

**UNITED STATES DEPARTMENT OF AGRICULTURE**

**Soil Survey**  
of  
**St. Clair County, Michigan**

By

**E. B. DEETER**

United States Department of Agriculture, in Charge

and

**H. W. FULTON, B. E. MUSGRAVE, and L. C. KAPP**

Michigan Agricultural Experiment Station



**Bureau of Chemistry and Soils**

In cooperation with the  
**Michigan Agricultural Experiment Station**

# BUREAU OF CHEMISTRY AND SOILS

HENRY G KNIGHT, *Chief*  
A. G. MCCALL, *Chief, Soil Investigations*  
SYDNEY FRISSELL, *Editor in Chief*

## SOIL SURVEY

CURTIS F. MARBUT, *in Charge*  
MARK BALDWIN, *Inspector, District 1*  
J. W. MCKERICHER, *in Charge Map Drafting*

## COOPERATION

### MICHIGAN AGRICULTURAL EXPERIMENT STATION

V. R. GARDNER, *Director*  
C. E. MILLAR, *in Charge Soil Survey*

## CONTENTS

	Page
County surveyed.....	1
Climate.....	3
Agriculture.....	4
Soils and crops.....	7
Well-drained soils.....	10
St. Clair silt loam.....	10
Tuscola very fine sandy loam.....	10
Fox fine sandy loam.....	11
Fox fine sandy loam, rolling phase.....	11
Oshtemo loamy fine sand.....	11
Plainfield fine sand.....	11
Coloma loamy fine sand.....	12
Bridgman fine sand.....	12
Genesee fine sandy loam.....	12
Imperfectly drained soils.....	12
Conover silt loam.....	13
Conover loam.....	13
Nappanee silt loam.....	14
Macomb loam.....	14
Gifford loam.....	14
Bronson loam.....	15
Bronson loam, light-textured phase.....	15
Bronson loamy fine sand.....	15
Brady fine sandy loam.....	15
Berrien loamy fine sand.....	16
Berrien fine sandy loam.....	16
Poorly drained soils.....	16
Brookston clay loam.....	17
Brookston silt loam.....	17
Brookston loam.....	17
Clyde loam.....	18
Toledo clay.....	18
Bono clay.....	18
Jeddo silty clay loam.....	18
Jeddo silt loam.....	18
Colwood very fine sandy loam.....	19
Colwood loam.....	19
Maumee loam.....	19
Allendale fine sandy loam.....	20
Wauseon fine sandy loam.....	20
Granby loamy fine sand.....	20
Newton loamy fine sand.....	21
Saugstuck fine sand.....	21
Griffin loam.....	21
Carlisle muck.....	21
Rife peat.....	22
Greenwood peat.....	22
Burned muck.....	22
Miscellaneous soil materials.....	23
Marsh.....	23
Coastal beach.....	23
Rough broken land.....	23
Made land.....	23
Soils and their interpretation.....	23
Summary.....	27
Map.....	

# SOIL SURVEY OF ST. CLAIR COUNTY, MICHIGAN

By E. B. DEETER, United States Department of Agriculture, in Charge, and  
H. W. FULTON, B. E. MUSGRAVE, and L. C. KAPP,  
Michigan Agricultural Experiment Station

## COUNTY SURVEYED

St. Clair County is in the southeastern part of the Lower Peninsula of Michigan and is the easternmost county in the State (fig. 1). Port Huron, the county seat, is 57 miles northeast of Detroit. The total area of the county is 726 square miles, or 464,640 acres.

The dominant surface feature is a smooth glacial plain sloping gently from north to south. This plain is interrupted by three belts (moraines) of billowy or somewhat rolling country, with elevations ranging from 75 to 150 feet higher than the nearby plain. The first belt extends northeastward from Capac to the county line, the second centers about Yale, and the third is on the east side of Black River, extending from the northern county line southward to a point about 1 mile northwest of Wadham. The transition from the plain to the more elevated rolling land is not abrupt but is marked by long gentle slopes. The plain includes extensive nearly level areas, also low smooth ridges.

At Yale, the elevation above sea level is 799 feet, at Emmett it is 776 feet, and at Marine City it is 585 feet.<sup>1</sup> These altitudes indicate the degree of the general slope from north to south. During August 1929 the level of Lake Huron was 582.18 feet above sea level and of Lake St. Clair was 576.79 feet.<sup>2</sup>

Black River and the lower course of its chief tributary, Mill Creek, have become deeply entrenched (pl. 1, A), so that their valleys are more than 100 feet below the upland. Parts of Belle and Pine Rivers have also cut deeply into the upland. The bottom lands along these four major streams are narrow and restricted, in few places attaining a width of more than one fourth mile, and in most places the width is much less. These tributary valleys have become "drowned" for some distance back from their junctions with St. Clair River. The drop from the smooth upland plain to the valleys below is very steep.

The broad areas of the plain lying between the deep stream valleys are not thoroughly dissected by streams, and those streams which do exist have cut only from 3 to 10 feet below the surface, except where



FIGURE 1—Sketch map showing location of St. Clair County, Mich.

<sup>1</sup> GANNETT, H. A DICTIONARY OF ALTITUDES IN THE UNITED STATES. U.S. Geol. Survey Bul. 274, Ed. 4, 1,072 p. 1906

<sup>2</sup> Lake levels from the following publication [UNITED STATES] WAR DEPARTMENT, CORPS OF ENGINEERS SURVEY OF NORTHERN AND NORTHEASTERN LAKES Bul. 33, Sup. 5, 11 p. U.S. Lake Survey, Detroit, Mich., 1929.

they approach the larger streams. For this reason, ditches are necessary to properly drain most of the land. The largest nearly flat interstream area is in the northwestern part of the county.

The region of lowland in the southern part of the county, comprising the delta at the mouth of St. Clair River, where it enters Lake St. Clair, is a small but distinctive physiographic feature. This section is generally known as the "St. Clair Flats", and will be so designated in this report. The entire section is either only a few feet above the water level or is covered with water to a slight depth, much of the land being true marsh. During the season of the survey (1929), the unusually high water level in Lake St. Clair submerged a large area and encroached on the somewhat higher parts, which have long almost imperceptible slopes to the water's edge.

