.3
		185-200	0.12	88.7	782	5.6	4.5	14.2
		200-215	0.13	87.9	729	5.6	4.8	13.5

Reference Number: 74
Location: 610m (2000ft)N and 23m (75ft)E of the SW corner of Sec. 17, T.51N., R.24W.
Vegetation: Black spruce and tamarack crown cover of about 40% each; lush understory consists mostly of grasses with some willow, Labrador tea, bog birch, goldenrod, gooseberry, and ferns; ground cover consists of some sphagnum mosses.
Microrelief: 15cm
Depth To Water Table: 15cm
Described And Sampled By: D. Mellem and B. Balen on August 10, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-140	35- 50	0.18	83.5	507	5.2	4.8	17.0
Sapric	140-148	85-100	0.19	82.4	467	5.4	5.0	17.4
Silty	148+	133-148	0.37	70.1	242	5.2	5.0	54.9
clay								
loam								

Reference Number: 75
Location: 221m (725ft)N and 38m (125ft)E of the SW corner of Sec. 20, T.51N., R.24W.
Vegetation: Scattered birch and aspen; understory consists of willow, speckled alder, grasses, nettles, raspberry, and goldenrod.
Microrelief: 40cm
Depth To Water Table: Below 176cm
Described And Sampled By: D. Mellem and B. Balen on August 10, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 40	35- 50	0.14	84.9	561	5.5	5.2	11.1
Hemic	40-163	85-100	0.17	83.7	513	5.6	5.4	12.1
Limnic	163-176	135-150	0.20	82.6	474	5.9	5.5	17.6
Silt	176+							

Reference Number: 76
Location: 442m (1450ft)S and 24m (80ft)E of the NW corner of Sec. 29, T.51N., R.24W.
Vegetation: Not recorded
Microrelief: 40cm
Depth To Water Table: Below 176cm
Described And Sampled By: D. Mellem and B. Balen on August 10, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 31	35- 50	0.21	75.4	306	5.7	5.6	18.6
Hemic	31- 58	85-100	0.22	79.8	396	5.6	5.3	18.3
Sapric	58-155	135-150	0.22	80.6	416	5.6	5.4	22.4
Limnic	155-165							
Sapric	165-192							
Silt	192+							

Reference Number: 77
Location: 450m (1475ft)N and 34m (110ft)E of the SW corner of Sec. 29, T.51N., R.24W.
Vegetation: Scattered northern white cedar; understory consists of willow, ash, ferns, goldenrod, nettles, and dogwood.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on August 10, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Silty clay loam	0-62 62+	35-50	0.19	82.2	461	6.4	6.2	18.9

Reference Number: 78
Location: 76m (250ft)N and 741m (2430ft)W of the SE corner of Sec. 8, T.52N., R.24W.
Vegetation: Consists mostly of speckled alder and grasses with some willow; ground cover consists of some mosses.
Microrelief: 5cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 23, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Sapric Fine sandy loam	0-46 46-64 64+	35-50	.....	83.0	488	5.3	4.8	31.2

Reference Number: 79
Location: 69m (225ft)N and 796m (2610ft)W of the SE corner of Sec. 9, T.52N., R.24W.
Vegetation: Consists mostly of grasses with some willow; ground cover consists of some mosses.
Microrelief: 5cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 22, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Fine sand Hemic Fine sand	0- 68 68- 70 70-135 135+	35- 50 85-100	0.17 0.17	83.6 84.8	509 559	4.0 4.4	3.5 3.9	9.4 7.6

Reference Number: 80
Location: 61m (200ft)N and 718m (2355ft)W of the SE corner of Sec. 10, T.52N., R.24W.
Vegetation: Consists mostly of speckled alder and grasses with some willow and dogwood.
Microrelief: 5cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 23, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Sapric Fine sand	0- 67 67-184 184+	35- 50 85-100 110-125 135-150	0.12 0.17 0.18	87.4 84.1 82.2 81.5	690 530 462 440	6.0 5.7 ... 6.0	5.3 5.3 ... 5.4	13.2 11.9 13.0 17.7

Reference Number: 81
Location: 20m (65ft)N and 579m (1900ft)E of the SW corner of Sec. 11, T.52N., R.24W.
Vegetation: Consists mostly of bog birch with some Labrador tea, leatherleaf, bog rosemary, and grasses; ground cover consists mostly of sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 22, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 55	35- 50	0.13	86.9	661	5.1	4.4	12.9
Fibric	55-266	85-100	0.13	87.8	722	5.4	4.7	9.4
Hemic	266-288	135-150	0.12	89.6	865	5.5	4.8	7.1
Sapric	288-330	185-200	0.11	90.0	897	5.6	5.0	8.0
Hemic	330-460	235-250	0.15	86.2	626	5.5	4.9	3.8
Mineral	460+	285-300	0.18	83.4	503	4.8	4.6	16.0
soil		335-350	0.14	87.6	707	5.2	5.0	8.9
		385-400	0.14	87.8	720	5.0	4.8	7.8
		390-405	0.12	89.8	879	...	...	7.6
		435-450	....	....	...	5.4	5.0	...

Reference Number: 82
Location: 411m (1350ft)S and 518m (1700ft)W of the NE corner of Sec. 12, T.52N., R.24W.
Vegetation: Consists mostly of speckled alder with some poplar; understory consists mostly of grasses.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 22, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-255	35- 50	0.10	87.5	697	5.4	5.0	17.0
Sapric	255-365	85-100	0.12	88.2	748	5.2	4.8	10.8
Sand	365+	135-150	0.15	86.2	622	5.6	5.0	11.8
		185-200	0.16	85.6	592	5.7	5.0	10.6
		235-250	0.16	85.5	590	5.6	5.3	12.2
		285-300	0.18	84.2	532	5.7	5.4	16.2

Reference Number: 83
Location: 30m (100ft)N and 564m (1850ft)W of the SE corner of Sec. 12, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 90%; understory consists of Labrador tea and leatherleaf with some grasses; ground cover consists mostly of sphagnum mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 22, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-15	35-50	0.12	84.1	530	4.0	3.3	7.5
Hemic	15-91	65-80	0.17	84.1	530	4.3	3.6	7.6
Sandy	91+							
loam								

Reference Number: 84
Location: 792m (2600ft)S and 788m (2585ft)W of the NE corner of Sec. 16, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 60%; lush understory consists mostly of willow and grasses with some bog birch.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 30, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 96	35- 50	0.16	83.0	487	5.2	4.7	23.3
Hemic	96-105	85-100	0.18	81.9	453	5.8	5.2	25.8
Sapric	105-150	135-150	0.24	77.1	338	6.0	5.6	40.6
Hemic	150-168	150-165	0.22	83.7	515	...	...	27.4
Limnic	168-204							
Fine	204+							
sand								

Reference Number: 85
Location: 17m (55ft)N and 771m (2530ft)W of the SE corner of Sec. 16, T.52N., R.24W.
Vegetation: Consists mostly of willow and sedges with some bog birch.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 30, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Fine sandy loam	0-28 28+	13-28	0.20	79.9	395	4.4	4.1	23.9

Reference Number: 86
Location: 792m (2600ft)S and 780m (2560ft)W of the NE corner of Sec. 21, T.52N., R.24W.
Vegetation: Consists mostly of sedges with bog birch and willow.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on May 30, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Fine sand	0-100 100+	35- 50 85-100	0.15 0.18	85.2 82.7	576 477	5.2 5.1	4.6 4.5	14.8 14.3

Reference Number: 87
Location: 134m (440ft)S and 143m (470ft)E of the NW corner of Sec. 25, T.52N., R.24W.
Vegetation: Tamarack crown cover of about 40% with scattered black spruce; understory consists of speckled alder, willow, Labrador tea, and cotton grass; ground cover consists mostly of sphagnum mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 26, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-335	35- 50	0.13	87.1	677	5.2	4.4	10.7
Limnic	335-394	85-100	0.13	87.1	674	5.6	4.8	10.4
Fine sand	394+	135-150	0.11	88.9	804	5.9	5.0	12.3
		185-200	0.15	86.0	613	6.0	5.2	15.4
		235-250	0.14	86.7	652	6.3	5.4	15.0
		285-300	0.17	84.0	526	6.2	5.6	18.6

Reference Number: 88
Location: 605m (1985ft)N and 244m (800ft)E of the SW corner of Sec. 25, T.52N., R.24W.
Vegetation: Scattered tamarack; understory consists of leatherleaf, cotton grass, Labrador tea, and swamp laurel; ground cover consists mostly of sphagnum mosses with some cranberry.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson, D. Mellem, and B. Leuelling on June 22, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-220	35- 50	0.08	90.6	964	3.9	2.9	8.6
Sapric	220-230	85-100	0.11	89.1	820	4.2	3.3	6.7
Fine sand	230+	135-150	0.14	86.4	635	4.8	4.0	11.1
		185-200	0.15	85.0	567	5.4	4.8	13.2
		210-225	0.19	82.1	457	5.8	5.3	16.5

Reference Number: 89
Location: 26m (85ft)N and 8m (25ft)E of the SW corner of Sec. 25, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 75% with scattered tamarack; lush understory consists mostly of Labrador tea and leatherleaf with some cotton grass, bog rosemary, and swamp laurel; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 25cm
Depth To Water Table: 10cm
Described And Sampled By: D. Mellem and D. Olson on June 26, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 10	35- 50	0.07	92.9	1300	3.8	2.8	7.5
Hemic	10-150	85-100	0.06	94.0	1572	4.0	2.8	3.8
Sapric	150-195	135-150	0.10	88.8	791	4.2	3.0	4.7
Hemic	195-484	185-200	0.09	90.8	987	4.6	3.6	7.4
Limnic	484-625	235-250	0.10	90.1	911	5.3	4.3	9.8
Silt	625+	285-300	0.10	90.2	922	5.1	4.8	8.5
		335-350	0.09	91.3	1048	5.6	4.6	6.0
		385-400	0.10	89.6	862	6.0	5.2	17.8
		435-450	0.11	89.0	810	6.4	5.6	37.5

Reference Number: 90
Location: 739m (2425ft)S and 424m (1390ft)W of the NE corner of Sec. 26, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 90%; lush understory consists of leatherleaf, Labrador tea, and cotton grass with some swamp laurel; ground cover consists mostly of sphagnum mosses and pitcher plant with some cranberry.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on June 21, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-380	35- 50	0.09	91.1	1022	3.7	3.2	6.7
Sapric	380-426	85-100	0.09	91.3	1052	3.9	3.3	3.9
Fine	426-458	135-150	0.10	89.7	866	4.8	4.2	7.1
sand		185-200	0.11	88.5	766	5.2	4.6	11.3
Hemic	458-463	235-250	0.12	88.5	768	5.8	5.1	10.2
Fine	463+	285-300	0.14	86.0	614	5.8	5.4	14.2
sand		335-350	0.15	86.4	633	6.0	5.4	16.8
		385-400	0.24	78.0	355	6.0	5.5	43.5
		400-415	0.13	86.2	625	6.0	5.5	32.5

Reference Number: 91
Location: 503m (1650ft)S and 553m (1815ft)E of the NW corner of Sec. 26, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 60% with about 30% crown cover of tamarack; lush understory consists of grasses, Labrador tea, and leatherleaf; ground cover consists mostly of sphagnum mosses with some pitcher plant.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on June 21, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-382	35- 50	0.11	89.1	818	5.0	4.2	10.1
Sapric	382-417	85-100	0.12	88.6	779	5.5	4.8	9.1
Hemic	417-452	135-150	0.14	87.0	668	5.4	4.8	9.3
Fine	452+	185-200	0.15	85.2	574	5.8	4.9	11.7
sand		235-250	0.15	86.2	624	5.6	5.1	12.1
		285-300	0.17	83.4	501	5.8	5.2	15.6
		335-350	0.17	84.8	557	5.8	5.3	14.3
		385-400	0.20	79.4	384	5.9	5.5	21.3
		425-440	0.19	81.9	452	6.0	5.6	19.3

Reference Number: 92
Location: 26m (85ft)N and 597m (1960ft)E of the SW corner of Sec. 26, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 30%; sparse understory consists of some Labrador tea and blueberry; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 20cm
Depth To Water Table: 30cm
Described And Sampled By: D. Olson and T. Malterer on June 26, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 20	35- 50	0.06	93.7	1480	3.8	3.0	3.5
Fibric	20- 40	85-100	0.10	89.6	857	4.4	3.5	3.9
Hemic	40-375	135-150	0.10	89.9	888	4.8	4.0	5.0
Sapric	375-385	185-200	0.11	88.6	774	5.3	4.7	7.7
Clay	385+	235-250	0.15	85.8	604	5.4	4.9	10.9
loam		285-300	0.15	85.0	565	5.6	4.9	12.0
		335-350	0.19	82.8	481	5.8	5.2	13.4
		370-385	0.20	81.7	445	5.8	5.2	16.4

Reference Number: 93
Location: 549m (1800ft)N and 754m (2475ft)W of the SE corner of Sec. 26, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 50%; lush understory consists of cotton grass, Labrador tea, leatherleaf, and bog rosemary; ground cover consists mostly of sphagnum mosses with some false Solomon's seal.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer and D. Olson on June 26, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 30	35- 50	0.10	90.2	915	4.0	2.9	7.1
Hemic	30-395	85-100	0.14	93.4	1423	3.8	3.4	4.9
Sapric	395-417	135-150	0.10	90.6	964	4.6	4.2	6.1
Limnic	417-427	185-200	0.12	88.5	770	5.2	4.8	8.5
Fine	427-457	235-250	0.13	87.8	719	5.6	5.1	12.9
and		285-300	0.12	87.7	713	5.9	5.3	10.7
medium		335-350	0.15	85.8	606	6.0	5.6	13.3
sand		385-400	0.16	85.1	570	6.0	5.6	14.5
Limnic	457-495							
Mineral soil	495+							

Reference Number: 94
Location: 30m (100ft)S and 652m (2140ft)W of the NE corner of Sec. 34, T.52N., R.24W.
Vegetation: Scattered black spruce, tamarack, northern white cedar, and balsam fir; sparse understory consists of grasses, willow, bog birch, Labrador tea, and ferns; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 30, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 90	35- 50	0.11	88.9	799	4.7	4.4	10.7
Sapric	90-135	85-100	0.18	83.0	489	5.1	4.8	11.9
Fine sand	135+	115-130	0.19	81.7	447	5.2	4.8	17.2

Reference Number: 95
Location: 591m (1940ft)S and 556m (1825ft)E of the NW corner of Sec. 35, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 30%; sparse understory consists of some sedges, Labrador tea, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 30, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 20	35- 50	0.10	89.4	844	3.5	3.0	8.9
Hemic	20-215	85-100	0.07	91.9	1130	3.6	3.1	6.0
Sapric	215-235	135-150	0.08	91.6	1102	3.8	3.4	6.8
Hemic	235-290	185-200	0.08	91.9	1131	4.4	4.0	7.2
Sapric	290-300	235-250	0.12	88.6	775	4.9	4.6	8.9
Hemic	300-355	285-300	0.14	86.8	660	5.2	4.9	12.6
Silty clay	355+	330-345	0.20	80.5	412	5.3	5.1	18.6

Reference Number: 96
Location: 30m (100ft)S and 457m (1500ft)W of the NE corner of Sec. 36, T.52N., R.24W.
Vegetation: Scattered tamarack and black spruce; lush understory consists mostly of leatherleaf with some Labrador tea, swamp laurel, cotton grass, and sedges; ground cover consists mostly of sphagnum mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson, B. Leuelling, and B. Balen on June 28, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-210	55- 70	0.09	91.5	1074	3.8	3.3	9.4
Limnic	210-231	85-100	0.16	84.4	542	4.6	4.3	17.5
Fine	231-290	135-150	0.14	87.3	685	5.4	5.2	10.0
sand		185-200	0.18	82.7	480	5.7	5.3	19.1
Peat with fine sand	290-297							
Silt	297+							