The original forest growth on the heavier well-drained soils consisted of oaks, beech, sugar maple, and basswood, with some scattered pine and hemlock, low wet places supported a growth of elm, soft maple, ash, and hickory; sandy ridges were covered with white pine, or a mixture of hardwoods and pine, and tamarack was the principal tree on the organic soils, although some small areas were covered with elm, ash, hickory, and maple. The forest also included some red (Norway) pine, alder, birch, juniper, red cedar, white cedar, and black spruce, and in one area of woodland, now including a second growth of elm, hard maple, soft maple, beech, and oak, the original growth had been chiefly white pine. Aspen, locally called "popple", is a widespread second-growth tree on sandy soils and muck areas. Russell, Harsens, and Dickinson Islands contain wooded areas in which the trees are mainly red oak and white oak, with some elm, hickory, and ash.

The first white people to come to the country now included in St. Clair County were two French priests who came up St. Clair River in 1670. Subsequent history shows many conflicts between the Indians, French, and English. The early settlers engaged in fishing, trapping, and lumbering. The present boundaries of the county were established in 1848.

According to the 1930 census,<sup>3</sup> the population of the county is 67,563, of which 29,351 persons are classed as rural. Of the rural population, 17,471 are classed as rural farm and 11,880 as rural non-farm. The density of the rural population is 41.3 persons a square mile. The eastern part of the county, along St. Clair River where the largest towns are located, is the most thickly populated. Port Huron, the county seat, located on St. Clair River, is the largest town, with a population in 1930 of 31,361. In 1854, its population was 3,088. Other towns are Marine City, with a population of 3,462; St. Clair, with 3,389; Algonac, 1,736; Marysville, 1,405; and Yale, 1,345. Smaller towns and villages are scattered throughout the county.

Nearly all the railroads entering the county converge at Port Huron. Here the main line of the Grand Trunk System from Chicago passes under St. Clair River, through a tunnel, and continues to Montreal, Canada, as the Canadian National Railway. A short line of the

<sup>3</sup> Soil survey reports are dated as of the year in which the field work was completed. Later census figures are given whenever possible.

Grand Trunk System connects Detroit and Port Huron. The Pere Marquette Railway connects Port Huron with Saginaw and continues to Ludington on Lake Michigan. Another line of this railway extends from Port Huron to the tip of the "thumb" of Michigan, and a short branch line connects Almont, Lapeer County, with Port Huron. The Port Huron & Detroit Railroad connects Port Huron, St. Clair, and Marine City, the terminus. A branch of the Michigan Central Railroad extends to St. Clair.

The large shipping traffic of the upper Great Lakes passes through St. Clair River, and water transportation is available to the towns along this river

The highway system is excellent. A complete network of paved and graveled roads, the mileage of which is constantly increasing, covers the county. Some of the dirt roads become impassable during the spring thaws. Schools and churches are located at convenient places, and telephones are available to practically all sections.

The production of salt from deep wells is an important industry, and salt-manufacturing plants are at Marysville, St. Clair, and south of Marine City. Brass and other metal products are manufactured in Port Huron, and here also are two paper plants and a cement plant. The largest employer of labor in the city is the Grand Trunk Railway whose shops are located here. A very large motor-boat industry centers about Algonac, Yale has a woolen mill and a canning factory, and a wood-working plant is located at Capac.

#### CLIMATE

St. Clair County lies in the pathway of the storms that sweep across the lake region, and the climate of eastern lower Michigan is characterized by the frequent and rapid weather changes produced by the passage of such storms. However, the climate is, to a certain extent, modified by the influence of the lakes which nearly surround Michigan, and although temperatures below zero frequently occur during January and February, the cold of winter is not usually so severe as in districts not protected by such large bodies of water.

The precipitation is well distributed throughout the year but is slightly greater during the spring and summer than during other seasons. In the southern part of eastern lower Michigan the snow-fall is less than elsewhere in the State, and it is apt to be melted by warm or rainy weather, so that in most years the ground is bare during part of the winter.

Abundant sunshine occurs during summer and early autumn, but much cloudy weather obtains during winter and early spring.

According to records of the Weather Bureau station at Port Huron, the average dates of the earliest and latest killing frosts are October 10 and May 6, respectively, giving an average frost-free season of 157 days. Killing frost has been recorded as early as September 22 and as late as June 6.

In late spring or early summer the prevailing winds are from the northeast, and as these are cool winds off Lake Huron, vegetation does not advance so rapidly as in some of the interior counties.

Table 1, compiled from the records of the Weather Bureau station at Port Huron, gives the most important climatic data for the county.

TABLE 1.—Normal monthly, seasonal, and annual temperature and precipitation at Port Huron, St. Clair County, Mich

[Elevation, 639 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1930)	Total amount for the wettest year (1882)	Snow, average depth
	°F	°F	°F	Inches	Inches	Inches	Inches
December.....	27 6	65	-14	1 99	2 02	2 95	7 1
January.....	22 3	64	-15	1 82	2 41	2 81	10 6
February.....	22 7	60	-25	1 92	2 14	2 23	10 4
Winter.....	24 2	65	-25	5 73	6 57	7 99	28 1
March.....	30 4	77	-14	2 09	1 19	5 25	7 0
April.....	43 0	87	7	2 24	1 77	2 33	2 4
May.....	55 2	93	24	2 98	2 82	4 99	(1)
Spring.....	42 0	93	-14	7 31	5 78	12 57	9 4
June.....	64 2	97	35	2 74	2 60	6 34	0
July.....	68 8	102	42	2 79	27	1 91	0
August.....	67 8	104	41	2 68	56	7 36	0
Summer.....	60 9	104	35	8 21	3 43	15 61	0
September.....	61 6	97	30	2 82	2 12	88	0
October.....	50 5	87	19	2 48	.98	1 76	4
November.....	37 5	72	-6	2 38	94	2 23	3 8
Fall.....	49 9	97	-6	7 68	4 04	4 87	4 2
Year.....	46 0	104	-25	28 93	19 82	41 04	41 7

<sup>1</sup> Trace

## AGRICULTURE

Owing to the rapid growth in population of Detroit, which is within easy trucking distance of St. Clair County, and the increased demand for dairy products, dairying has become of first importance in practically every part of the county, and the farmers have been able to build up their herds both in quality and quantity (pl 1, B). In addition to the Detroit trade, a large quantity of dairy products is consumed in Port Huron, St. Clair, Marine City, and other towns within the county. Most of the dairy cattle are Holstein-Friesians. The growth of the dairy industry during the last 20 years is shown by the census figures. In 1909 the value of dairy products, excluding home use, was \$631,784; in 1919, \$1,343,965; and in 1929, \$2,081,076.