Reference Number: 97
Location: 495m (1625ft)S and 27m (90ft)E of the NW corner of Sec. 36, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 90%; understory consists of Labrador tea, leatherleaf, swamp laurel, and blueberry; ground cover consists of sphagnum and other mosses with some cranberry.
Microrelief: Not recorded
Depth to Water Table: At surface
Described And Sampled By: D. Olson, B. Leuelling, and B. Balen on June 28, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 7	35- 50	0.10	90.4	940	3.8	3.1	5.0
Hemic	7-295	85-100	0.11	89.1	819	4.1	3.6	5.8
Sapric	295-330	135-150	0.12	88.7	785	5.0	4.4	7.2
Hemic	330-380	185-200	0.15	85.5	589	5.1	4.7	11.2
Limnic	380-395	235-250	0.18	84.1	528	5.4	5.0	22.3
Mineral	395+	285-300	0.16	84.9	564	5.6	5.2	13.5
soil		335-350	0.19	81.6	443	5.8	5.3	21.1

Reference Number: 98
Location: 428m (1405ft)S and 652m (2140ft)E of the NW corner of Sec. 36, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 80% with scattered tamarack; understory consists of Labrador tea, leatherleaf, swamp laurel, and cotton grass; ground cover consists of sphagnum mosses with some cranberry.
Microrelief: 12cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson, B. Leuelling, and B. Balen on June 28, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 58	35- 50	0.08	92.7	1271	4.0	3.2	8.7
Sapric	58-110	85-100	0.15	85.5	591	5.2	4.7	10.4
Hemic	110-261	135-150	0.13	87.6	708	5.6	5.2	12.1
Limnic	261-359	185-200	0.10	89.9	887	5.7	5.2	9.1
Fine	350+	235-250	0.10	90.4	940	6.0	5.4	11.9
sand								

Reference Number: 99
Location: 453m (1485ft)N and 26m (85ft)E of the SW corner of Sec. 36, T.52N., R.24W.
Vegetation: Black spruce crown cover of about 95%; sparse understory consists of some Labrador tea and ferns; ground cover consists mostly of sphagnum mosses.
Microrelief: 25cm
Depth To Water Table: Not recorded
Described And Sampled By: D. Mellem and B. Balen on June 30, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-185	35- 50	0.16	85.3	580	3.5	3.0	6.6
Sapric	185-192	85-100	0.16	84.0	524	4.3	3.9	7.8
Silt	192+	135-150	0.14	87.3	686	4.6	4.4	7.1
loam		170-185	0.24	78.5	366	4.8	4.7	27.4

Reference Number: 100
Location: 802m (2630ft)N and 12m (40ft)E of the SW corner of Sec. 12, T.48N., R.25W.
Vegetation: Consists mostly of grasses with willow, bog birch, and dogwood; ground cover consists of some sphagnum and other mosses.
Microrelief: 5cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 12, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-110	35- 50	0.18	82.7	479	5.2	4.6	9.2
Silty	110+	85-100	0.19	81.6	444	5.6	5.0	34.6
clay								

Reference Number: 101
Location: 427m (1400ft)N and 15m (50ft)E of the SW corner of Sec. 12, T.48N., R.25W.
Vegetation: Scattered tamarack, black spruce, jack pine, and white pine; lush understory consists mostly of leatherleaf with some bog birch and cotton grass; ground cover consists of sphagnum mosses with some other mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 12, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 20	35- 50	0.16	84.5	545	4.1	3.3	12.0
Hemic	20-181	85-100	0.15	85.4	584	5.3	4.6	9.0
Fine sand	181+	135-150	0.16	84.7	552	5.6	5.0	12.9

Reference Number: 102
Location: 40m (130ft)N and 9m (30ft)E of the SW corner of Sec. 12, T.48N., R.25W.
Vegetation: Scattered tamarack, paper birch, and white pine; understory consists of leatherleaf, Labrador tea, grasses, and bog rosemary; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 40cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 12, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 45	35- 50	0.12	88.1	734	3.9	3.1	9.1
Hemic	45-228	85-100	0.18	82.3	466	4.1	3.2	4.1
Sapric	228-232	135-150	0.13	87.7	710	4.7	3.9	7.7
Sandy	232+	185-200	0.15	85.7	601	5.1	4.5	12.6
clay		213-228	0.17	83.1	491	5.5	4.7	22.3

Reference Number: 103
Location: 424m (1390ft)N and 9m (30ft)W of the SE corner of Sec. 12, T.48N., R.25W.
Vegetation: Scattered black spruce and tamarack; sparse understory consists of Labrador tea, leatherleaf, and swamp laurel; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 20, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 5	35- 50	0.16	85.0	565	3.8	3.1	7.3
Hemic	5-100	85-100	0.13	87.1	675	4.2	3.6	9.2
Fine sand	135+	120-135	0.15	86.4	334	4.4	3.8	10.9

Reference Number: 104
Location: 35m (115ft)N and 9m (30ft)W of the SE corner of Sec. 12, T.48N., R.25W.
Vegetation: Scattered black spruce and tamarack; sparse understory consists of some leatherleaf, Labrador tea, and grasses; ground cover consists mostly of sphagnum mosses.
Microrelief: 40cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 20, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 20	35- 50	0.11	89.0	808	3.6	3.0	7.5
Hemic	20-278	85-100	0.12	88.0	736	4.0	3.4	6.8
Sapric	278-285	135-150	0.12	88.1	737	4.4	3.6	8.3
Fine	285+	185-200	0.11	88.8	791	4.8	4.4	10.3
to		235-250	0.15	86.3	630	5.2	4.4	12.8
medium sand		270-285	0.24	80.1	404	5.4	4.6	42.7

Reference Number: 105
Location: 206m (675ft)S and 15m (50ft)E of the NW corner of Sec. 13, T.48N., R.25W.
Vegetation: Scattered black spruce and tamarack; understory consists of leatherleaf, Labrador tea, swamp laurel, and cotton grass; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on June 20, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 20	35- 50	0.10	89.9	886	4.0	3.1	7.0
Hemic	20- 40	85-100	0.10	90.7	976	4.7	3.6	6.5
Sapric	40- 60	135-150	0.10	89.8	879	5.4	4.6	8.4
Hemic	60-405	185-200	0.13	87.0	666	5.6	4.8	13.5
Sapric	405-600	235-250	0.16	84.0	526	5.8	5.0	16.2
Silt	600+	285-300	0.12	87.8	719	5.8	5.1	12.1
loam		335-350	0.12	88.5	767	6.0	5.3	12.0
		385-400	0.10	89.8	880	6.2	5.4	9.1
		435-450	0.13	87.6	705	6.0	5.5	26.1
		485-500	0.14	86.1	621	5.6	5.5	28.2
		535-550	0.11	88.7	786	5.8	5.6	28.0
		585-600	0.13	87.0	666	6.1	5.6	28.5

Reference Number: 106
Location: 495m (1625ft)S and 325m (1065ft)E of the NW corner of Sec. 36, T.49N., R.25W.
Vegetation: Consists mostly of grasses with some willow.
Microrelief: Not recorded
Depth To Water Table: Not recorded
Described And Sampled By: D. Mellem and B. Balen on June 19, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-52	35-50	0.40	66.4	197	6.2	5.7	65.0
Silt	52+							

Reference Number: 107
Location: 191m (625ft)S and 38m (125ft)E of the NW corner of Sec. 14, T.50N., R.25W.
Vegetation: Consists mostly of grasses.
Microrelief: 40cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 11, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-270	35- 50	0.13	87.5	698	5.6	5.0	11.5
Limnic	270-340	85-100	0.13	87.3	690	5.4	5.0	13.3
Medium	340+	135-150	0.16	85.2	575	5.9	5.3	13.1
sand		185-200	0.16	85.0	567	6.1	5.5	10.5
with		235-250	0.13	88.0	732	6.1	5.5	9.7
pebbles		285-300	0.16	83.8	517	6.2	6.1	31.5
		325-340	0.28	75.1	301	6.1	6.0	67.8

Reference Number: 108
Location: 675m (2215ft)S and 27m (90ft)E of the NW corner of Sec. 14, T.50N., R.25W.
Vegetation: Consists mostly of grasses.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 11, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-160	35- 50	0.15	85.2	577	5.1	4.8	11.2
Sapric	160-195	85-100	0.15	85.2	576	5.2	4.8	14.1
Fine	195+	135-150	0.18	83.2	496	5.4	5.1	14.8
sand		170-185	0.18	82.8	480	5.7	5.3	15.7

Reference Number: 109
Location: 436m (1430ft)N and 32m (105ft)E of the SW corner of Sec. 14, T.50N., R.25W.
Vegetation: Consists mostly of grasses.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on July 11, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 80	35- 50	0.23	80.0	399	6.0	5.3	50.4
Sapric	80-114	85-100	0.21	80.3	407	5.6	5.2	27.2
Clay with calcareous pebbles	114+							

Reference Number: 110
Location: 38m (125ft)S and 732m (2400ft)E of the NW corner of Sec. 2, T.51N., R.25W.
Vegetation: Consists mostly of nettles and grasses.
Microrelief: 20cm
Depth To Water Table: 50cm
Described And Sampled By: T. Malterer and B. Balen on August 14, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-80	35-50	0.25	67.6	208	4.6	4.4	48.9
Silty clay loam	80+							

Reference Number: 111
Location: 32m (105ft)S and 799m (2620ft)W of the NE corner of Sec. 7, T.51N., R.25W.
Vegetation: Consists of cotton grass, bog birch, and leatherleaf; ground cover consists mostly of sphagnum mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on August 8, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-131	35- 50	0.17	83.2	494	4.1	3.2	6.8
Sapric	131-187	85-100	0.17	83.5	504	4.4	3.4	9.5
Hemic	187-239	135-150	0.24	79.1	379	4.6	3.8	20.3
Coarse sand	239+	185-200	0.18	83.0	487	4.8	4.0	11.0
		215-230	0.12	88.0	733	4.6	4.0	5.7

Reference Number: 112
Location: 30m (100ft)S and 34m (110ft)E of the NW corner of Sec. 7, T.51N., R.25W.
Vegetation: Consists mostly of bog birch and grasses.
Microrelief: Negligible
Depth To Water Table: Below 176cm
Described And Sampled By: D. Olson and B. Balen on August 21, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 35	35- 50	0.14	85.8	604	4.4	3.5	8.0
Sapric	35-128	85-100	0.20	80.5	412	4.5	3.9	14.6
Hemic	128-160	135-150	0.19	83.2	495	4.7	4.2	9.6
Coarse sand	160+							

Reference Number: 113
Location: 792m (2600ft)N and 47m (155ft)E of the SW corner of Sec. 7, T.51N., R.25W.
Vegetation: Scattered black spruce; lush understory consists of bog birch, leatherleaf, Labrador tea, cotton grass, and white pine; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on August 21, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 97	35- 50	0.17	84.6	549	4.8	3.5	8.7
Sapric	97-210	85-100	0.15	85.4	585	4.8	3.8	8.6
Hemic	210-356	135-150	0.20	82.5	470	5.1	4.3	15.4
Sapric	356-377	185-200	0.20	81.4	439	4.9	4.4	21.5
Coarse	377+	235-250	0.12	88.8	796	4.5	4.2	7.3
sand		285-300	0.11	88.4	764	5.3	4.4	6.2
		335-350	0.16	85.6	596	4.8	4.3	13.3

Reference Number: 114
Location: 46m (150ft)S and 35m (115ft)E of the NW corner of Sec. 11, T.51N., R.25W.
Vegetation: Poplar crown cover of about 80%; sparse understory consists of some goldenrod.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 16, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-15	0-15	0.20	72.4	262	7.4	6.2	33.5
Silt	15+							
loam								

Reference Number: 115
Location: 648m (2125ft)S and 24m (80ft)E of the NW corner of Sec. 11, T.51N., R.25W.
Vegetation: Consists of Labrador tea, grasses, and leatherleaf; ground cover consists mostly of sphagnum mosses.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 16, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-40	35-50	0.19	82.2	461	5.9	4.8	12.5
Sapric	40-60							
Fine	60+							
sandy								
loam								

Reference Number: 116
Location: 8m (25ft)S and 43m (140ft)W of the NE corner of Sec. 14, T.51N., R.25W.
Vegetation: Scattered tamarack and paper birch; understory consists of bog birch, willow, Labrador tea, cotton grass, goldenrod, ferns, and raspberry.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 16, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-40	35-50	0.20	81.7	448	5.6	5.4	23.7
Sapric	40-76							
Silt	76-80							
with								
peat								
Silt	80+							
loam								

Reference Number: 117
Location: 30m (100ft)S and 792m (2600ft)W of the NE corner of Sec. 14, T.51N., R.25W.
Vegetation: Scattered tamarack and paper birch; understory consists of Labrador tea, willow, leatherleaf, grasses, and ferns; ground cover consists mostly of sphagnum mosses with some cranberry.
Microrelief: 26cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 16, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-225	35- 50	0.16	85.5	587	5.4	4.8	13.8
Silt	225+	85-100	0.16	85.0	567	5.4	5.0	7.8
loam		135-150	0.14	86.6	647	5.7	5.0	8.1
		185-200	0.21	80.4	411	5.8	5.3	31.9

Reference Number: 118
Location: 46m (150ft)S and 23m (75ft)E of the NW corner of Sec. 14, T.51N., R.25W.
Vegetation: Scattered paper birch; sparse understory consists of speckled alder, poplar, grasses, ferns, and goldenrod; ground cover consists mostly of sphagnum mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 16, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-163	35- 50	0.16	84.3	536	5.5	5.2	9.6
Sapric	163-228	85-100	0.16	84.9	562	5.8	5.4	8.2
Limnic	228-233	135-150	0.16	85.2	578	5.8	5.6	12.1
Fine	233+	185-200	0.22	78.4	362	5.9	5.7	24.5
sand								

Reference Number: 119
Location: 796m (2610ft)S and 38m (125ft)E of the NW corner of Sec. 14, T.51N., R.25W.
Vegetation: Scattered paper birch; understory consists of bog birch, Labrador tea, cotton grass, and balsam fir.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 16, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-117	35- 50	0.15	84.7	551	6.2	5.8	12.7
Silt	117+	85-100	0.17	83.7	514	6.0	5.8	11.5

Reference Number: 120
Location: 15m (50ft)S and 23m (75ft)E of the NW corner of Sec. 18, T.51N., R.25W.
Vegetation: Scattered black spruce; lush understory consists of jack pine, bog birch, leatherleaf, cotton grass, and swamp laurel; ground cover consists mostly of sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on August 21, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 10	35- 50	0.18	83.4	504	4.2	3.3	8.2
Hemic	10- 74	85-100	0.17	83.9	519	4.6	3.6	9.2
Sapric	74-142	110-125	0.17	84.2	535	4.4	3.8	9.5
Coarse	142+							
sand								

Reference Number: 121
Location: 34m (110ft)S and 762m (2500ft)W of the NE corner of Sec. 23, T.51N., R.25W.
Vegetation: Scattered tamarack; lush understory consists of grasses and bog birch with some willow and goldenrod.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on August 17, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-135	35- 50	0.14	85.5	591	5.7	5.3	12.9
Silt	135+	85-100	0.12	87.9	727	5.4	5.0	11.1
		118-133	0.15	85.6	596	5.6	5.1	10.9