The value of all agricultural products during the peak year of high prices (1919) was \$13,315,951 and for 1929 was \$10,424,719.

The kinds of crops grown have not changed to a great extent, although the proportion of the various crops differs somewhat from year to year. Table 2, compiled from census data, shows the acreage of leading crops in stated years

TABLE 2.—Acreage of principal crops in St. Clair County, Mich., in stated years

Crop	1899	1909	1919	1926 <sup>1</sup>	1929
Corn.....	23, 294	25, 435	17, 135	25, 900	18, 192
Oats.....	59, 465	55, 347	54, 771	45, 940	35, 647
Wheat.....	40, 390	13, 829	29, 183	34, 430	18, 465
Rye.....	1, 577	3, 672	10, 195	1, 850	1, 281
Barley.....	1, 485	2, 048	6, 565	2, 100	3, 704
Buckwheat.....	1, 306	1, 589	1, 152	1, 040	1, 935
Dry edible beans.....	891	6, 472	1, 846	6, 750	4, 791
All hay crops.....	79, 702	97, 776	98, 805	92, 870	80, 254
Potatoes.....	4, 346	3, 607	2, 462	2, 890	2, 362
Sugar beets.....		2, 346	1, 200	2, 662	721

<sup>1</sup> Annual crop report for Michigan, 1926  
<sup>2</sup> Annual crop report for Michigan, 1925.

The 1920 census reports only 221 acres of alfalfa in 1919, but in 1924 this had increased to 1,280 acres and in 1929 to 3,736 acres. The crop is increasing in favor wherever it is possible to obtain a stand.

The 1930 census reports 3,965 acres in orchards, including 88,220 bearing apple trees, in 1929. Very little fruit is produced on a commercial scale, and the small home orchards are more or less neglected.

In 1929, an expenditure of \$142,972 was made for fertilizer and lime, an average of \$39.42 a farm. Most of the fertilizer is bought ready mixed. The use of lime has greatly increased during the last few years.

In 1929, \$384,131 were paid for wages on 1,441 farms reporting the use of hired labor, or an average of \$266.57 for each farm reporting.

The trend of the farm situation in St. Clair County is revealed by the census figures relating to the number and size of farms and the numbers of owner- and tenant-operated farms in different census years. These data are set forth in table 3.

TABLE 3.—Number and size of farms and percentages of owner- and tenant-operated farms in St. Clair County, Mich., in stated years

Year					Year				
	Farms	Average size of farms	Operated by owners	Operated by tenants		Farms	Average size of farms	Operated by owners	Operated by tenants
	Number	Acres	Percent	Percent		Number	Acres	Percent	Percent
1880.....	4, 931	80 0	91 1	8 9	1910.....	4, 627	91 6	85 0	14 6
1890.....	4, 552	82 0	88 4	11 6	1920.....	4, 159	95 2	81 9	16 8
1900.....	4, 980	84 7	85 6	13 4	1930.....	3, 627	94 2	87 5	11 7

The significant features of table 3 are the marked decrease in the number of farms, the slight decrease in farms operated by owners, and the increase in the average size of farms.

At the present time (1929), cash rent for farms averages \$3 an acre. On a share basis, when landlord and tenant each pay half the cost of seed, fertilizer, and other expenses, the crops are divided equally; when the tenant furnishes everything, the landlord receives one third of the crops.

In general, the farm home and outbuildings are well constructed. Practically all of the work animals are horses of good type. The use of tractors in farm operations is common, and most of the farm machinery, such as hay loaders, binders, cultivators, and other implements, is modern.

With dairying as the dominant farm industry, a large percentage of the crops grown are fed on the farm. About one third of the corn crop is fed as silage, and most of the barley is ground for the ration for dairy cattle. Oats are fed likewise, although part of this leading grain crop is sold to local markets for shipment. On the other hand, some oats are shipped into Marine City to supply the local demand. A considerable quantity of feed for dairy cattle is imported in the form of concentrates which are sold locally and mixed to order. With the decline of an outside market for hay, most of the crop is consumed on the farm. As most of the whole milk is sold, dry skim milk is bought at 8 cents a pound, is mixed with about 9 parts of water, and is fed to calves.

A large number of farmers engage in general farming, in conjunction with dairying. Wheat is an important cash crop, but some of it is also used as feed. Navy beans are an important source of income, practically all of them being sold at local elevators, and small surpluses of barley, rye, buckwheat, and potatoes are also sold (pl. 2, A). Sugar beets are hauled to local weighing stations, from which they are hauled to sugar factories at Crosswell, Sanilac County, and Mount Clemens, Macomb County.

The feeding of beef cattle for market is of some importance, chiefly in the northern part of the county. Most of the cattle are western steers, but some are raised on the farms. Beef cattle are commonly taken to Detroit in trucks. In this section, also, a rather large number of sheep are kept, with wool as the main source of revenue. Because of the lack of skim milk, few swine are raised for sale.

Poultry is of importance on many farms in almost every locality, as there is a strong demand for chickens and eggs from the numerous summer residents and in nearby cities and towns. Some of the feed is produced on the farm, but a large quantity is shipped into the county.

Truck crops are grown on a rather large acreage near Port Huron and some of the smaller towns, and large quantities of truck crops, chiefly cabbage, are grown in the vicinities of Berville and Allenton. Most of these crops are shipped to Detroit. Peas and lima beans for canning are being grown near Emmett and North Street, where there are viners, and in the vicinity of Yale where there is a canning factory.