Reference Number: 122
Location: 61m (200ft)S and 69m (225ft)E of the NW corner of Sec. 23, T.51N., R.25W.
Vegetation: Scattered tamarack; lush understory consists mostly of grasses with some bog birch, willow, speckled alder, goldenrod, and nettles.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on August 17, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-176	35- 50	0.15	87.5	699	5.9	5.4	13.5
Sapric	176-181	85-100	0.12	88.1	743	5.8	5.2	9.7
Silty clay	181+	135-150	0.12	88.2	746	6.0	5.6	11.8

Reference Number: 123
Location: 511m (1675ft)S and 58m (190ft)E of the NW corner of Sec. 23, T.51N., R.25W.
Vegetation: Scattered tamarack; lush understory consists mostly of grasses with some speckled alder and bog birch.
Microrelief: 30cm
Depth To Water Table: 15cm
Described And Sampled By: T. Malterer and B. Balen on August 14, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-181	35- 50	0.14	86.2	626	5.7	5.2	15.7
Sapric	181-195	85-100	0.12	88.9	798	5.8	5.3	12.0
Gravel	195+	135-150	0.12	88.7	786	5.8	5.4	11.2
		171-186	0.20	81.6	445	6.1	5.8	32.3

Reference Number: 124
Location: 610m (2000ft)N and 73m (240ft)E of the SW corner of Sec. 23, T.51N., R.25W.
Vegetation: Consists mostly of grasses with bog birch, willow, and speckled alder.
Microrelief: 25cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer and B. Balen on August 14, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 28	35- 50	0.14	86.9	662	5.7	5.4	14.6
Hemic	28-138	85-100	0.12	87.1	673	6.0	5.3	11.2
Clay loam	138+	120-135	0.10	89.8	884	5.5	5.3	12.7

Reference Number: 125
Location: 107m (350ft)N and 84m (275ft)E of the SW corner of Sec. 23, T.51N., R.25W.
Vegetation: Consists mostly of grasses and marsh marigold with some willow.
Microrelief: 25cm
Depth To Water Table: 30cm
Described And Sampled By: T. Malterer and B. Balen on August 14, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-11	35-50	0.18	84.6	550	5.5	5.2	10.4
Hemic	11-35	56-71	0.17	84.5	544	6.6	5.6	18.7
Sapric	35-73							
Silt	73+							

Reference Number: 126
Location: 46m (150ft)S and 738m (2420ft)W of the NE corner of Sec. 24, T.51N., R.25W.
Vegetation: Scattered tamarack; lush understory consists mostly of grasses with bog birch, willow, and dogwood; ground cover consists of mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on August 17, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-25	35-50	0.22	79.3	383	5.8	5.3	33.1
Sapric	25-85	65-80	0.20	81.8	448	5.5	5.1	17.0
Fine sand and silt	85+							

Reference Number: 127
Location: 61m (200ft)S and 8m (25ft)E of the NW corner of Sec. 24, T.51N., R.25W.
Vegetation: Scattered black spruce; lush understory consists of speckled alder, grasses, and bog birch with some goldenrod and nettles.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: D. Mellem and B. Balen on August 17, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-140	35- 50	0.19	82.4	468	5.6	5.3	35.0
Sapric	140-145	85-100	0.15	85.4	587	5.8	5.4	16.5
Silty clay	145+	125-140	0.16	85.2	578	5.9	5.4	14.2

Reference Number: 128
Location: 416m (1365ft)N and 82m (270ft)W of the SE corner of Sec. 22, T.52N., R.25W.
Vegetation: Consists of speckled alder, sedges, and grasses.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling and D. Mellem on August 22, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-175	35- 50	0.09	89.9	893	5.9	5.1	12.1
Sapric	175-179	85-100	0.10	89.3	831	5.9	5.2	13.4
Fine to medium sand	179+	135-150	0.13	88.0	732	5.6	5.0	7.8

Reference Number: 129
Location: 434m (1425ft)S and 148m (485ft)E of the NW corner of Sec. 24, T.52N., R.25W.
Vegetation: Consists of willow, bog birch, sedges, speckled alder, dogwood, and grasses; ground cover consists of sphagnum mosses.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling and D. Mellem on August 22, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-30	10-25	0.18	82.1	459	5.8	4.9	36.5
Fine sand with peat and calcareous pebbles	30-39							
Fine sand	39+							

Reference Number: 130
Location: 30m (100ft)N and 447m (1465ft)W of the SE corner of Sec. 31, T.52N., R.25W.
Vegetation: Consists mostly of sedges and willow.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 18, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Peat with medium sand	0-48	32-47	0.33	68.0	214	5.6	4.4	46.0
Medium and coarse sand	48+							

Reference Number: 131
Location: 30m (100ft)N and 500m (1640ft)W of the SE corner of Sec. 31, T.52N., R.25W.
Vegetation: Consists mostly of grasses and willow.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 18, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric interbedded with fine sand	0-242	35- 50	0.35	70.1	234	5.5	4.6	41.4
		85-100	0.26	74.7	295	4.7	4.7	37.5
		135-150	0.49	63.9	177	5.0	3.9	75.3
		185-200	0.57	57.0	132	4.5	4.5	80.6
		208-223	0.54	59.7	148	3.4	3.2	80.3
Medium sand	242+							

Reference Number: 132
Location: 27m (90ft)N and 55m (180ft)W of the SE corner of Sec. 31, T.52N., R.25W.
Vegetation: Consists mostly of sedges with some willow.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 18, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-32	40-55	0.31	72.2	260	5.9	4.8	43.3
Silt loam	32-34							
Sapric	34-61							
Medium sand	61+							

Reference Number: 133
Location: 38m (125ft)N and 53m (175ft)W of the SE corner of Sec. 32, T.52N., R.25W.
Vegetation: Consists mostly of grasses and willow.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: B. Leuelling, D. Olson, and B. Balen on August 18, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-157	35- 50	0.19	81.4	439	5.6	3.8	15.0
Hemic	157-211	85-100	0.21	79.0	375	5.6	4.0	20.4
Fibric	211-243	135-150	0.18	84.4	540	5.3	4.5	8.6
Sapric	243-262	185-200	0.15	86.5	642	5.6	4.6	6.7
Loamy fine sand	262+	225-240	0.11	89.7	867	6.0	4.7	8.1

Reference Number: 134
Location: 282m (925ft)S and 622m (2040ft)E of the NW corner of Sec. 11, T.51N., R.26W.
Vegetation: Consists mostly of grasses with willow.
Microrelief: 45cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer on August 17, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Medium and fine sand	0-29 29+	13-28	.....	68.2	214	5.4	.....	53.1

Reference Number: 135
Location: 38m (125ft)S and 152m (500ft)E of the NW corner of Sec. 12, T.51N., R.26W.
Vegetation: Consists mostly of nettles and grasses with some willow.
Microrelief: 20cm
Depth To Water Table: 50cm
Described And Sampled By: T. Malterer on August 18, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-70	35- 50	0.63	52.5	110	4.8	4.5	80.9
Fine sand	70+	85-100	0.63	52.8	112	6.7	6.3	83.9

Reference Number: 136
Location: 35m (115ft)S and 742m (2435ft)W of the NE corner of Sec. 13,T.51N., R.26W.
Vegetation: Consists mostly of grasses with willow.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: D. Olson and B. Balen on August 21, 1978.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-39	35-50	0.24	78.5	366	4.7	3.8	18.1
Sapric Coarse sand	39-98 98+	83-98	0.25	74.7	295	5.2	4.3	26.2

APPENDIX C

SITE DESCRIPTIONS WITH DOE ENERGY VALUE DATA

Reference Number: 137
Location: 26m (85ft)N and 744m (2440ft)E of the SW corner of Sec. 36, T.43N., R.22W.
Vegetation: Consists mostly of grasses with speckled alder and some willow, dogwood, raspberry, and ferns.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: D. Olson and H. Hobbs on July 2, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-274	35- 50	0.14	86.5	642	6.0	5.1	18.1
Fine	274+	85-100	0.12	88.4	761	5.9	5.0	11.8
sand		135-150	0.13	88.2	749	6.1	5.1	9.9
		185-200	0.17	84.3	538	6.3	5.4	31.7
		235-250	0.17	84.9	561	6.2	5.4	32.3

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	49.8	4.7	2.2	0.3	28.0
85-100	51.4	5.2	2.6	0.3	28.2
135-150	52.8	5.3	3.1	0.3	28.5
185-200	42.8	4.4	2.8	0.3	23.1
235-250	36.9	3.8	2.3	0.4	18.9

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8528	85.3	15.0	56.9	28.1
85-100	8417	88.9	12.3	60.5	27.2
135-150	9087	89.1	10.1	62.4	27.5
185-200	7341	86.0	26.6	51.3	22.1
235-250	6217	83.9	37.8	44.8	17.4

Reference Number: 138
Location: 607m (1990ft)N and 354m (1160ft)W of the SE corner of Sec. 24, T.45N., R.22W.
Vegetation: Scattered tamarack, black spruce, black ash, and paper birch; lush understory consists mostly of grasses with some aspen, willow, Labrador tea, leatherleaf, and brambles; ground cover consists of some sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: H. Hobbs and G. Gabanski on July 1, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-213	35- 50	0.16	84.6	550	5.6	4.7	14.1
Sapric	213-244	85-100	0.13	88.1	739	5.8	4.8	8.3
Silt	244+	135-150	0.11	89.2	826	5.9	4.9	8.2
loam		185-200	0.15	86.5	643	5.6	4.9	19.3
		215-230	0.24	79.5	389	5.8	5.0	55.6

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.6	4.9	2.3	0.3	29.5
85-100	51.7	4.9	2.6	0.3	28.6
135-150	54.6	5.3	2.9	0.3	30.1
185-200	50.1	4.9	2.7	0.3	27.5
215-230	31.7	3.2	1.9	0.3	16.2

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8885	85.3	11.4	61.4	27.2
85-100	8767	87.6	12.0	59.8	28.2
135-150	9363	89.7	6.9	64.0	29.1
185-200	8461	88.0	14.4	58.6	27.0
215-230	5383	83.1	46.8	38.4	14.8

Reference Number: 139
Location: 15m (50ft)S and 372m (1220ft)W of the NE corner of Sec. 27, T.47N., R.22W.
Vegetation: Black ash crown cover of about 50% with scattered elm; sparse understory consists of some grasses, dogwood, and marsh marigold; ground cover consists of some mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: D. Riihiluoma and D. Haverkost on September 8, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Mineral soil	0-260	35- 50	0.19	81.9	453	6.0	5.4	18.8
	260+	85-100	0.17	84.2	534	6.0	5.4	12.7
		135-150	0.20	82.8	481	6.2	5.6	23.3
		185-200	0.17	83.8	517	6.2	5.7	19.9
		235-250	0.15	85.5	590	5.4	5.0	22.0

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	47.0	4.4	2.3	0.5	25.0
85-100	51.8	4.8	2.9	0.8	27.2
135-150	42.0	4.1	2.6	0.8	22.6
185-200	48.2	4.4	1.9	1.2	25.5
235-250	41.0	4.2	1.8	2.6	23.9

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	7930	80.4	20.8	51.9	27.3
85-100	8223	84.5	12.5	59.0	28.5
135-150	7188	82.0	27.9	49.8	22.3
185-200	8103	83.8	18.9	54.7	26.4
235-250	6912	84.7	26.5	54.2	19.3

Reference Number: 140
Location: 165m (540ft)S and 23m (75ft)W of the NE corner of Sec. 9, T.48N., R.22W.
Vegetation: Scattered tamarack and black spruce; understory consists of some Labrador tea, leatherleaf, shrubs, and grasses; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: 10cm
Described And Sampled By: H. Hobbs and T. Deering on April 23, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Fibric Limnic Coarse sand	0-122	35- 50	0.13	87.1	674	4.0	3.3	9.7
	122-183	85-100	0.14	85.9	609	4.7	3.6	12.4
	183-229	150-165	0.18	83.1	491	5.0	4.1	24.7
	229+							

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	54.0	5.2	2.0	0.3	30.5
85-100	51.7	5.2	2.3	0.3	28.7
150-165	37.2	3.6	2.3	0.3	20.3

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9310	86.4	8.0	65.3	26.7
85-100	8978	86.7	11.8	62.8	25.4
150-165	6435	80.8	36.3	44.7	19.0

Reference Number: 141
Location: 337m (1105ft)S and 18m (60ft)E of the NW corner of Sec. 10, T.49N., R.22W.
Vegetation: Tamarack crown cover of about 35% with scattered black spruce; understory consists of leatherleaf with some Labrador tea, speckled alder, and bog birch; ground cover consists of mosses.
Microrelief: 20cm
Depth To Water Table: 10cm above surface
Described And Sampled By: H. Hobbs and T. Deering on April 23, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-300	35- 50	0.13	86.9	665	5.6	4.8	15.6
Fine	300+	85-100	0.21	79.7	393	6.0	5.2	19.1
sand		135-150	0.18	83.1	493	5.9	5.3	15.8
		185-200	0.15	85.5	588	5.1	4.9	26.1
		235-250	0.16	85.6	596	5.9	5.4	31.7
		280-295	0.36	70.1	235	6.6	6.3	78.3

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	48.1	4.5	1.7	0.4	27.7
85-100	47.7	4.5	2.8	0.6	25.5
135-150	50.1	4.6	2.8	1.4	24.6
185-200	45.1	4.5	2.4	1.5	23.9
235-250	43.4	4.9	3.3	0.9	21.6
280-295	12.8	1.6	0.9	2.0	7.4

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8106	86.0	17.5	57.2	25.3
85-100	8184	80.7	18.8	57.4	23.8
135-150	8555	84.1	16.5	58.6	24.9
185-200	7761	86.2	22.6	55.8	21.6
235-250	7855	87.3	26.0	57.5	16.5
280-295	2237	72.8	75.3	22.4	2.3

Reference Number: 142
Location: 634m (2080ft)S and 56m (185ft)W of the NE corner of Sec. 13, T.50N., R.22W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of Labrador tea with leatherleaf and bog birch; ground cover consists mostly of sphagnum mosses.
Microrelief: 40cm
Depth To Water Table: 15cm
Described And Sampled By: D. Olson and L. Severson on June 12, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-183	35- 50	0.13	87.6	707	5.3	4.6	8.7
Fibric	183-229	85-100	0.11	88.5	772	5.7	4.8	8.2
Silty	229+	135-150	0.12	88.9	798	6.0	5.0	9.7
clay		200-215	0.22	81.1	430	6.1	5.2	43.5

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	54.0	5.5	2.3	0.3	31.4
85-100	53.0	5.2	2.4	0.2	31.3
135-150	51.9	5.0	2.6	0.3	30.7
200-215	39.9	3.9	2.2	0.2	21.9

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9357	88.1	6.6	67.5	25.9
85-100	9078	89.1	7.8	63.3	28.9
135-150	8794	89.3	9.7	60.3	30.0
200-215	6673	89.8	31.9	45.3	22.8

Reference Number: 143
Location: 168m (550ft)N and 582m (1910ft)E of the SW corner of Sec. 5, T.51N., R.22W.
Vegetation: Consists of scattered tamarack and black spruce with leatherleaf and some bog birch, cotton grass, and Labrador tea; ground cover consists mostly of sphagnum mosses with some polytrichum mosses and false Solomon's seal.
Microrelief: 40cm
Depth To Water Table: At surface
Described And Sampled By: H. Hobbs and G. Gabanski on June 13, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-183	35- 50	0.10	88.6	780	5.0	4.0	7.2
Silt	183+	85-100	0.12	88.7	784	5.2	4.1	10.1
		135-150	0.13	88.0	732	5.7	4.6	13.3

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	55.2	5.7	2.4	0.2	31.3
85-100	54.5	5.3	2.3	0.2	30.8
135-150	54.7	5.5	2.1	0.2	31.8

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9542	89.7	5.3	66.3	28.4
85-100	9074	88.6	6.9	64.0	29.1
135-150	9216	89.5	5.7	63.2	31.1

Reference Number: 144
Location: 27m (90ft)N and 683m (2240ft)W of the SE corner of Sec. 33, T.51N., R.22W.
Vegetation: Scattered black spruce; lush understory consists mostly of bog birch with some grasses, leatherleaf, Labrador tea, and willow; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: L. Severson and D. Olson on June 12, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-122	35- 50	0.09	90.4	946	5.4	4.5	8.1
Fibric	122-152	85-100	0.10	90.3	929	6.0	5.0	8.6
Hemic	152-259	135-150	0.09	91.7	1102	6.0	5.0	10.3
Very fine sand	259+	185-200	0.13	87.2	679	6.1	5.2	17.6

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.8	5.4	3.0	0.2	31.6
85-100	51.8	5.2	2.8	0.2	32.0
135-150	51.0	5.1	2.7	0.2	32.5
185-200	50.7	5.0	2.7	0.3	28.9

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9073	91.0	6.9	65.3	27.8
85-100	8927	90.1	8.1	64.4	27.5
135-150	8719	91.3	8.5	66.4	25.1
185-200	8722	89.2	12.4	61.2	26.4

Reference Number: 145
Location: 732m (2400ft)S and 411m (1350ft)W of the NE corner of Sec. 3, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 40% with scattered tamarack; understory consists of leatherleaf with some bog rosemary and cotton grass; ground cover consists mostly of sphagnum mosses with some false Solomon's seal.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: T. Malterer and H. Hobbs on April 14, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-221	35- 50	....	....	....	4.3	3.0	....
Hemic	221-371	85-100	....	....	....	4.7	3.4	....
Very	371+	135-150	....	....	....	5.1	4.1	....
fine		185-200	0.07	91.8	1118	5.4	4.5	7.1
sand		235-250	0.07	92.3	1194	5.7	4.7	8.3
		285-300	0.09	90.7	977	5.8	4.8	10.6
		335-350	0.12	89.0	808	6.0	5.1	12.3

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	50.6	5.8	1.4	0.2	36.6
85-100	52.4	5.6	1.2	0.2	36.6
135-150	52.5	6.0	1.9	0.2	34.2
185-200	54.1	5.6	2.5	0.2	31.0
235-250	52.5	5.3	2.5	0.2	32.0
285-300	52.6	5.1	2.9	0.3	30.6
335-350	46.0	4.9	3.0	0.4	24.6

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8544	92.6	5.5	72.5	22.0
85-100	8804	94.2	4.1	73.3	22.6
135-150	9375	92.9	5.3	72.5	22.2
185-200	9527	91.7	6.6	70.5	22.9
235-250	9021	92.7	7.5	66.3	26.2
285-300	9032	90.7	8.6	53.4	38.0
335-350	7820	87.4	21.0	53.9	25.1

Reference Number: 146
Location: 280m (920ft)S and 38m (125ft)E of the NW corner of Sec. 19, T.52N., R.22W.
Vegetation: Scattered tamarack and black spruce; lush understory consists mostly of cotton grass with leatherleaf; ground cover consists mostly of sphagnum mosses with some polytrichum mosses and cranberry.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and T. Deering on April 14, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-180	35- 50	0.11	88.9	798	5.3	4.3	6.3
Sapric	180-188	85-100	0.08	91.9	1128	5.5	4.4	9.0
Very	188+	130-145	0.15	86.0	616	5.6	4.6	11.6
fine								
sand								

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.3	5.5	2.9	0.2	28.9
85-100	47.9	4.6	2.1	0.2	27.1
130-145	36.6	3.6	1.8	0.2	21.2

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8671	88.1	11.1	63.4	25.5
85-100	8166	87.8	18.1	55.2	26.7
130-145	6379	87.8	36.6	43.8	19.6

Reference Number: 147
Location: 785m (2575ft)S and 27m (90ft)W of the NE corner of Sec. 23, T.52N., R.22W.
Vegetation: Black spruce crown cover of about 35% with scattered tamarack; sparse understory consists of some leatherleaf, bog rosemary, and grasses; ground cover consists mostly of sphagnum mosses with some pitcher plant and cranberry.
Microrelief: 30cm
Depth To Water Table: 10cm
Described And Sampled By: H. Mooers and D. Riihiluoma on August 11, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 25	35- 50	0.06	92.0	1142	4.7	3.6	7.4
Hemic	25-155	85-100	0.09	88.6	780	5.4	4.4	6.4
Mineral soil	155+	135-150	0.12	88.2	749	5.9	5.0	14.7

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.6	5.6	1.6	0.2	35.1
85-100	55.5	5.9	2.8	0.2	29.6
135-150	53.5	5.5	2.1	0.2	29.0

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8835	91.9	6.0	70.9	23.1
85-100	9839	89.5	6.0	69.6	24.4
135-150	9220	90.3	9.7	63.7	26.6

Reference Number: 148
Location: 61m (200ft)N and 602m (1975ft)E of the SW corner of Sec. 5, T.45N., R.23W.
Vegetation: Scattered black spruce; understory consists of some bog birch, raspberry, leatherleaf, Labrador tea, cattails, willow, sedges, grasses, and ferns; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: Not recorded
Depth To Water Table: At surface
Described And Sampled By: D. Riihiluoma and D. Haverkost on September 17, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-100	35- 50	0.12	88.5	769	5.4	4.5	9.3
Hemic	100-180	85-100	0.09	90.9	993	5.7	4.6	16.1
Mineral soil	180+	135-150	0.11	90.2	918	5.7	4.6	10.4
		165-180	0.17	84.0	525	5.8	4.9	22.2

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.6	5.3	2.5	0.2	29.9
85-100	50.2	5.3	2.6	0.2	29.8
135-150	53.5	5.5	2.7	0.2	30.9
165-180	42.5	4.3	2.8	0.3	22.3

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8946	87.6	10.5	62.7	26.8
85-100	8712	90.1	11.9	64.4	23.7
135-150	9404	90.1	7.3	65.5	27.2
165-180	7316	83.4	27.9	48.3	23.8

Reference Number: 149
Location: 808m (2650ft)N and 408m (1340ft)W of the SE corner of Sec. 5, T.45N., R.23W.
Vegetation: Scattered tamarack and black spruce; understory consists of sedges with some bog birch, grasses, and ferns; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: D. Riihiluoma and D. Haverkost on September 17, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-170	35- 50	0.09	90.5	949	5.9	4.8	9.0
Fibric	170-245	85-100	0.10	90.4	938	6.0	4.9	8.6
Hemic	245-285	135-150	0.11	89.9	892	6.1	5.0	12.3
Fibric	285-315	185-200	0.10	90.4	945	6.2	5.1	9.4
Hemic	315-330	235-250	0.13	88.2	744	6.3	5.3	16.9
Sapric	330-365	285-300	0.15	85.8	605	6.4	5.4	19.0
Limnic with sand	365+	350-365	0.28	76.2	320	5.6	5.3	48.6

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.1	5.4	2.5	0.2	29.0
85-100	54.0	5.5	2.5	0.2	30.3
135-150	53.1	5.4	2.9	0.2	27.6
185-200	52.0	5.3	2.7	0.2	30.0
235-250	51.3	5.0	3.0	0.3	27.7
285-300	49.4	4.8	3.0	0.3	26.7
350-365	24.2	2.5	1.6	0.8	11.4

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9210	88.2	9.8	63.5	26.7
85-100	8785	89.8	7.5	66.2	26.3
135-150	8970	90.4	10.7	62.8	26.5
185-200	8969	90.6	9.8	62.8	27.4
235-250	8863	89.2	12.7	60.8	26.5
285-300	8548	86.1	15.8	57.2	27.0
350-365	3932	74.4	59.5	29.8	10.7

Reference Number: 150
Location: 61m (200ft)N and 221m (725ft)W of the SE corner of Sec. 5, T.45N., R.23W.
Vegetation: Scattered black spruce; lush understory consists mostly of grasses with some willow, bog birch, sedges, raspberry, and ferns.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: D. Riihiluoma and D. Haverkost on September 17, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-295	35- 50	0.12	88.0	730	5.6	4.5	7.7
Medium sand	295+	85-100	0.09	91.7	1111	5.6	4.5	7.2
		135-150	0.11	89.3	838	5.8	4.6	11.7
		185-200	0.09	90.7	969	5.8	4.7	7.9
		235-250	0.17	84.6	550	5.9	5.0	17.2
		280-295	0.28	77.0	334	5.9	5.3	46.8

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.9	5.4	2.6	0.2	29.1
85-100	53.0	5.4	2.6	0.2	31.5
135-150	50.4	5.2	2.7	0.2	29.8
185-200	52.6	5.2	2.8	0.2	30.6
235-250	48.6	4.6	3.0	0.4	25.8
280-295	48.0	4.5	2.7	0.5	25.1

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8881	88.4	8.8	63.5	27.7
85-100	9193	90.1	7.2	64.9	27.9
135-150	8787	89.8	11.7	62.4	25.9
185-200	8963	90.5	8.5	63.4	28.1
235-250	8388	85.8	17.6	56.3	26.1
280-295	8302	85.5	19.3	54.8	25.9

Reference Number: 151
Location: 8m (25ft)S and 198m (650ft)W of the NE corner of Sec. 5, T.45N., R.23W.
Vegetation: Tamarack crown cover of about 35% with scattered black spruce; lush understory consists mostly of leatherleaf with some Labrador tea and swamp laurel; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 60cm
Depth To Water Table: At surface
Described And Sampled By: H. Mooers and D. Riihiluoma on September 18, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-280	35- 50	0.12	88.5	767	4.8	3.9	13.0
Sapric	280-345	85-100	0.08	91.5	1082	5.5	4.6	8.5
Sand	345+	135-150	0.09	91.0	1010	5.7	4.7	7.1
		185-200	0.08	91.8	1118	6.0	4.9	10.6
		235-250	0.07	92.4	1219	6.1	5.1	9.0
		285-300	0.16	85.2	575	6.2	5.3	24.4
		330-345	0.22	79.4	385	6.3	5.5	39.7

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.7	5.3	2.3	0.2	28.3
85-100	52.1	5.3	2.3	0.2	29.3
135-150	52.2	5.1	2.4	0.2	31.3
185-200	50.5	5.0	2.4	0.2	31.2
235-250	54.1	5.2	2.7	0.2	29.6
285-300	47.9	4.4	2.9	0.5	24.9
330-345	46.2	4.5	2.8	0.7	22.7

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9095	91.0	10.2	65.1	24.7
85-100	9064	89.0	10.8	62.2	27.0
135-150	8980	91.4	8.8	64.5	26.7
185-200	8610	92.0	10.6	65.4	24.0
235-250	9134	91.4	8.2	65.3	26.5
285-300	8137	86.4	19.4	55.3	25.3
330-345	7942	82.4	23.1	52.0	24.9

Reference Number: 152
Location: 8m (25ft)S and 785m (2575ft)E of the NW corner of Sec. 5, T.45N., R.23W.
Vegetation: Scattered tamarack and black spruce; lush understory consists mostly of leatherleaf with some Labrador tea and swamp laurel; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 40cm
Depth To Water Table: 20cm
Described And Sampled By: H. Mooers and D. Riihiluoma on September 18, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-220	35- 50	0.15	85.9	607	4.2	3.3	11.3
Medium	220+	85-100	0.13	87.8	721	5.6	4.6	22.9
sand		135-150	0.11	89.7	867	5.8	4.9	10.0
		205-220	0.16	85.2	574	6.1	5.2	24.3

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.7	5.5	2.2	0.2	30.7
85-100	53.5	5.4	2.4	0.2	28.9
135-150	52.9	5.2	2.3	0.2	30.5
205-220	52.1	5.1	3.0	0.2	28.3

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9195	85.8	8.6	64.9	26.5
85-100	9294	87.8	9.5	63.0	27.5
135-150	9126	89.3	8.8	60.1	31.1
205-220	8854	89.2	11.3	59.2	29.5

Reference Number: 153
Location: 402m (1320ft)S and 399m (1310ft)W of the NE corner of Sec. 23, T.45N., R.23W.
Vegetation: Scattered tamarack; lush understory consists of bog birch and leatherleaf with some Labrador tea, bog rosemary, and horsetails; ground cover consists mostly of sphagnum mosses with some false Solomon's seal.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: H. Hobbs and G. Gabanski on July 1, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 61	35- 50	....	....	...	5.8	4.8	....
Hemic	61-183	85-100	0.11	88.9	803	6.1	5.2	10.3
Fibric	183-213	135-150	....	....	...	6.2	5.3	....
Hemic	213-350	185-200	0.15	86.5	639	6.2	5.4	17.1
Silt	350+	235-250	....	....	...	6.4	5.5	....
		285-300	....	....	...	6.5	5.5	....

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.8	5.2	2.4	0.4	26.8
85-100	53.4	5.2	2.2	0.3	29.6
135-150	53.7	5.1	2.5	0.4	25.9
185-200	51.8	4.9	2.4	0.3	28.1
200-330	50.7	4.8	2.8	0.4	25.4

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9026	90.4	13.4	61.9	24.7
85-100	9242	91.6	9.4	63.1	27.5
135-150	8991	91.0	12.4	58.8	28.8
185-200	8840	88.5	12.5	60.5	27.0
200-330	8572	89.4	15.8	59.0	25.2

Reference Number: 154
Location: 126m (415ft)S and 198m (650ft)W of the NE corner of Sec. 29, T.45N., R.23W.
Vegetation: Scattered paper birch; lush understory consists mostly of grasses with some speckled alder and willow.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: H. Hobbs and T. Deering on April 30, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-122	35- 50	0.19	81.7	445	6.3	5.8	25.5
Fine sand	122+	85-100	0.18	83.7	514	6.3	5.7	19.4

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	43.5	4.2	2.7	0.3	22.6
85-100	43.0	4.2	2.7	0.5	22.4

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	7388	82.7	26.6	51.5	21.9
85-100	7399	83.4	27.2	50.5	22.3

Reference Number: 155
Location: 174m (570ft)N and 23m (75ft)W of the SE corner of Sec. 32, T.46N., R.23W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of leatherleaf with some Labrador tea and grasses; ground cover consists mostly of sphagnum mosses with some other mosses.
Microrelief: 40cm
Depth To Water Table: 15cm above surface
Described And Sampled By: D. Riihiluoma and D. Haverkost on September 5, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-265	35- 50	0.08	89.4	847	4.9	4.0	10.5
Sapric	265+	85-100	0.11	88.4	761	5.3	4.4	8.2
		135-150	0.08	92.1	1159	5.7	4.8	9.5
		185-200	0.10	89.8	877	5.8	4.9	10.0
		250-265	0.10	89.9	893	6.0	5.1	9.3

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	....	...	...	...	....
85-100	54.0	5.5	2.4	0.2	30.3
135-150	53.0	5.4	2.6	0.3	29.4
185-200	51.5	5.1	2.5	0.2	28.1
250-265	52.2	5.4	2.8	0.3	29.9

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	....	....	...	....	....
85-100	9469	89.8	7.5	67.2	25.3
135-150	9196	91.5	9.5	63.4	27.1
185-200	8570	90.9	12.6	62.3	25.1
250-265	8602	92.2	9.5	61.5	29.0