In general, the methods of farming employed are efficient, in that good seed beds are prepared, with sufficient cultivation following when necessary. The hay crops of timothy, red clover, alsike, and sweetclover are seeded with grain crops, usually wheat or barley. The practice of fall plowing is increasing in favor.

Probably the most serious crop losses are sustained because of improper drainage. On the artificially drained land, many of the ditches are either too shallow or they have been allowed to fill with washed-in soil, and in many places a growth of willows along the ditches is an additional hindrance. These drawbacks result in a high

water table and slow removal of surface water after rains. Consequently, on the extensive nearly level areas, farmers are often late in planting crops, and the soils do not warm up early. To offset this condition, deep water furrows are plowed and crops are planted on the ridges between them. Only a very small acreage of land is tile drained.

A very common crop rotation is wheat, hay (left 2 years), corn, and oats. Barley may replace corn in the rotation, or sod may be followed by beans, after which oats are grown.

Some of the common fertilizer mixtures for corn are 2-16-2<sup>4</sup> and 4-16-4, and for wheat, fertilizers such as 2-12-2, 2-12-4, and 2-16-2 are used. Oats and beans receive 2-16-2 or 2-16-4 mixtures. Applications average 150 pounds an acre. Muck soils receive applications of 0-10-10 or 0-10-12 mixtures for sugar beets and 0-16-12 mixtures for corn.

The following varieties of crops are commonly grown: Oats, Worthy and Wolverine; wheat, American Banner and Berkeley Rock; corn, Michigan Yellow Dent, Pickett Yellow Dent, Golden Glow, and Clement White Cap; barley, Spartan, Wisconsin Pedigree, and Michigan Black Barbless (on muck); rye, Rosen; alfalfa, Grimm, Canadian Variegated, and Hardigan; and potatoes, White Rural and Petoskey.

As additional knowledge is gained, with year after year of variety tests and fertilizer experiments, under the supervision of the Michigan Agricultural Experiment Station at East Lansing, the information is made available to the farmers. An annual bulletin on fertilizer recommendations is issued by the station.

#### SOILS AND CROPS <sup>5</sup>

One of the distinctive features of the agriculture of St. Clair County is that nowhere is there an appreciable area, in which one or two crops are grown to the exclusion of others, but the character of the different soils frequently determines the variety or combination of crops to be grown on many farms.

Hay crops occupy by far the greatest acreage, with timothy and red clover leading. Alsike and sweetclover are important hay crops, and the alfalfa acreage is steadily increasing. Timothy and red clover are favored on the soils of good or somewhat imperfect drainage, such as St. Clair silt loam, the Conover soils, and Nappanee silt loam; and alsike is sown more often on the lower wetter areas of such soils as the Brookston, Jeddo, and Allendale. On some abandoned farms hay crops only are growing. The Brookston and Clyde soils, together with burned muck over clay when properly drained, give the best results with alfalfa, because these soils usually contain calcium carbonate from the surface downward, or, at least, within easy reach of the deep-feeding roots.

Oats occupy a much larger acreage than either corn or wheat. This is a crop which is not adversely affected by a cool climate, and

<sup>4</sup> Percentages, respectively, of nitrogen, phosphoric acid, and potash

<sup>5</sup> The soil boundaries and areas along the St. Clair-Macomb County line do not everywhere join. The soil mapped Brookston loam in Macomb County is called Macomb loam in St. Clair County. The differences between the two soils are brought out in the descriptions in this report. Other differences between the two maps are minor, involving slight differences in soil texture and color.

it does well on most of the soils of the county, which are not very high in organic matter. Oats are not favored on muck soils because the growth is too rank and the crop is apt to lodge. Although the average acre yield of oats is between 30 and 35 bushels, yields of 50 or 60 bushels are produced on some farms. Oats do not produce heavily on the lighter sands and loamy fine sands, and this results in reducing the average yield over the county.

Wheat has always been a favored crop because it is well adapted to the extensive light-colored Conover and St. Clair soils and also because it is benefited by the annual winter covering of snow. The matter of drainage is of great importance as affecting wheat yields, owing to the danger of winter-killing on wet land. In many years the more undulating areas of the St. Clair, Conover, and Macomb soils return better wheat yields than the nearly level parts of the Conover, Nappanee, and Allendale soils. Wheat will do well on the Brookston, Wauseon, Brady, and Gilford soils when the underdrainage is sufficiently improved. The average acre yield for the county is between 15 and 25 bushels.

Corn is grown in practically every part of St. Clair County, but the light-colored soils are somewhat less productive of this crop than the dark-colored soils. The soils best adapted to corn are those comparatively high in organic matter, including the Brookston, Clyde, Wauseon, Griffin, and Genesee soils. However, it must be noted that all except the last-named soil have poor natural drainage which must be improved in order to insure maximum corn yields. On many farms drainage has not been undertaken, and the yields on the dark-colored soils in many seasons are no better than on the lighter-colored better-drained soils; in fact, during unusually wet seasons, the yields may be lower. Yields of corn commonly range from 25 to 35 bushels an acre, but the yields are lower on the light sands, deep muck, areas with a hardpan layer in the subsoil, unusually wet soils, and soils which have heavy plastic clay subsoils. Better than average yields are obtained on drained Brookston soils and on St. Clair and Conover soils which have been supplied with organic matter.

Barley has been receiving increased attention during the last few years, and the total acreage in 1929 was fairly large. Barley has largely replaced corn, as it is not only ground and fed to livestock but is also seeded as a hay crop.

White pea beans (navy beans) are well suited to the climate, as there is no long-continued period of hot weather during summer to prevent the setting and filling of bean pods.<sup>6</sup> A fairly large acreage is devoted to beans, but in recent years it has fluctuated with prices received for the crop. Most of the heavy soils and the sandy loams, where properly drained, are adapted to beans. Although average acre yields are between 12 and 15 bushels, well-drained Brookston soils often produce more than 20 bushels.

Rye is grown mainly on the Coloma, Fox, Oshtemo, Plainfield, and Bronson soils. The average acre yield is between 15 and 18 bushels. Buckwheat is grown on a wide range of soils, often taking the place of a crop which has failed. Yields range from 12 to 20 bushels an acre.