Reference Number: 156
Location: 314m (1030ft)N and 732m (2400ft)E of the SW corner of Sec. 14, T.47N., R.23W.
Vegetation: Black spruce crown cover of about 35%; understory consists of some cotton grass, leatherleaf, swamp laurel, Labrador tea, and cattails; ground cover consists mostly of sphagnum mosses with some polytrichum mosses and cranberry.
Microrelief: 70cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and S. Nelson on June 27, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 91	35- 50	0.10	90.4	944	4.3	3.2	7.3
Hemic	91-213	85-100	0.14	86.7	652	4.4	3.2	5.6
Sapric	213-244	135-150	0.16	85.1	570	4.5	3.4	8.8
Hemic	244-305	185-200	0.19	82.5	472	4.9	3.9	13.8
Limnic	305-335	235-250	0.19	83.1	491	5.3	4.4	18.6
Silty clay	335+	285-300	0.37	70.8	243	5.6	4.7	69.4

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.6	5.4	1.5	0.3	33.4
85-100	54.3	5.7	1.6	0.2	31.5
135-150	55.7	5.6	2.0	0.3	28.6
185-200	54.6	5.1	2.6	0.3	28.5
235-250	49.8	4.7	3.0	0.5	25.2
285-300	15.5	1.8	0.9	0.3	9.6

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9012	91.2	6.7	67.5	25.8
85-100	9366	89.3	6.8	66.6	26.6
135-150	9700	86.0	7.9	64.2	27.9
185-200	9289	84.7	9.0	59.8	31.2
235-250	8484	83.9	16.8	55.3	27.9
285-300	2588	69.2	72.0	21.4	6.6

Reference Number: 157
Location: 165m (540ft)N and 552m (1810ft)E of the SW corner of Sec. 32, T.48N., R.23W.
Vegetation: Consists mostly of grasses with some willow.
Microrelief: 15cm
Depth To Water Table: Not recorded
Described And Sampled By: H. Hobbs and T. Deering on April 23, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Fine sand	0-152	35- 50	0.19	81.4	437	5.6	5.0	28.9
	152+	85-100	0.20	81.0	427	5.1	4.6	40.0
		125-140	0.18	83.3	498	5.4	5.1	39.4

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	42.9	4.4	2.8	0.5	22.3
85-100	34.3	3.7	2.6	0.6	17.3
125-140	34.5	3.8	2.4	1.4	17.5

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	7516	82.1	27.2	53.4	19.4
85-100	6100	80.2	41.5	43.6	14.9
125-140	6142	82.8	40.5	44.5	15.0

Reference Number: 158
Location: 503m (1650ft)S and 94m (310ft)W of the NE corner of Sec. 16, T.49N., R.23W.
Vegetation: Scattered black spruce and tamarack; sparse understory consists of some grasses, sedges, leatherleaf, bog rosemary, and cattails; ground cover consists mostly of sphagnum mosses with some polytrichum mosses and pitcher plant.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: G. Gabanski and S. Nelson on June 25, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric Limnic Bottom unknown	0-305	35- 50	....	....	....	4.7	3.5	....
	305+	85-100	....	....	....	4.6	3.4	....
		135-150	....	....	....	5.0	3.8	....
		185-200	....	....	....	5.5	4.3	....
		235-250	0.05	94.9	1847	6.1	5.0	17.5
		285-300	0.05	95.1	1959	6.6	5.3	21.9

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	50.1	5.3	1.6	0.4	34.6
85-100	....	...	...	1.5	....
135-150	....	...	...	0.3	....
185-200	51.4	5.3	3.4	0.4	27.9
235-250	49.7	5.1	3.5	0.4	26.4
285-300	47.7	5.1	3.8	0.4	24.4

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8510	95.0	8.1	71.1	20.8
85-100	8282	95.9	8.0	....	....
135-150	8619	95.9	6.4	....	....
185-200	9009	94.5	11.7	....	....
235-250	9245	95.0	14.9	61.8	23.3
285-300	8469	96.0	18.5	60.7	20.8

Reference Number: 159
Location: 373m (1225ft)S and 46m (150ft)W of the NE corner of Sec. 5, T.43N., R.24W.
Vegetation: Scattered tamarack, paper birch, and red maple; understory consists of speckled alder with some grasses, leatherleaf, Labrador tea, and willow.
Microrelief: 30cm
Depth To Water Table: 5cm above surface
Described And Sampled By: H. Hobbs and T. Deering on April 30, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-274	35- 50	0.13	88.0	735	5.6	4.8	8.7
Silty	274+	85-100	0.12	88.4	762	5.9	4.9	12.3
clay		135-150	0.12	89.0	812	6.0	5.0	8.3
		185-200	0.09	90.9	995	5.9	5.0	8.5
		240-255	0.18	84.1	527	6.2	5.4	24.2

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.5	5.1	2.1	0.3	30.5
85-100	52.5	5.1	2.7	0.3	30.5
135-150	54.0	5.3	2.7	0.2	30.7
185-200	53.0	5.3	2.6	0.3	31.9
240-255	51.3	5.0	2.8	0.4	28.7

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8962	87.3	9.5	60.6	29.9
85-100	9049	89.2	8.9	63.4	27.7
135-150	9233	90.0	7.1	64.0	28.9
185-200	9087	89.5	6.9	63.9	29.2
240-255	8771	87.1	11.9	61.5	26.6

Reference Number: 160
Location: 53m (175ft)N and 229m (750ft)W of the SE corner of Sec. 24, T.44N., R.24W.
Vegetation: Consists mostly of grasses with speckled alder and some bog birch, willow, and dogwood.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: H. Hobbs and T. Deering on April 30, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-235	35- 50	0.13	85.9	606	5.9	5.1	12.1
Sapric	235-240	85-100	0.14	86.9	663	5.8	4.8	9.3
Medium	240+	135-150	0.11	89.0	806	5.9	4.9	9.2
sand		185-200	0.12	88.6	780	5.9	4.9	13.9
		220-235	0.14	86.7	652	5.9	4.9	13.8

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	50.4	5.0	2.7	0.4	28.7
85-100	52.6	5.1	2.9	0.3	29.8
135-150	53.9	5.5	3.0	0.3	28.9
185-200	51.8	5.1	2.9	0.3	29.6
220-235	52.9	5.3	3.3	0.3	26.8

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8561	87.5	12.9	61.6	25.5
85-100	9040	87.0	9.3	63.0	27.7
135-150	9302	89.0	8.5	64.5	27.0
185-200	8992	89.0	10.3	61.4	28.3
220-235	9166	86.9	11.4	59.8	28.8

Reference Number: 161
Location: 472m (1550ft)S and 748m (2455ft)W of the NE corner of Sec. 13, T.45N., R.24W.
Vegetation: Scattered tamarack; lush understory consists mostly of grasses with speckled alder, bog birch, willow, and some ferns.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: S. Nelson and D. Olson on June 30, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-213	35- 50	....	....	...	5.9	5.0	....
Fibric	213-396	85-100	0.12	88.8	796	6.0	5.0	9.2
Hemic	396-518	135-150	....	....	...	6.2	5.2	....
Limnic	518-731+	185-200	0.12	89.1	819	6.0	5.3	25.2
Bottom		235-250	0.16	85.7	597	5.8	5.4	47.5
unknown		285-300	0.27	76.1	318	6.4	6.1	78.1

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.5	4.8	2.3	0.3	28.1
85-100	52.3	4.9	2.4	0.3	28.8
135-150	54.1	5.3	3.0	0.3	30.5
185-200	48.2	4.8	3.3	0.4	25.2
235-250	34.9	3.6	2.7	0.4	16.8
285-300	22.2	2.5	1.7	0.6	11.3

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8503	87.2	13.1	58.5	28.4
85-100	8767	88.8	11.3	59.7	29.0
135-150	9340	91.4	6.8	65.5	27.7
185-200	8452	90.4	18.0	59.6	22.4
235-250	6044	87.1	41.5	42.8	15.7
285-300	3851	83.7	61.8	29.3	8.9

Reference Number: 162
Location: 44m (145ft)N and 209m (685ft)E of the SW corner of Sec. 31, T.47N., R.24W.
Vegetation: Consists of bog birch, bog rosemary, and leatherleaf with some grasses, ferns, and iris; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: 10cm
Described And Sampled By: H. Hobbs and D. Olson on June 25, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-213	35- 50	0.11	88.6	779	5.1	4.3	9.2
Fibric	213-259	85-100	0.11	89.6	857	5.5	4.5	6.6
Medium sand	259+	135-150	0.12	88.7	785	5.6	4.5	9.4
		185-200	0.11	89.9	885	5.7	4.6	4.8
		235-250	0.19	83.1	493	5.6	4.7	43.7

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.1	4.8	2.1	0.3	30.4
85-100	53.9	4.7	2.0	0.2	30.7
135-150	53.1	4.8	2.2	0.3	30.5
185-200	54.2	5.3	2.9	0.3	31.2
235-250	43.2	4.1	2.8	0.4	21.4

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9038	88.6	9.3	62.2	28.5
85-100	9058	89.4	8.5	61.9	29.6
135-150	8930	89.7	9.1	59.7	31.2
185-200	9294	90.2	6.1	65.3	28.6
235-250	7371	87.1	28.1	49.6	22.3

Reference Number: 163
Location: 15m (50ft)S and 757m (2485ft)E of the NW corner of Sec. 6, T.49N., R.24W.
Vegetation: Consists mostly of bog birch with some willow, sedges, grasses, and ferns; ground cover consists of sphagnum mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: H. Mooers and D. Riihiluoma on August 15, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-178	35- 50	0.17	84.3	535	5.3	4.4	10.3
Limnic	178-194	85-100	0.13	87.4	691	5.6	4.7	8.7
Clay	194+	160-175	0.30	74.4	290	6.1	5.4	55.2

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	46.7	4.5	2.3	0.3	26.3
85-100	52.2	5.1	2.9	0.3	28.9
160-175	25.0	2.6	1.8	0.5	12.6

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	7915	83.3	19.8	54.7	25.5
85-100	8862	87.1	10.6	61.2	28.2
160-175	4144	74.0	57.4	29.6	13.0

Reference Number: 164
Location: 724m (2375ft)S and 38m (125ft)E of the NW corner of Sec. 20, T.51N., R.24W.
Vegetation: Birch crown cover of about 35% with scattered black spruce and tamarack; sparse understory consists of some speckled alder, Labrador tea, leatherleaf, and ferns; ground cover consists mostly of sphagnum mosses.
Microrelief: 30cm
Depth To Water Table: 30cm
Described And Sampled By: H. Mooers and D. Riihiluoma on August 11, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 5	35- 50	0.17	83.7	512	6.1	5.1	13.7
Sapric	5- 66	85-100	....	....	...	5.8	5.1	....
Hemic	66-271	135-150	....	....	...	6.0	5.3	....
Sapric	271-308	185-200	....	....	...	6.2	5.5	....
Limnic	308-419							
Very fine sand	419+							

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.2	5.0	2.5	0.3	30.0
85-200	50.8	5.0	3.1	0.9	26.0

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8890	84.5	9.0	63.1	27.9
85-200	8720	83.6	14.3	59.1	26.6

Reference Number: 165
Location: 46m (150ft)N and 20m (65ft)E of the SW corner of Sec. 9, T.52N., R.24W.
Vegetation: Scattered black spruce; lush understory consists mostly of willow with grasses, raspberry, and some sumac and ferns.
Microrelief: 10cm
Depth To Water Table: 10cm
Described And Sampled By: H. Mooers and D. Haverkost on August 6, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 47	35- 50	0.18	82.5	471	5.2	4.7	17.3
Hemic	47- 98	85-100	0.15	84.5	547	5.5	4.9	10.9
Sapric	98-227	135-150	0.20	82.4	468	5.6	5.1	18.4
Silt	227+	185-200	0.31	71.8	254	5.7	5.4	52.6

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.4	4.8	2.6	0.3	30.1
85-100	54.0	5.2	2.9	0.4	29.4
135-150	49.3	4.8	3.1	0.8	26.4
185-200	30.3	3.2	2.1	0.7	15.0

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8665	85.9	10.8	62.1	27.1
85-100	9165	87.2	8.2	62.7	29.1
135-150	8507	83.8	15.5	58.0	26.5
185-200	5131	73.0	48.6	38.1	13.3

Reference Number: 166
Location: 328m (1075ft)S and 206m (675ft)W of the NE corner of Sec. 2, T.45N., R.25W.
Vegetation: Scattered tamarack; lush understory consists mostly of sedges with some speckled alder, bog birch, leatherleaf, and swamp laurel; ground cover consists of some sphagnum mosses and pitcher plant.
Microrelief: 15cm
Depth To Water Table: At surface
Described And Sampled By: S. Nelson and D. Olson on June 24, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-183	85-100	.....	.....	.....	6.0	5.0	.....
Hemic	183-244	135-150	.....	.....	.....	6.0	5.0	.....
Fibric	244-305	185-200	.....	.....	.....	6.2	5.1	.....
Limnic	305-335	235-250	.....	.....	.....	6.3	5.3	.....
Fibric	335-396	285-300	.....	.....	.....	6.9	5.9	.....
Limnic	396-731	335-350	.....	.....	.....	6.7	6.1	.....
Limnic with silt	731+							

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
85-100	51.1	4.6	1.6	0.2	29.4
135-150	54.5	5.1	1.1	0.2	32.9
185-200	54.2	5.2	1.4	0.2	30.7
235-250	54.3	5.5	2.6	0.2	31.1
285-300	43.1	5.1	3.3	0.4	24.9
335-350	39.3	4.8	3.1	0.4	22.6

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
85-100	8566	89.0	13.1	58.1	28.8
135-150	9126	94.1	6.2	64.4	29.4
185-200	9205	94.3	8.3	64.2	27.5
235-250	9393	95.6	6.4	67.7	25.9
285-300	7761	93.6	23.2	59.5	17.3
335-350	7078	93.2	29.9	55.2	14.9

Reference Number: 167
Location: 430m (1410ft)S and 43m (140ft)E of the NW corner of Sec. 35, T.46N., R.25W.
Vegetation: Consists mostly of cattails with grasses and willow.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: H. Hobbs and T. Deering on April 30, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-274	35- 50	0.11	87.6	708	6.0	5.1	16.7
Medium	274+	85-100	0.17	83.7	515	6.3	5.4	17.2
sand		135-150	0.14	87.0	669	6.3	5.4	19.8
		185-200	0.15	86.4	633	6.3	5.4	15.8
		235-250	0.20	81.6	444	6.1	5.4	26.3

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	49.6	4.9	2.6	0.3	26.4
85-100	50.6	5.0	2.9	0.3	25.8
135-150	46.8	4.5	2.6	0.3	25.3
185-200	50.4	4.9	2.9	0.3	26.0
235-250	46.4	4.2	2.3	0.7	23.1

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8584	86.4	16.2	59.0	24.8
85-100	8746	85.2	15.5	57.6	26.9
135-150	8002	87.6	20.6	52.3	27.1
185-200	8502	87.4	15.5	54.9	29.6
235-250	7795	83.0	23.3	49.9	26.8

Reference Number: 168
Location: 256m (840ft)N and 590m (1935ft)E of the SW corner of Sec. 11, T.48N., R.25W.
Vegetation: Scattered tamarack, paper birch, and black spruce; lush understory consists of bog birch, Labrador tea, and leatherleaf with some swamp laurel; ground cover consists mostly of sphagnum mosses with some polytrichum mosses.
Microrelief: 40cm
Depth To Water Table: 15cm
Described And Sampled By: G. Gabanski and H. Hobbs on June 23, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-244	35- 50	.....	.....	.....	4.6	3.7	.....
Clay	244+	85-100	.....	.....	.....	4.9	4.1	.....
loam		135-150	.....	.....	.....	5.2	4.4	.....