Potatoes seldom occupy more than a few acres on a farm, but in the aggregate they are grown on several thousand acres each year,

<sup>6</sup> COX, J. F., and PETTIGROVE, H. R. BEAN GROWING IN MICHIGAN. Mich. Agr. Expt. Sta. Spec. Bul. 129, 21 p., illus. 1924.

on both heavy and sandy soils, but they do best on sandy soils, such as the Fox, Oshtemo, Tuscola, Bronson, and Berrien soils. Allendale fine sandy loam and Wauseon fine sandy loam, with proper drainage, will produce good yields of potatoes.

Sugar beets are grown to some extent, but this crop is not so extensively grown as formerly. With proper drainage, yields ranging from 8 to 10 tons an acre are grown on shallow muck areas, on burned muck over clay, and on the Brookston and Clyde soils. These soils are higher in organic matter, lime, and mineral plant food than the light-colored St. Clair and Conover soils which are not nearly so well adapted to the crop.

Truck crops are grown near Port Huron on the sandy Berrien, Allendale, Newton, Brady, Oshtemo, and Gilford soils. With proper attention to the maintenance of fertility and to drainage, good results are obtained. Near Berville and Allenton, Conover loam is the principal soil used for growing cabbage, cauliflower, cucumbers, tomatoes, and carrots.

The soils of St. Clair County are dominantly heavy textured, being chiefly silt loams and loams, but they range from fine sand to heavy clay. They include a comparatively large total area of lighter-textured soils ranging from heavy sandy loam to loose sand. Muck and peat soils are locally important. Based on natural drainage conditions, which have imposed the most important differences in characteristics, the soils are divided into three groups as set forth in table 4. In addition to the soils listed in the three groups, four classes of miscellaneous soil material, which are mainly nonagricultural, have been differentiated and mapped, and include rough broken land, made land, marsh, and coastal beach.

TABLE 4.—*Soil groups in St. Clair County, Mich*

Group	Description	Soil type	Group	Description	Soil type
1-----	{ Well-drained soils	St. Clair silt loam Tuscola very fine sandy loam Fox fine sandy loam Fox fine sandy loam, rolling phase Oshtemo loamy fine sand Plainfield fine sand Coloma loamy fine sand Bridgman fine sand Genesee fine sandy loam Conover silt loam Conover loam Nappanee silt loam Macomb loam. Gilford loam Bronson loam Bronson loam, light-textured phase Bronson loamy fine sand Brady fine sandy loam Berrien loamy fine sand Berrien fine sandy loam	3-----	{ Poorly drained soils	(Brookston clay loam. Brookston silt loam. Brookston loam Clyde loam Toledo clay. Bono clay. Jeddo silty clay loam Jeddo silt loam Colwood very fine sandy loam Colwood loam Maumee loam Allendale fine sandy loam Wauseon fine sandy loam. Granby loamy fine sand. Newton loamy fine sand. Saugatuck fine sand Griffin loam Carlisle muck Rifle peat Greenwood peat Burned muck
2-----	{ Imperfectly drained soils				

The soils of group 1 cover 9.7 percent of the area of the county; of group 2, 50.6 percent; and of group 3, 36.7 percent.

Although in parts of St. Clair County a certain soil type predominates, no large areas occur in which there are not at least two or more kinds of soil. In fact, between Smiths Creek and Starrville, some of the heavier soils are so thickly dotted with low sandy mounds

and knolls that sand-spot symbols are used on the map to indicate such a general condition. North of Capac, one area of muck is continuous for about 5 miles.

In the following pages of this report the soils of St. Clair County are described in detail and their agricultural relationships are discussed, their location and distribution are shown on the accompanying soil map, and their acreage and proportionate extent are given in table 5.

TABLE 5—*Acreage and proportionate extent of soils mapped in St. Clair County, Mich*

Type of soil	Acres	Per- cent	Type of soil	Acres	Per- cent
St Clair silt loam.....	21,632	4 7	Toledo clay.....	1,984	0 4
Tuscola very fine sandy loam.....	1,280	3	Bono clay.....	1,088	. 2
Fox fine sandy loam.....	1,472	3	Jeddo silty clay loam.....	5,696	1. 2
Fox fine sandy loam, rolling phase.....	192	1	Jeddo silt loam.....	2,170	. 5
Oshetmo loamy fine sand.....	3,904	8	Colwood very fine sandy loam.....	3,778	8
Plainfield fine sand.....	10,880	2 3	Colwood loam.....	1,472	. 3
Coloma loamy fine sand.....	1,472	3	Maumee loam.....	1,408	3
Bridgman fine sand.....	1,408	3	Allendale fine sandy loam.....	43,392	9 3
Genesee fine sandy loam.....	3,008	6	Wauseon fine sandy loam.....	7,552	1 6
Conover silt loam.....	91,778	19 7	Granby loamy fine sand.....	448	1
Conover loam.....	33,472	7 2	Newton loamy fine sand.....	6,592	1 4
Nappanee silt loam.....	47,936	10 3	Saugatuck fine sand.....	1,728	4
Macomb loam.....	8,064	1 7	Griffin loam.....	11,008	2 4
Gilford loam.....	768	2	Carlisle muck.....	5,824	1 3
Bronson loam.....	512	1	Rifle peat.....	1,536	3
Bronson loam, light-textured phase.....	384	1	Greenwood peat.....	384	1
Bronson loamy fine sand.....	1,280	3	Burned muck (over clay).....	18,752	4 0
Brady fine sandy loam.....	3,136	7	Burned muck (over sand).....	1,216	3
Berrien loamy fine sand.....	32,704	7 0	Marsh.....	11,392	2 4
Berrien fine sandy loam.....	15,296	3 3	Coastal beach.....	256	1
Brookston clay loam.....	18,368	4 0	Rough broken land.....	1,664	4
Brookston silt loam.....	30,080	6 5	Made land.....	512	1
Brookston loam.....	3,072	7			
Clyde loam.....	2,688	6			
			Total.....	464,640	-----

#### WELL-DRAINED SOILS

The well-drained soils of group 1 are characterized by light-brown or grayish-brown surface soils and yellow or reddish-brown subsoils. Very little organic matter has accumulated in the soils of this group. These soils commonly occupy comparatively narrow ridges and rolling or slightly hilly country, where drainage is naturally good, or they consist of such loose pervious sandy material that water readily drains away through the subsoil and substratum.

**St. Clair silt loam.**—St. Clair silt loam is the principal member of the well-drained group of soils. It occurs largely in the northern part of the county, where it occupies the higher ridge positions. Its total area is 21,632 acres.

The content of organic matter is not high, and the surface soil of plowed or cultivated fields assumes an ash-gray color when dry. The surface soil is silt loam which is readily worked into favorable tilth. The subsoil is silty clay loam which is rather hard when dry and plastic when moist. Its structure and consistence, however, are such as to allow the penetration of plant roots. The lower subsoil layer, or substratum, is heavy calcareous glacial till. The surface soil, to a depth of 8 or 9 inches, is medium or slightly acid, and the subsoil is neutral in its upper part, but it becomes more alkaline (sweeter) with depth.

**Tuscola very fine sandy loam.**—Tuscola very fine sandy loam, although a minor soil as regards total area, is of some agricultural

importance, being well-drained, fertile, and easily worked. The surface soil is light grayish-brown very fine sandy loam which overlies yellowish-brown or light reddish-brown friable clay or heavy very fine sandy loam. The substratum consists of silt and very fine sand. This soil occurs only in close proximity to St. Clair River.

**Fox fine sandy loam.**—Fox fine sandy loam has a plow-soil layer of grayish-brown or light-brown fine sandy loam. The subsurface layer, to a depth ranging from 10 to 18 inches, is light yellowish-brown or reddish-yellow sandy loam which becomes heavier with depth. The subsoil consists of sticky reddish-brown material, from 3 to 8 inches thick, having a sandy clay loam or sandy clay texture. It is underlain abruptly by a substratum consisting of beds of gray calcareous stratified gravel and sand.

This is a friable soil, easily maintained in good tilth. It is not extensive and occurs in small scattered areas, most of which are level or nearly level. It is recognized as a good farming soil, and nearly all the land is cleared.

**Fox fine sandy loam, rolling phase.**—The rolling phase of Fox fine sandy loam differs from the typical Fox soil in its more rolling or rougher surface relief and in the presence of stones and boulders in places on the surface and through the soil. Some of the slopes are subject to erosion, and this fact, together with the greater difficulty of tillage caused by less favorable surface relief, renders such areas less valuable for agriculture than are the smoother, more nearly level areas of typical Fox fine sandy loam. The gravel substratum material of this soil is used in many places for road building and commercial purposes, and gravel pits are common in such areas.

**Oshtemo loamy fine sand.**—Oshtemo loamy fine sand has a 4-inch surface layer of grayish-brown loamy sand or loamy fine sand, which grades into yellowish-brown material of the same texture. The presence of a small proportion of gravel is not uncommon. In the next layer are the chief differences between this soil and the Fox soils. Instead of the very clayey subsoil of the Fox soils, which is hard when dry, Oshtemo loamy fine sand has a reddish-brown sandy and gravelly layer which contains less clay and silt and in which, even when wet, there is little coherence of the mineral soil particles. This layer occurs between depths of 15 and 30 inches, and, with the layers above, shows an acid reaction. Below a depth of 30 inches the material is stratified slightly calcareous sand and gravel.

Most of this soil in St. Clair County occupies comparatively narrow ridges trending nearly north and south. The total area is small, and the soil is of minor agricultural importance. Drainage ranges from good to excessive. Because of their slight elevation and good drainage, many areas are favored locations for farmsteads. Although the soil is warm and readily worked, it is of low or only moderate natural fertility.

**Plainfield fine sand.**—Plainfield fine sand, to a depth ranging from 5 to 8 inches, is light grayish-brown loamy fine sand poorly supplied with organic matter. This layer is underlain by incoherent light yellowish-brown fine sand. The substratum, below a depth of 2 feet, is yellow or grayish-yellow pervious unconsolidated fine sand continuing to a depth of 5 or more feet with practically no change, except for iron stains and a few gray mottlings in the lower part. The soil is acid to a depth exceeding 3 feet.

In St. Clair County the areas of this soil are rather small and scattered. Two of the larger bodies occur southeast of Ruby, a narrow area borders the shore of Lake Huron, and a few areas are in the neighborhood of Thornton and Snyderville. Topographically the soil occupies low ridges, small sand plains, and stream terraces. It is inclined to be droughty, as its sand content is so loose and pervious that it cannot easily retain soil moisture, organic matter, or mineral plant food.

**Coloma loamy fine sand.**—Coloma loamy fine sand is similar in soil characteristics to Plainfield fine sand. In general, it carries a somewhat higher proportion of fine-earth material, in places has stones or boulders on the surface and through the soil, and occupies areas of rolling or distinctly undulating relief. The areas are small and scattered. Owing to its small total area, low fertility, droughtiness, susceptibility to blowing, and, in places, unfavorable relief, this soil is of minor agricultural importance in St. Clair County.

**Bridgman fine sand.**—Bridgman fine sand is a very inextensive soil type in St. Clair County. It consists of deep deposits of loose fine sand accumulated in dune form by wind action. Owing to unfavorable location and surface relief, to low fertility, and to the loose, pervious character of the soil material, this soil is not important in the agriculture of the county. The areas lie near Lake Huron.

**Genesee fine sandy loam.**—The first-bottom land of St. Clair County is of slight agricultural importance. The total area is small, the land is restricted to rather narrow bottoms subject to overflow, and in places it is poorly drained.

Typical Genesee fine sandy loam consists of very dark grayish-brown fine sandy loam which continues to a depth of 4 inches and is underlain to a depth of 15 inches by dark grayish-brown fine sandy loam. The color becomes lighter with depth, changing to dark brown or yellowish brown. It is a recently formed soil and is still changed through deposition or removal by stream currents. Hence it is not uniform in its characteristics. In places, a 6- or 8-inch layer of brown fine sandy loam covers very pale yellow or yellowish-gray fine sandy loam or fine sand. The gray color is contributed by the light-colored sand of recent deposits.