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35-150	51.9	5.0	2.7	0.2	29.1

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35-150	8963	86.9	11.1	61.3	27.6

Reference Number: 169
Location: 15m (50ft)S and 20m (65ft)W of the NE corner of Sec. 19, T.48N., R.25W.
Vegetation: Plowed field.
Microrelief: Negligible
Depth To Water Table: 213cm
Described And Sampled By: H. Hobbs and G. Gabanski on June 25, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 91	35- 50	0.25	68.7	220	5.6	5.3	28.7
Fibric	91-152	85-100	0.28	73.0	270	5.5	5.2	21.3
Hemic	152-274	135-150	0.18	83.7	514	5.7	5.3	15.4
Limnic	274-560	185-200	0.23	78.4	363	5.4	5.1	20.4
Clay	560+	235-250	0.20	81.8	449	5.6	5.2	17.7
loam		285-300	0.19	82.3	465	5.8	5.4	26.4
		335-350	0.31	74.7	294	6.8	6.5	50.2
		385-400	0.32	72.6	264	5.7	5.4	58.2
		435-450	0.32	74.4	291	6.4	6.4	72.8
		485-500	0.38	66.7	200	5.1	4.9	55.0
		535-550	0.38	66.7	201	5.4	5.2	35.2

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	48.6	4.5	2.3	0.3	29.1
85-100	47.7	4.6	2.7	0.3	28.4
135-150	53.0	5.0	3.1	0.4	28.3
185-200	45.9	4.3	2.6	0.4	26.9
235-250	48.6	4.7	2.7	0.5	26.6
285-300	45.5	4.8	2.9	1.5	23.2
335-350	31.2	3.4	2.0	1.1	16.7
385-400	29.4	3.1	1.9	0.6	15.5
435-450	25.8	2.7	1.6	0.8	13.6
485-500	20.4	2.2	1.3	0.9	10.2
535-550	15.5	1.8	1.0	1.0	8.2

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	7722	76.2	15.1	58.3	26.6
85-100	8032	76.9	16.4	58.2	25.4
135-150	8936	84.8	10.3	60.9	28.8
185-200	7732	76.1	20.0	53.7	26.3
235-250	8235	78.5	17.0	55.6	27.4
285-300	8054	82.7	22.2	55.9	21.9
335-350	5284	78.4	45.6	42.6	11.8
385-400	4922	73.6	49.5	37.3	13.2
435-450	4355	76.5	55.4	33.1	11.5
485-500	3416	72.1	65.0	28.6	6.4
535-550	2547	67.6	72.4	23.9	3.7

Reference Number: 170
Location: 640m (2100ft)S and 439m (1440ft)E of the NW corner of Sec. 5, T.50N., R.25W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of leatherleaf with some grasses, Labrador tea, and swamp laurel; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 35cm
Depth To Water Table: At surface
Described And Sampled By: H. Mooers, L. Severson, and T. Deering on April 21, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 25	35- 50	0.12	85.4	587	4.3	3.3	9.8
Hemic	25-225	85-100	0.13	86.9	666	4.6	3.3	5.7
Sapric	225-230	135-150	0.13	85.6	596	5.0	3.6	....
Silty	230+	185-200	0.11	88.3	755	5.2	4.0	11.5
clay								
loam								

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.2	5.5	1.8	0.2	31.9
85-100	55.4	5.6	2.4	0.2	30.6
135-150	54.5	5.6	2.7	0.2	32.0
185-200	51.9	5.3	2.6	0.2	30.9

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8499	87.6	9.5	64.1	26.4
85-100	9654	87.9	5.8	64.9	29.3
135-150	9455	88.9	5.0	66.2	28.8
185-200	8636	89.2	9.3	61.2	29.5

Reference Number: 171
Location: 363m (1190ft)S and 107m (350ft)E of the NW corner of Sec. 5, T.50N., R.25W.
Vegetation: Scattered tamarack and black spruce; lush understory consists mostly of grasses with some bog birch, leatherleaf, and bog rosemary; ground cover consists mostly of sphagnum mosses with some polytrichum mosses.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: H. Mooers, L. Severson, and T. Deering on April 21, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-170	35- 50	0.13	86.0	615	4.3	3.7	9.3
Silt	170+	85-100	0.13	87.4	693	5.2	3.9	6.6
loam		135-150	0.12	87.9	728	5.1	3.9	9.4

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.6	5.5	2.5	0.2	30.9
85-100	55.5	5.8	2.5	0.2	29.6
135-150	53.3	5.4	2.5	0.2	30.6

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9159	86.3	8.2	66.1	25.7
85-100	9673	88.2	6.5	66.4	27.1
135-150	9246	88.7	8.0	63.6	28.4

Reference Number: 172
Location: 20m (65ft)N and 328m (1075ft)W of the SE corner of Sec. 6, T.50N., R.25W.
Vegetation: Black spruce crown cover of about 40% with scattered tamarack; lush understory consists mostly of leatherleaf with some Labrador tea, swamp laurel, and grasses; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 45cm
Depth To Water Table: At surface
Described And Sampled By: H. Mooers, L. Severson, and T. Deering on April 18, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0-155	35- 50	0.08	91.0	1011	4.4	2.9	4.2
Hemic	155-295	85-100	0.09	90.3	932	4.1	2.9	3.5
Sapric	295-300	135-150	0.10	90.6	965	4.3	3.1	3.3
Silty	300+	185-200	0.10	90.6	964	4.6	3.5	5.4
clay		235-250	0.12	88.4	759	5.1	4.0	10.0
loam		285-300	0.15	85.5	587	5.4	4.3	13.2

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	50.7	5.2	0.9	0.1	38.6
85-100	50.1	5.4	0.5	0.1	40.6
135-150	52.4	5.5	1.1	0.1	37.3
185-200	55.1	5.4	2.4	0.2	32.6
235-250	51.5	5.0	2.6	0.2	30.6
285-300	53.4	5.3	3.0	0.2	30.2

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8450	90.8	4.4	70.3	25.3
85-100	8325	92.5	3.3	74.2	22.5
135-150	8985	92.0	3.6	74.3	22.1
185-200	9369	89.5	4.4	66.6	29.0
235-250	8813	87.6	10.1	62.4	27.5
285-300	9188	87.7	7.9	63.7	28.4

Reference Number: 173
Location: 373m (1225ft)S and 213m (700ft)W of the NE corner of Sec. 6, T.50N., R.25W.
Vegetation: Black spruce crown cover of about 40% with scattered tamarack; lush understory consists mostly of grasses with some leatherleaf, bog rosemary, and swamp laurel; ground cover consists mostly of sphagnum mosses with some polytrichum mosses and cranberry.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: H. Mooers, L. Severson, and T. Deering on April 21, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 20	35- 50	0.11	86.8	660	4.9	3.5	9.3
Hemic	20-280	85-100	0.09	88.7	783	4.9	3.6	6.6
Silt	280+	135-150	0.09	91.3	1048	5.0	3.8	5.7
loam		185-200	0.11	89.0	809	5.3	4.0	9.4
		235-250	0.13	87.4	691	5.5	4.4	9.2

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.8	5.6	2.5	0.2	30.5
85-100	55.3	5.6	2.4	0.2	30.1
135-150	55.0	5.6	2.1	0.2	32.3
185-200	52.2	5.2	2.8	0.2	30.5
235-250	54.4	5.1	2.6	0.2	29.0

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9457	87.9	7.5	68.4	24.1
85-100	9760	89.5	6.3	65.7	28.0
135-150	9468	91.4	4.7	65.9	29.4
185-200	9072	89.5	8.9	63.0	28.1
235-250	9314	88.4	8.7	60.4	30.9

Reference Number: 174
Location: 46m (150ft)N and 40m (130ft)W of the SE corner of Sec. 7, T.50N., R.25W.
Vegetation: Black spruce crown cover of about 35% with scattered tamarack; lush understory consists mostly of Labrador tea with some swamp laurel and leatherleaf; ground cover consists mostly of sphagnum and other mosses.
Microrelief: 30cm
Depth To Water Table: 10cm
Described And Sampled By: D. Olson, H. Hobbs, and T. Deering on April 16, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-183	35- 50	0.12	88.0	731	3.8	3.0	8.9
Loamy	183+	85-100	0.14	86.5	639	4.3	3.4	6.9
sand		135-150	0.14	87.5	697	5.0	3.8	10.8

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.0	5.3	1.2	0.2	34.4
85-100	53.1	5.6	2.6	0.2	32.3
135-150	49.8	4.9	2.5	0.2	28.7

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8735	88.4	6.8	67.0	26.2
85-100	9156	89.0	6.2	66.3	27.5
135-150	8317	87.9	13.9	58.9	27.2

Reference Number: 175
Location: 9m (30ft)S and 340m (1115ft)E of the NW corner of Sec. 8, T.50N., R.25W.
Vegetation: Scattered black spruce and tamarack; lush understory consists of Labrador tea and leatherleaf with some swamp laurel, bog rosemary, and cotton grass; ground cover consists mostly of sphagnum mosses with some other mosses and cranberry.
Microrelief: 60cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and L. Severson on June 17, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-152	35- 50	0.09	90.3	926	3.9	3.0	3.6
Fibric	152-183	85-100	0.10	90.6	959	4.1	3.1	6.8
Hemic	183-330	135-150	0.10	90.3	934	4.2	3.1	3.6
Silty	330+	185-200	0.14	86.8	655	4.6	3.4	10.1
clay		235-250	0.13	87.1	674	4.9	3.8	7.9

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.1	5.5	1.1	0.2	36.7
85-100	51.9	5.4	1.0	0.1	35.3
135-150	53.7	5.5	1.2	0.2	35.1
185-200	55.1	5.5	1.7	0.2	31.1
235-250	53.1	5.2	2.8	0.3	29.9
250-330	50.4	5.0	2.6	0.3	28.8

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8736	90.1	4.3	70.0	25.7
85-100	8873	90.2	6.3	66.5	27.2
135-150	9224	91.0	4.4	69.1	26.5
185-200	9428	88.4	6.5	66.6	26.9
235-250	9140	87.3	8.6	66.1	25.3
250-330	8719	87.4	13.0	59.0	28.0

Reference Number: 176
Location: 800m (2625ft)S and 32m (105ft)W of the NE corner of Sec. 10, T.50N., R.25W.
Vegetation: Consists mostly of grasses with some other herbaceous plants and shrubs.
Microrelief: 10cm
Depth To Water Table: 100cm
Described And Sampled By: G. Gabanski and H. Hobbs on June 19, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-270	35- 50	0.15	84.7	555	6.1	5.5	11.1
Loam	270+	85-100	0.13	87.3	686	6.1	5.4	10.7
		135-150	0.15	86.1	620	6.2	5.5	11.9
		185-200	0.19	81.7	447	6.3	5.7	20.5
		250-265	0.22	79.0	375	6.1	5.8	28.6

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.1	5.2	3.0	0.3	28.3
85-100	51.6	4.9	2.3	0.3	28.4
135-150	52.7	5.2	3.4	0.4	27.8
185-200	47.5	4.6	3.3	0.6	23.8
250-265	36.1	3.6	2.6	1.0	18.4

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8769	84.2	12.0	60.8	27.2
85-100	8703	86.9	12.5	58.0	29.5
135-150	9031	86.7	10.5	61.7	27.8
185-200	8048	82.8	20.3	55.4	24.3
250-265	5978	76.6	38.4	44.6	17.0

Reference Number: 177
Location: 40m (130ft)S and 546m (1790ft)W of the NE corner of Sec. 15, T.52N., R.25W.
Vegetation: Northern white cedar crown cover of about 60% with scattered paper birch and tamarack; ground cover consists of mosses.
Microrelief: 10cm
Depth To Water Table: 30cm
Described And Sampled By: D. Olson, H. Hobbs, and T. Deering on April 16, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0- 91	35- 50	0.13	85.7	600	6.0	5.4	13.4
Fibric	91-183	85-100	0.10	89.5	855	6.1	5.6	13.3
Hemic	183-366	135-150	0.12	88.7	783	6.1	5.7	8.2
Limnic	366-645+	185-200	0.12	88.2	748	6.3	5.7	8.4
with		235-250	0.13	87.5	698	6.3	5.7	9.6
snails		285-300	0.13	86.9	663	6.4	5.8	9.6
Bottom unknown		315-330	0.12	87.6	707	6.2	6.0	13.9

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.8	5.5	3.0	0.4	31.6
85-100	54.1	5.9	3.5	0.4	29.7
135-150	52.6	5.7	3.7	0.6	29.7
185-200	53.7	5.8	3.8	0.8	29.0
235-250	53.4	5.5	3.5	0.7	29.7
285-300	53.3	5.9	3.6	0.8	28.1
315-330	51.0	5.8	3.9	1.1	27.0

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9192	87.0	6.8	67.1	26.1
85-100	9558	88.3	6.3	67.6	26.1
135-150	9251	88.7	7.7	65.7	26.6
185-200	9444	87.7	7.0	66.6	26.4
235-250	9349	87.9	7.3	64.1	28.6
285-300	9455	87.8	8.2	65.3	26.5
315-330	9086	87.8	11.2	64.9	23.9

Reference Number: 178
Location: 762m (2500ft)S and 477m (1565ft)E of the NW corner of Sec. 32, T.52N., R.25W.
Vegetation: Consists mostly of grasses and reeds with some willow, cattails, and nettles.
Microrelief: 30cm
Depth To Water Table: At surface
Described And Sampled By: L. Severson and G. Gabanski on June 16, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric	0-183	35- 50	0.26	74.8	297	5.7	5.3	37.5
Fine	183+	85-100	0.23	77.8	351	5.4	5.0	26.9
sand		135-150	0.44	65.2	187	3.0	3.3	72.5

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	36.7	3.4	2.0	0.6	20.8
85-100	46.1	4.7	2.9	1.5	22.2
135-150	30.8	3.2	2.0	3.5	15.2

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	6016	72.4	36.5	44.1	19.4
85-100	8039	80.7	22.5	55.0	22.5
135-150	5339	78.2	45.2	42.1	12.7

Reference Number: 179
Location: 26m (85ft)S and 747m (2450ft)E of the NW corner of Sec. 35, T.52N., R.25W.
Vegetation: Consists of grasses with some brambles and other shrubs.
Microrelief: 15cm
Depth To Water Table: Below 60cm
Described And Sampled By: L. Severson and H. Hobbs on June 14, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Sapric Medium sand	0-213 213+	35- 50	.....	.....	.....	5.9	5.5	.....
		85-100	.....	.....	.....	6.1	5.5	.....
		135-150	.....	.....	.....	5.3	5.1	.....
		185-200	.....	.....	.....	4.6	4.5	.....