Genesee fine sandy loam is mapped along Black River and Mill Creek. Drainage is generally good. The relief is somewhat uneven, and in places old channels or depressions are wet. About 95 percent of the land is used as pasture. The forested areas support a growth of elm, oak, ash, beech, and willow. Where cleared and cultivated, the soil yields good crops, especially of corn, in favorable seasons, but its best present use is probably as pasture.

#### IMPERFECTLY DRAINED SOILS

The soils of group 2 have been formed under conditions of imperfect drainage. However, drainage has not been so poor as to allow the accumulation of an extensive amount of organic matter in the surface soils, and instead of being distinctly dark colored they are merely gray or grayish brown. Conditions of imperfect drainage have been imposed on these soils, because they occupy nearly level positions or because of the presence of a heavy clay layer at various depths below the surface. In either case, the resultant color in the subsoil is yellow, with some mottling of gray.

**Conover silt loam.**—Conover silt loam is the most extensive soil in St. Clair County, occupying 19.7 percent of the entire area. The continuity of the areas of this soil is interrupted by bodies of other soils, very commonly the lower-lying Brookston or Jeddo soils, or by higher ridges of sandy soils.

Conover silt loam is characterized by a medium content of organic matter in the surface layer which is 7 or 8 inches thick and dark gray in color. Developed in a smooth or nearly level country, drainage conditions are marked by the slow removal of surface water and also by slow internal drainage. Although the subsoil is somewhat gritty and friable, it is sufficiently dense to check the free downward movement of moisture, and the soil is mottled yellow, brown, and gray in color. The surface layer is medium or somewhat strongly acid. The degree of acidity decreases with depth, and at a depth ranging from 24 to 30 inches, the subsoil is "sweet", or alkaline.

Conover silt loam occurs in large, but not unbroken, areas extending from the vicinity of Bouvier Bay, in the southern part of the county, northward and northwestward to the northern county line.

The surface relief of most of the land is level or nearly flat, but in some parts of the county it ranges from gently sloping to slightly undulating. Owing to the level surface, the more or less heavy subsoil, and the low position of the soil, artificial drainage is necessary for best results in farming. All the land under cultivation is drained, for the most part, into ditches along the roads, by laterals leading into them from adjacent fields.

Conover silt loam is an important and productive soil where properly drained. Approximately 80 percent of the land is cleared and cultivated or is used for pasture. Wood lots on most farms are from 2 to 10 acres in extent. The original tree growth consisted mainly of elm, maple, oak, beech, hickory, and ash. The land is cropped to corn, oats, wheat, clover, timothy, sugar beets, and beans. This is considered a fair or good corn soil, and yields in favorable seasons range from 30 to 70 bushels an acre. Wheat yields from 20 to 40 bushels and oats from 35 to 65 bushels, with an average of about 40 bushels. The soil is well suited to grass, and yields of timothy and clover range from 1½ to 2 tons an acre. Both alsike and red clover are "seeded down." Sugar beets are grown as a special crop.

**Conover loam.**—Conover loam, which is closely related to Conover silt loam, occurs for the most part in two sections of St. Clair County. One, where Conover loam dominates the agriculture, is in the western part, in Berlin and Riley Townships, and the other is an elongated strip in the northeastern part, extending northward from near the village of Wadham to the county line. In both sections, Conover loam, which is the dominant soil, is the basis of a comparatively prosperous agriculture.

The surface layer of Conover loam is brownish-gray or dark grayish-brown friable mellow loam to a depth of 5 or 6 inches, where it grades into light yellowish-brown or light grayish-brown silt loam or silty clay loam, with brown and gray mottlings. The subsurface layer may become heavier and more plastic with depth. The subsoil, at a depth ranging from 15 to 25 inches, is dull yellowish-brown or brownish-yellow slightly compact silty clay loam or sandy clay loam, mottled with gray and rust brown. It is underlain by a mass of mixed friable

calcareous material. Quantities of stone and gravel are scattered over the surface and through the soil.

Conover loam, because of a slightly more workable surface soil and a less dense more pervious subsoil, is somewhat more productive in normal seasons than Conover silt loam. Like the silt loam it is used as a general-farming soil.

**Nappanee silt loam.**—Nappanee silt loam, with an extent of 47,936 acres, is of considerable agricultural importance in St. Clair County. It has many of the features of the Conover soils, the principal difference being that it has a heavy plastic subsoil which renders the movement of water and penetration by roots of crops extremely difficult. The surface soil in fields is inclined to puddle during rains and bake on drying. Particularly in Greenwood Township, Nappanee silt loam is more "sour", or acid, than are the Conover soils.

Nappanee silt loam, to a depth of 4 or 5 inches, consists of light-brown or grayish-brown friable silt loam. The subsurface material is a shade lighter in color, is mottled with gray and yellow, and ranges in texture from silt loam to silty clay loam which becomes heavier with depth. This is underlain by heavy impervious brown or yellowish-brown calcareous clay. Lime concretions are present at a depth ranging from 4 to 5 feet. The parent material is heavy unweathered calcareous till. Small areas of Nappanee silty clay loam have been included in mapped areas of this soil, though, as a whole, it is very uniform in texture and color.

Nappanee silt loam occurs in fairly large areas in the southern part of the county south of Smiths Creek, and it is extensively developed in Greenwood Township in the northern part.

The surface relief is flat or gently sloping, and subsurface drainage is naturally poor, owing to the heavy texture and the impervious condition of the subsoil. Satisfactory artificial drainage is difficult to establish.

Nappanee silt loam is recognized as a strong soil, and because of its fertility nearly all the land is in cultivation. It is hard to cultivate, however, because of its heavy texture, plastic consistence, and tendency to bake and become cloddy if plowed when too wet. In long dry periods it may crack and open to a depth of 10 or more inches. This is good grassland, and clover and timothy grow well on it. Oats, wheat, and corn are the principal grain crops, and the soil is well suited to them. Corn yields from 30 to 80 bushels an acre; wheat, from 12 to 30 bushels; and oats, from 30 to 50 bushels.