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
0-100	51.0	5.3	3.1	0.5	28.0
100-220	38.9	4.1	2.7	1.5	18.3

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
0-100	8646	78.3	12.0	60.9	27.1
100-220	6735	79.0	34.4	47.2	18.4

Reference Number: 180
Location: 343m (1125ft)N and 617m (2025ft)E of the SW corner of Sec. 22, T.47N., R.26W.
Vegetation: Consists of grasses and shrubs including willow and bog birch with some ferns, iris, and blackberry; ground cover consists of some sphagnum mosses.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: G. Gabanski and H. Hobbs on June 23, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Fibric Hemic Sapric Sandy loam	0-122 122-274 274-488 488-518 518+	35- 50	0.15	85.2	574	5.3	4.6	9.4
		85-100	0.13	87.4	693	5.5	4.7	12.0
		135-150	0.13	87.5	701	5.8	4.9	8.9
		185-200	0.12	88.4	758	6.3	5.2	10.9
		235-250	0.12	88.6	780	6.5	5.4	7.0
		285-300	0.13	87.1	677	6.5	5.6	15.9
		335-350	0.16	85.3	582	6.3	5.5	23.0
		385-400	0.19	82.6	474	6.3	5.6	37.9
		440-455	0.19	83.0	487	6.3	5.7	31.4

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	52.5	5.0	2.9	0.4	30.8
85-100	53.4	4.9	2.6	0.3	29.3
135-150	53.4	4.9	2.2	0.3	31.1
185-200	53.0	5.2	2.9	0.3	29.8
235-250	55.2	5.4	3.1	0.3	29.1
285-300	51.1	5.0	3.1	0.6	25.4
335-350	44.9	4.4	2.9	0.6	22.5
385-400	36.5	3.6	2.3	0.6	17.8
440-455	26.1	2.7	1.7	0.7	13.2

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8717	87.5	8.4	63.7	27.9
85-100	8813	88.2	9.5	62.2	28.3
135-150	9039	89.3	8.1	64.0	27.9
185-200	8950	89.6	8.8	64.5	26.7
235-250	9327	89.1	6.9	65.5	27.6
285-300	8812	87.7	14.8	58.6	26.6
335-350	7686	86.0	24.7	51.3	24.0
385-400	6253	82.0	39.1	41.7	19.2
440-455	4464	78.7	55.5	32.0	12.5

Reference Number: 181
Location: 792m (2600ft)S and 23m (75ft)W of the NE corner of Sec. 23, T.47N., R.26W.
Vegetation: Consists mostly of grasses with other herbaceous plants.
Microrelief: Negligible
Depth To Water Table: 91cm
Described And Sampled By: H. Hobbs and G. Gabanski on June 23, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Silt loam with pebbles	0-155 155+	35- 50	0.19	80.2	406	5.6	5.0	13.8
		85-100	0.18	82.8	481	5.6	4.8	14.7
		135-150	0.18	84.4	541	5.9	5.2	12.8

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.8	4.7	2.5	0.3	31.1
85-100	52.6	4.6	2.5	0.3	30.3
135-150	51.6	4.6	2.8	0.3	29.1

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8259	81.2	9.7	62.9	27.4
85-100	8162	83.8	9.8	61.2	29.0
135-150	8816	85.6	11.6	60.6	27.8

Reference Number: 182
Location: 495m (1625ft)S and 41m (135ft)W of the NE corner of Sec. 31, T.49N., R.26W.
Vegetation: Black spruce crown cover of about 35% with scattered tamarack; lush understory consists mostly of leatherleaf with some Labrador tea and cotton grass; ground cover consists mostly of sphagnum mosses with other mosses and some cranberry.
Microrelief: 30cm
Depth To Water Table: 5cm
Described And Sampled By: H. Hobbs and T. Deering on April 22, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic Sapric Silt loam	0-152 152-198 198+	35-50	.....	.....	.....	4.0	3.2	.....
		70-85	.....	.....	.....	3.9	3.2	.....

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35-85	51.7	5.3	1.7	0.2	30.8

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35-85	9055	80.9	10.2	64.7	25.1

Reference Number: 183
Location: 38m (125ft)N and 803m (2635ft)W of the SE corner of Sec. 11, T.50N., R.26W.
Vegetation: Consists of grasses with some goldenrod and raspberry.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: D. Olson, H. Hobbs, and T. Deering on April 16, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-138	35- 50	0.16	84.6	548	4.7	4.0	8.0
Sapric	138-232	85-100	0.12	87.7	713	5.1	4.2	7.9
Medium sand	232+	135-150	0.15	86.0	615	5.5	4.6	11.7
		185-200	0.14	85.8	605	5.8	4.9	13.2
		215-230	0.31	73.3	274	5.2	4.8	60.9

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.9	5.5	2.3	0.2	29.5
85-100	54.1	5.4	2.3	0.2	30.7
135-150	49.5	4.9	2.7	0.3	27.5
185-200	51.9	5.2	2.9	0.3	28.9
215-230	20.1	2.4	1.6	0.4	10.7

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9280	84.6	8.5	63.4	28.1
85-100	9224	88.9	7.2	62.8	30.0
135-150	8477	86.9	15.2	57.9	26.9
185-200	8947	86.0	10.7	61.6	27.7
215-230	3448	71.8	64.9	27.6	7.5

Reference Number: 184
Location: 605m (1985ft)S and 187m (615ft)E of the NW corner of Sec. 20, T.50N., R.26W.
Vegetation: Consists mostly of grasses with some cattails and willow.
Microrelief: 10cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson, H. Hobbs, and T. Deering on April 15, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-274	35- 50	0.11	88.9	802	5.3	4.5	6.6
Fibric	274-305	85-100	0.11	89.6	863	5.4	4.5	7.5
Hemic	305-350	135-150	0.10	90.5	947	5.6	4.6	8.1
Sapric	350-650	185-200	0.09	90.4	942	5.6	4.6	6.4
Loam with pebbles	650+	235-250	0.09	91.2	1039	5.7	4.6	6.9
		285-300	0.07	92.2	1175	6.0	4.8	5.7
		335-350	0.08	91.5	1076	6.0	5.2	13.5
		385-400	0.09	90.4	943	6.7	5.7	22.4
		435-450	0.11	88.6	780	5.6	5.2	27.3
		485-500	0.09	90.3	929	6.4	5.9	25.7

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.5	5.5	2.5	0.3	32.2
85-100	53.9	5.6	2.6	0.3	31.7
135-150	54.2	5.6	2.3	0.2	32.1
185-200	54.1	5.6	2.2	0.2	32.2
235-250	53.4	5.7	2.6	0.2	32.8
285-300	53.6	5.8	2.6	0.3	32.5
335-350	49.6	5.5	4.1	0.3	26.9
385-400	46.2	5.3	3.7	0.4	24.1

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9208	90.0	6.0	68.5	25.5
85-100	9332	91.3	5.8	70.2	24.0
135-150	9389	90.5	5.6	70.1	24.3
185-200	9404	91.7	5.6	70.0	24.4
235-250	9214	92.0	5.3	71.1	23.6
285-300	9179	92.1	5.2	73.0	21.8
335-350	8772	92.4	13.6	65.4	21.0
385-400	8401	90.7	20.4	61.0	18.6

Reference Number: 185
Location: 448m (1470ft)N and 50m (165ft)E of the SW corner of Sec. 10, T.45N., R.27W.
Vegetation: Scattered black spruce and tamarack; lush understory consists mostly of grasses with some Labrador tea and brambles; ground cover consists of some sphagnum mosses.
Microrelief: 20cm
Depth To Water Table: At surface
Described And Sampled By: H. Hobbs and T. Deering on April 29, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0-305	35- 50	0.15	85.1	569	4.5	3.6	9.1
Sapric	305-366	85-100	0.13	87.8	722	4.7	3.8	7.8
Limnic	366-510	135-150	0.08	91.8	1114	5.1	4.1	5.3
Silty	510+	185-200	0.09	91.2	1038	5.7	4.6	14.5
clay		235-250	0.09	91.5	1070	6.0	4.9	14.3
		285-300	0.12	88.3	755	5.7	4.9	27.1
		335-350	0.12	88.2	748	5.7	5.0	30.6
		385-400	0.13	87.1	672	5.4	4.9	26.9
		435-450	0.12	89.2	829	4.1	4.0	26.8
		485-500	0.12	88.7	783	5.8	5.2	41.5

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.1	5.3	1.5	0.2	30.0
85-100	54.5	5.2	1.8	0.3	30.6
135-150	53.9	5.3	1.8	0.2	32.4
185-200	52.7	5.8	3.3	0.3	28.8
235-250	50.1	5.7	3.8	0.3	26.0
285-300	44.0	5.0	3.2	0.4	23.1
335-350	43.0	4.6	2.9	0.7	21.2
385-400	44.0	4.8	3.0	1.0	20.9
435-450	39.8	5.0	3.2	2.0	22.6
485-500	39.9	4.7	2.9	1.2	22.9

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	9141	85.3	9.9	64.3	25.8
85-100	9331	91.3	7.5	63.8	28.7
135-150	9284	90.0	6.4	66.6	27.0
185-200	9548	92.5	9.1	66.0	24.9
235-250	9143	91.8	14.1	63.8	22.1
285-300	7943	90.0	24.3	55.1	20.6
335-350	7668	88.1	27.5	52.9	19.6
385-400	7867	87.4	26.3	53.9	19.8
435-450	7276	90.2	27.4	58.2	14.4
485-500	7237	90.8	28.3	53.3	18.4

Reference Number: 186
Location: 716m (2350ft)N and 12m (40ft)W of the SE corner of Sec. 14, T.48N., R.27W.
Vegetation: Consists mostly of bog birch with some grasses, willow, and ferns.
Microrelief: Negligible
Depth To Water Table: At surface
Described And Sampled By: G. Gabanski and H. Hobbs on June 20, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 91	35- 50	0.13	86.0	613	5.9	5.0	11.7
Fibric	91-213	85-100	0.09	89.7	870	6.1	5.1	8.0
Hemic	213-335	135-150	0.10	90.3	930	6.0	5.3	11.8
Sapric	335-396	185-200	0.14	87.0	671	6.4	5.5	14.4
Limnic	396-518	235-250	0.13	88.5	766	6.1	5.6	12.6
Medium	518+	285-300	0.14	87.3	684	6.4	5.8	20.5
to		335-350	0.21	80.9	423	4.7	4.6	41.3
coarse								
sand								

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	53.2	4.8	2.0	0.3	30.7
85-100	51.7	5.4	3.0	0.3	31.3
135-150	51.5	5.3	3.4	0.3	30.5
185-200	53.2	5.2	3.2	0.4	28.2
235-250	53.8	5.1	2.7	0.4	27.9
285-300	49.8	5.0	3.0	0.9	24.4
335-350	37.1	4.1	3.0	2.4	15.9

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8920	88.1	9.1	61.9	29.0
85-100	8919	90.1	8.4	66.7	24.9
135-150	8947	90.3	9.0	65.0	26.0
185-200	9017	88.5	9.8	62.5	27.7
235-250	9187	89.2	10.0	61.7	28.3
285-300	8814	90.3	16.8	58.0	25.2
335-350	6631	83.3	37.5	47.1	15.4

Reference Number: 187
Location: 52m (170ft)N and 23m (75ft)E of the SW corner of Sec. 23, T.50N., R.27W.
Vegetation: Scattered tamarack and black spruce; understory consists of swamp laurel with some Labrador tea and cotton grass; ground cover consists mostly of sphagnum mosses with some polytrichum mosses and cranberry.
Microrelief: 55cm
Depth To Water Table: At surface
Described And Sampled By: D. Olson and L. Severson on June 18, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Hemic	0- 61	35- 50	0.13	86.9	662	3.9	3.0	6.7
Fibric	61- 91	85-100	0.09	91.2	1036	4.2	3.1	4.1
Hemic	91-122	135-150	0.13	88.0	731	4.2	3.2	7.3
Fibric	122-152	185-200	0.12	88.0	733	4.6	3.5	12.5
Hemic	152-246							
Sandy clay loam	246+							

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	50.2	5.4	1.3	0.2	34.3
85-100	53.6	5.7	1.3	0.2	34.3
135-150	55.2	5.8	2.2	0.2	30.5
185-200	52.0	5.2	2.7	0.2	28.7

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8571	86.6	8.5	68.0	23.5
85-100	8776	90.9	5.0	69.2	25.8
135-150	9677	87.0	6.2	69.9	23.9
185-200	9033	88.0	11.1	61.5	27.4

Reference Number: 188
Location: 434m (1425ft)N and 655m (2150ft)E of the SW corner of Sec. 15, T.52N., R.27W.
Vegetation: Black spruce crown cover of about 35%; understory consists of leatherleaf with some cotton grass, swamp laurel, and bog rosemary; ground cover consists mostly of sphagnum mosses with some false Solomon's seal, cranberry, and polytrichum mosses.
Microrelief: 40cm
Depth To Water Table: 10cm
Described And Sampled By: H. Hobbs and G. Gabanski on June 17, 1980.

Layer	Depth (cm)	Sample Depth (cm)	Bulk Density (g/cc)	Moisture Content Total Wt. (%)	Moisture Content Dry Wt. (%)	pH H_2O	pH $CaCl_2$	Ash Content (%)
Fibric	0- 152	35- 50	0.09	90.9	998	4.2	3.1	5.3
Hemic	152- 305	85-100	0.07	92.3	1195	4.0	2.9	3.9
Fibric	305- 366	135-150	0.09	91.7	1105	4.1	3.0	4.5
Hemic	366- 457	185-200	0.08	92.3	1198	4.2	3.1	3.6
Sapric	457- 731	235-250	0.10	90.4	939	4.5	3.4	4.6
with		285-300	0.09	90.7	976	4.8	3.6	7.7
limnic		335-350	0.12	88.1	742	5.0	4.0	15.7
Limnic	731-1097	380-395	0.16	85.6	595	5.2	4.4	28.4
Limnic with clay	1097-1188							
Clay	1188+							

Ultimate Analysis

Sample Depth (cm)	Total C (%)	H (%)	N (%)	S (%)	O (%)
35- 50	51.3	5.7	1.3	0.2	35.5
85-100	52.6	5.8	1.2	0.2	35.8
135-150	53.5	5.7	1.2	0.1	35.7
185-200	53.1	6.0	1.1	0.2	36.1
235-250	52.9	5.9	2.1	0.1	33.1
285-300	53.4	5.8	2.9	0.2	30.6
335-350	48.8	5.0	2.5	0.2	26.7
380-395	51.9	5.1	2.7	0.3	27.5

Proximate Analysis

Sample Depth (cm)	Btu/lb.	Moisture Content (%)	Ash Content (%)	Volatiles (%)	Fixed Carbon (%)
35- 50	8690	91.1	6.1	69.6	24.3
85-100	9023	92.5	4.4	72.3	23.3
135-150	9146	92.5	3.8	72.2	24.0
185-200	9093	92.4	3.5	71.8	24.7
235-250	9094	91.2	5.9	68.9	25.2
285-300	9128	90.4	7.0	67.1	25.9
335-350	8471	88.7	16.7	58.3	25.0
380-395	8914	88.0	12.7	58.6	28.7

GLOSSARY

Btu. British thermal unit, the quantity of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

Clay. As a soil separate, the mineral soil particles less than .002 mm in diameter. As a soil textural class, soil material that is 40% or more clay, less than 45% sand and less than 40% silt.

Crown cover. The amount of plant surface that covers the ground as viewed from above, expressed as a percentage of the total possible (100%) or of a particular group, e.g. black spruce crown cover of about 50%.

Ericaceous. Belonging to the family Ericaceae. Plants of the heath family, including bog rosemary, leatherleaf, Labrador tea, and swamp laurel.

Evapotranspiration. The total amount of water taken into the atmosphere by evaporation from the surface and from the transpiration of living plants.

Fibric peat. The least decomposed of peat types. It contains large amounts of fiber which is well preserved, and its botanical origin is readily identifiable.

Glacial drift. All rock material (clay, sand, gravel, boulders) transported by a glacier and deposited directly by or from the ice, or by running water emanating from a glacier.

Ground cover. Low growing plants such as mosses that form a dense layer on the ground surface.

Hemic peat. The moderately decomposed peat type which is partly altered physically and chemically. Fibers are largely destroyed when rubbed and are less easily identified than in fibric peat.

Humus. The more or less stable fraction of the organic soil matter remaining after the major portion of plant and animal residue has decomposed. Usually dark in color.

Limnic materials. Materials deposited in lakes. These materials are primarily chemical and biological precipitates (plants and animals).

Loam. The textural class name for soil having a moderate amount of sand, silt, and clay. Loam soils contain 7% to 27% clay, 28% to 50% silt, and less than 52% sand.

Lobe, glacial. One of the lobate protrusions of the margin of an ice sheet.

Microrelief. Relief of a peatland surface from the top of hummocks or ridges to the bottom of hollows.

Mineralization. The conversion of an element from an organic form to an inorganic state as a result of microbial decomposition.

Moraine. An accumulation of material which has been transported or deposited by glacial ice. Moraine material is usually an ungraded mass of sediment ranging in size from clay to boulders.

pH. A numerical symbol for the degree of acidity or alkalinity of a solution. A pH value of 7 indicates a neutral solution; pH values of 0 to 7 indicate decreasing acidity, and values from 7 to 14 indicate increasing alkalinity.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Sand. Individual rock or mineral fragments in soils having diameters ranging from .05 to 2 mm. The textural class name of any soil that contains 85% or more sand and not more than 20% clay.

Sapric peat. The most highly decomposed peat. An amorphous mass consisting largely of humus. Fibers, except for the larger ones, are not identifiable.

Silt. Individual mineral particles that range in diameter from .002 mm to .05 mm. Soil of the silt textural class is 80% or more silt and less than 12% clay.

Soil. A naturally occurring, unconsolidated material on the earth's surface that has been influenced by parent material, climate, microorganisms, and topography, all acting through time to produce soil that may differ from the material from which it was derived in many physical, chemical, mineralogical, biological, and morphological properties.

Stratigraphy. Science dealing with the formation, composition, and correlation of stratified sequences.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil.

Till. Unstratified and unsorted glacial drift deposited directly by the ice and consisting of clay, silt, sand, gravel, and boulders intermingled in any proportions.

Understory. A layer of foilage in a forest beneath the crown cover and above the ground cover.

REFERENCES

American Society for Testing Materials. 1971. Standard classification of peats, mosses, humus, and related products. D2607-69. Philadelphia, PA.

Boelter, D. H. and E. S. Verry. 1977. Peatlands and water in the northern lake states. USDA Forest Service General Technical Rep. NC-31. St. Paul, MN.

Brady, N. C. 1974. The nature and properties of soils. Macmillan Publishing Co. Inc., New York, NY.

Buol, S. W., F. D. Hole, and R. J. McCracken. 1973. Soil genesis and classification. Iowa State Univ. Press, Ames, IO.

Canada Soil Survey Committee. 1976. Manual on soil sampling and methods of analysis. Edited by J. A. McKeague. Soil Research Institute. Canada.

Eng, M. T. 1979. An evaluation of the surficial geology and peat resources of SW St. Louis County, Minnesota (map and text). Scale: 1:126,720. Minnesota Department of Natural Resources, Division of Minerals. St. Paul, MN.

Fuchsman, C. H. 1978. The industrial chemical technology of peat. Minnesota Department of Natural Resources. St. Paul, MN.

Gary, M., R. McAfee, C. Wolf, editors. 1977. Glossary of geology. American Geological Institute. Falls Church, VA.

Glaser, P. H., G. A. Wheeler, E. Gorham, and H. E. Wright, Jr. 1981. The patterned mires of the Red Lake peatland, northern Minnesota: vegetation, water chemistry and landforms. p. 575-599. Journal of Ecology, v. 69.

Glaser, P. H. 1980. The Red Lake peatland. Unpublished.

Grigal, D. F., R. C. Severson and G. E. Goltz. 1976. Evidence of aeolian activity in north-central Minnesota, 8000-5000 years ago. Geol. Soc. Amer. Bull., v. 87.

Hammond, R. F. 1975. The origin, formation and distribution of peatland resources. Pages 1-22 *in* D. W. Robinson and J. G. D. Lamb, eds. Peat in horticulture. Academic Press, London.

Hebden, D. and H. J. F. Stroud. 1981. Coal gasification processes. Pages 1599-1752 *in* Eliot, M. A., ed. Chemistry of coal utilization, second supplementary volume. John Wiley and Sons, New York, NY.

Heinselman, M. L. 1963. Forest sites, bog processes, and peatland types in the Glacial Lake Agassiz Region, Minnesota. Ecol. Monograph 33: 327-374.

_____1970. Landscape evolution, peatland types, and the environment in the Lake Agassiz Peatlands Natural Area, Minnesota. Ecol. Monograph 40: 235-260.

Hobbs, H. C. 1980. Case histories of three sphagnum bogs in northeastern Minnesota. Pages 38-46 *in* International Peat Society, Proceedings of the 6th International Peat Congress. Duluth, MN.

_____1981. Surficial geology of Aitkin County, Minnesota (map and text). Scale: 1:126,720. Unpublished. Minnesota Department of Natural Resources, Division of Minerals. St. Paul, MN.

International Peat Society, Committee on Peat Classification. 1976. Peat classification report of Commission 1. Helsinki, Finland.

Iron Range Resources and Rehabilitation Commission. 1965*a*. Peat sampling: Hill City South East bog, Aitkin County, Minnesota. Unpublished.

_____1965*b*. Peat sampling: McGregor bog, Aitkin County, Minnesota. Unpublished.

_____1965*c*. Peat sampling: McGregor North bog, Aitkin County, Minnesota. Unpublished.

_____1965*d*. Peat sampling: McGregor South bog, Aitkin County, Minnesota. Unpublished.

_____1970. Peat sampling: Jacobson West bog, Aitkin County, Minnesota. Unpublished.

Kavanagh, T. and M. Herlihy. 1975. Microbiological aspects. Pages 39-49 *in* D. W. Robinson and J. G. D. Lamb, eds. Peat in horticulture. Academic Press, London.

Kurmis, V., H. L. Hansen, J. J. Olson, and A. R. Aho. 1978. Vegetation types, species, and areas of concern and forest resources utilization of northern Minnesota's peatlands. Univ. of Minnesota, College of Forestry. Minneapolis, MN.

Morey, G. B. 1976. Geologic map of Minnesota, bedrock geology. Minnesota Geological Survey Miscellaneous Map M-24. St. Paul, MN.

_____1978. Lower and middle precambrian stratigraphic nomenclature for east-central Minnesota. Report of Investigations 21. Minnesota Geological Survey. St. Paul, MN.

Minnesota Department of Natural Resources. 1979. Minnesota Peat Program: Legislative status report. Minnesota Department of Natural Resources, Division of Minerals. St. Paul, MN.

_____1981. Minnesota Peat Program final report. Minnesota Department of Natural Resources, Division of Minerals. St. Paul, MN.

Moore, P. D. and D. J. Bellamy. 1974. Peatlands. Springer-Verlag New York Inc., New York, NY.

Ode, W. H. 1963. Coal analysis and mineral matter. *In* H. H. Lowry (ed.), Chemistry of coal utilization, supplementary volume. John Wiley and Sons, Inc., New York, NY.

Olson, D. J., T. J. Malterer, D. R. Mellem, B. Leuelling, and E. J. Tome. 1979. Inventory of peat resources, SW St. Louis County, Minnesota. Minnesota Department of Natural Resources, Division of Minerals. St. Paul, MN.

Plummer, C. E. 1949. Report of progress in peat development. Office of the Commissioner of the IRRR. St. Paul, MN.

Puustjarvi, V. and R. A. Robertson. 1975. Physical and chemical properties. Pages 23-38 *in* D. W. Robinson and J. G. D. Lamb, eds. Peat in horticulture. Academic Press, London.

Rader, A. M. 1979. Synthetic natural gas from peat. Pages 291-296 *in* I and Ec Product Research and Development, v. 18.

Rodgers, W. P. 1978. The coal primer. Valley Press, Inc., Van Buren, AR.

Severson, L. S., H. D. Mooers, and T. J. Malterer. 1980. Inventory of peat resources, Koochiching County, Minnesota. Minnesota Department of Natural Resources, Division of Minerals. St. Paul, MN.

Soil Science Society of America. 1970. Glossary of soil science terms. Madison, WI.

_____1974. Histosols: their characteristics, classification, and use. Soil Sci. Soc. of Amer. Special Pub. 6. Madison, WI.

Soil Survey Staff. 1975. Histosols. Pages 211-226 *in* Soil taxonomy, Agric. Handb. No. 436, USDA. U.S. Government Printing Office, Washington, D.C.

_____1951 (Reissued 1962). Soil survey manual, Agric. Handb. No. 18, USDA. U.S. Government Printing Office, Washington, D.C.

Soper, E. K. 1919. Peat deposits of Minnesota. Univ. of Minnesota Geological Survey Bull. 16. Minneapolis, MN.

Terasamae, J. 1977. Postglacial history of Canadian muskeg. Pages 9-30 *in* N. W. Radforth and C. O. Brawner, eds. Muskeg and the northern environment in Canada. Univ. of Toronto Press, Toronto.

United States Department of Energy. 1979. Peat prospectus. Div. of Fossil Fuel Processing. Washington, D.C.

United States Geological Survey. National Topographic Map Series. Scale: 1:24,000. Aitkin County, Minnesota. Reston, VA.

Walmsley, M. E. 1977. Physical and chemical properties of peat. Pages 82-129 *in* N. W. Radforth and C. O. Brawner, eds. Muskeg and the northern environment in Canada. Univ. of Toronto Press, Toronto.

Wright, H. E., Jr. 1972*a*. Physiography of Minnesota. Pages 561-580 *in* P. K. Sims and G. B. Morey, eds. Geology of Minnesota: a centennial volume. Minnesota Geological Survey. St. Paul, MN.

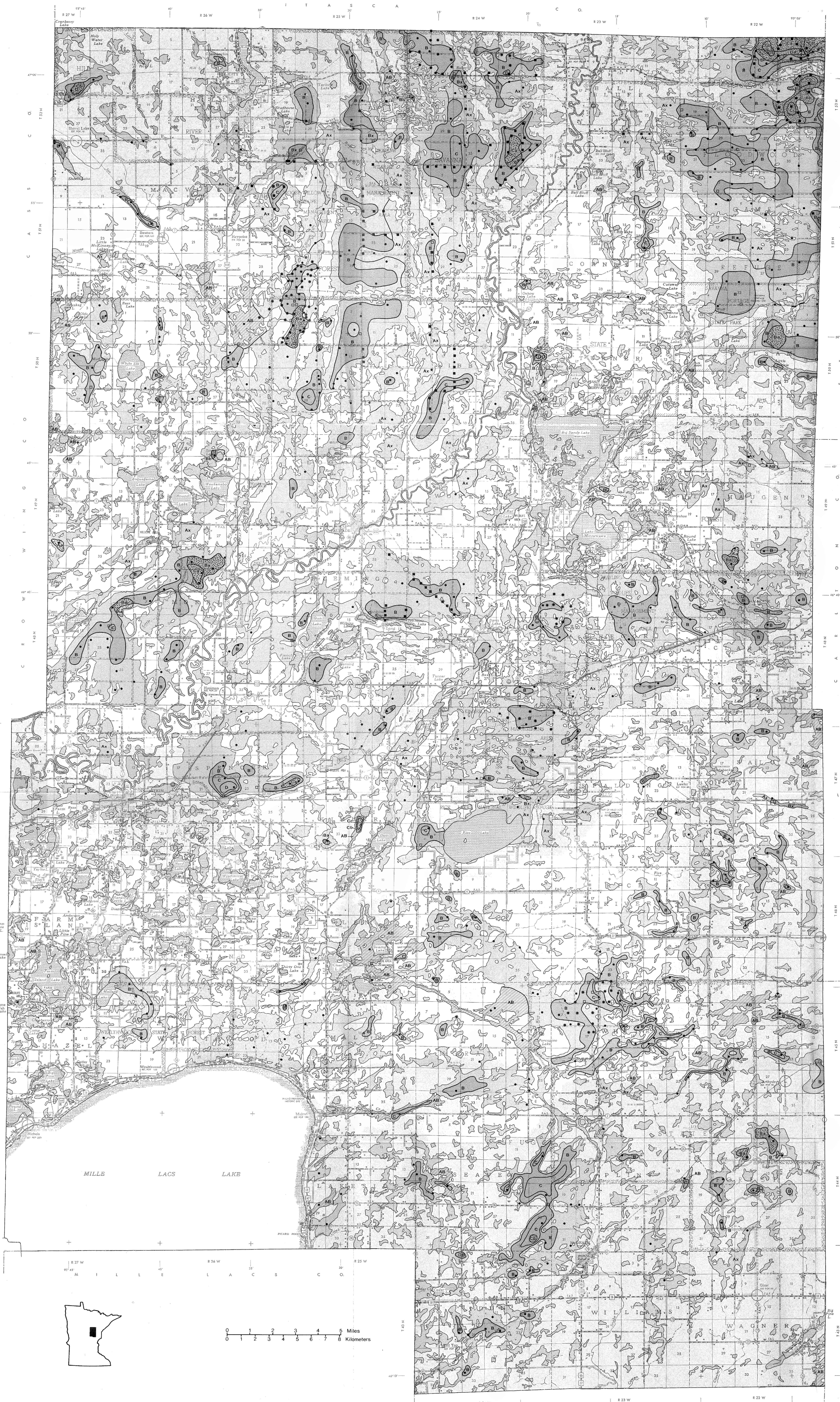
_____1972*b*. Quaternary history of Minnesota. Pages 515-547 *in* P. K. Sims and G. B. Morey, eds. Geology of Minnesota: a centennial volume. Minnesota Geological Survey. St. Paul, MN.

Wright, H. E., Jr. and W. A. Watts. 1969. Glacial and vegetational history of northeastern Minnesota. Special Publications Series SP-11. Minnesota Geological Survey. St. Paul, MN.

PEAT RESOURCES

Aitkin County, Minnesota

1981



PEAT AND MINERAL UNITS

- Peat less than 150 cm deep
- Peat greater than 150 cm deep
- Peat depth 0-300 cm
- Raised bog (fibric sphagnum moss "cap")
- Mineral soil

LABELS FOR DEPTH AND TYPE OF PEAT

TOTAL DEPTH OF PEAT

A	0-150 cm (~ 0- 5 ft)
B	151-300 cm (~ 5-10 ft)
AB	0-300 cm (~ 0-10 ft)
C	301-450 cm (~10-15 ft)
D	451-600 cm (~15-20 ft)

Total depth is hemic peat when labeled with upper-case letters only.

DEPTH OF FIBRIC SPHAGNUM MOSS LAYER

a	20- 60 cm (~1- 2 ft)
b	61-150 cm (~2- 5 ft)
c	151-300 cm (~5-10 ft)

DEPTH OF SAPRIC PEAT

x Total depth is sapric peat

FORMS USED FOR PEAT LABELS

- The "A" unit is indicated by color only; total depth (0-150 cm) is hemic peat.
- B — Units labeled with an upper-case letter only (e.g., B, C, or D) indicate that the total depth is hemic peat.
- Ax, Bx — The total depth A (0-150 cm) or B (151-300 cm) consists of sapric peat.
- Ba — The total depth of peat (e.g., B 151-300 cm) includes a layer of fibric sphagnum moss peat (e.g., a 20-60 cm deep) overlying hemic peat.
- AB — Units labeled AB indicate that the depth ranges from 0-300 cm of hemic peat.

PEAT OBSERVATION SITES

- • DNR observation site.
- ▪ DNR sample site with laboratory data.
- ▫ DNR sample site with additional DOE laboratory data.
- ✱ IRRRB (Iron Range Resources and Rehabilitation Board) site.

0 1 2 3 4 5 Miles
0 1 2 3 4 5 6 7 8 Kilometers

Minnesota Peat Inventory Project

Minnesota Department of Natural Resources
Division of Minerals

Base map: General Highway Map, Aitkin County, Minnesota; Minnesota Department of Transportation, 1979

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