**Macomb loam.**—Macomb loam is one of the less extensive soil types of the county. It is associated with the Conover and Nappanee soils, from which it is distinguished by a somewhat darker colored surface soil, a distinct and characteristic yellow color in the subsoil, and a greater general tendency to stoniness. Although natural drainage is poor, the subsoil of Macomb loam is comparatively loose and permeable, and when the land is artificially drained and cleared of stone it forms good productive farm land, well adapted to corn, oats, and pasture. Most of the areas are in a north-and-south belt through the central part of the county.

**Gilford loam.**—The 10- or 12-inch surface layer of Gilford loam consists of dark grayish-brown loam or fine sandy loam, which is neutral or very slightly acid in reaction. This grades into light-brown rather sticky sandy clay, in which, in most places, are embedded

various quantities of gravel. Fine material is not everywhere present in this layer in sufficient quantity to impart the characteristic stickiness, and in the extreme condition the texture is gravelly light sandy loam. The next lower material is gray wet sand, below which is heavy clay.

Gilford loam is a very inextensive soil type. It occurs in small bodies associated with Conover, Nappanee, and other soils, in conjunction with which it is farmed. Where drained it has the same general uses and agricultural value as Conover loam.

**Bronson loam.**—Bronson loam exhibits only slightly poorer drainage than the Fox and Oshtemo soils, to which it is closely related. Bronson loam has a somewhat darker surface soil but has a sandy clay or gravelly sandy clay subsoil similar to that of the Fox soils lying over gravel deposits. However, it differs from the Fox soils, in that heavy clay is reached at a depth ranging from 4 to 8 feet, with a consequent higher ground-water level. Being of small total area, Bronson loam is of only slight agricultural importance in St. Clair County. Most of the areas occur as low ridges, such as those north of Algonac in the extreme southern part of the county.

**Bronson loam, light-textured phase.**—The light-textured phase of Bronson loam is similar to typical Bronson loam throughout, except that the surface soil has a higher content of fine sand or sand. The total area is small, and the soil, where cultivated, is used in connection with the adjoining soils.

**Bronson loamy fine sand.**—Bronson loamy fine sand is similar to Oshtemo loamy fine sand. It consists of a layer of loose sand or fine sand, with which is mixed some gravel, underlain by a thin layer of gritty gravelly coherent yellowish-brown clay which lies at a depth ranging from 2 to 3 feet below the surface. Beneath the clay layer is somewhat splotched or mottled pale-yellow and gray gravelly sand which rests on heavy clay at a depth ranging from 4 to 5 feet below the surface. This soil is of small total extent and of slight agricultural importance. It typically occupies low ridges and is associated with Oshtemo loamy fine sand.

**Brady fine sandy loam.**—Brady fine sandy loam has a sandy clay or gravelly sandy clay subsoil which exhibits more accentuated imperfect drainage characteristics than the subsoils of the Bronson soils. The poor drainage is caused by the presence of heavy clay at a slighter depth or by the low position of the areas, which prevents good natural drainage.

The topsoil of Brady fine sandy loam consists of dark-gray or dark brownish-gray sandy loam underlain, at a depth ranging from 8 to 12 inches, by pale-yellow sandy loam containing some gray mottling. The subsoil consists of plastic slightly compact pale-yellow or yellowish-brown gritty sandy clay, with gray and yellow mottlings. This material grades, at a depth of 24 or 28 inches, into gray sand and gravel, which is slightly coherent when wet. The substratum is similar to that underlying the Fox soils, but the sand is somewhat mottled.

The total extent of Brady fine sandy loam is small. It occurs in small areas associated with the Fox and Oshtemo soils. The land is flat or undulating, this soil usually occurring in depressions a little below the surrounding soils.

This is a comparatively unimportant soil, but the larger areas are cleared and farmed in connection with adjoining soils. The land is suited to general farming and to pasture.

**Berrien loamy fine sand.**—Where cultivated, Berrien loamy fine sand is grayish-brown fine sand or fine sandy loam, grading, at a depth ranging from 8 to 12 inches, into brownish-yellow or yellow loamy fine sand. The subsoil, occurring at a depth ranging from 18 to 24 inches, is pale-yellow loamy fine sand or sand with rust-brown, yellow, and gray mottlings. In most places, the lower part of the subsoil grades, at a depth of about 30 inches, into gray fine sand splotted or mottled with yellow.

The virgin (uncultivated) soil is marked by a very light gray or nearly white fine sand layer beneath the forest litter, sharply set off below from a distinctly rust brown loamier material.

Berrien loamy fine sand is intermediate between the poorly drained Newton soils and the very well drained Plainfield soils. Consequently variations are included, which show characteristics of each of those two soils. Areas of Berrien loamy fine sand are ridgy, slightly undulating, or moundy and billowy. The variations in the soil are determined to a large extent by the surface relief and position, as these factors affect drainage. On the higher elevations, the surface soil is usually dark-brown or brownish-gray fine sandy loam or loamy fine sand, which grades into yellow loamy fine sand underlain by pale-yellow fine sand, with rust-brown and gray mottlings. It differs from the Plainfield soils in the darker surface soil and the mottled subsoil. On the lower elevations and in depressions between mounds and ridges are spots of dark-gray fine sandy loam grading downward into brownish-yellow loamy fine sand containing yellow and gray mottlings and underlain by mottled gray and yellow fine sand. In many places, at a depth ranging from 4 to 6 feet, the substratum consists of heavy bluish-gray impervious clay.

This soil occurs in a number of areas throughout the central and eastern parts of the county. A large irregular body lies in the neighborhood of Sparlingville, and areas occupy slightly elevated positions on the St. Clair flats.

**Berrien fine sandy loam.**—Berrien fine sandy loam has a surface layer, from 7 to 10 inches thick, of dark grayish-brown fine sandy loam or loamy fine sand. The subsurface material is yellowish brown, or mottled yellow and gray, and ranges in texture from fine sandy loam to fine sand. This material grades downward into pale-yellow and gray fine sand or sand, the gray color increasing with depth. At a depth ranging from 3 to 5 feet, it is underlain abruptly by mottled yellow and bluish-gray impervious clay.

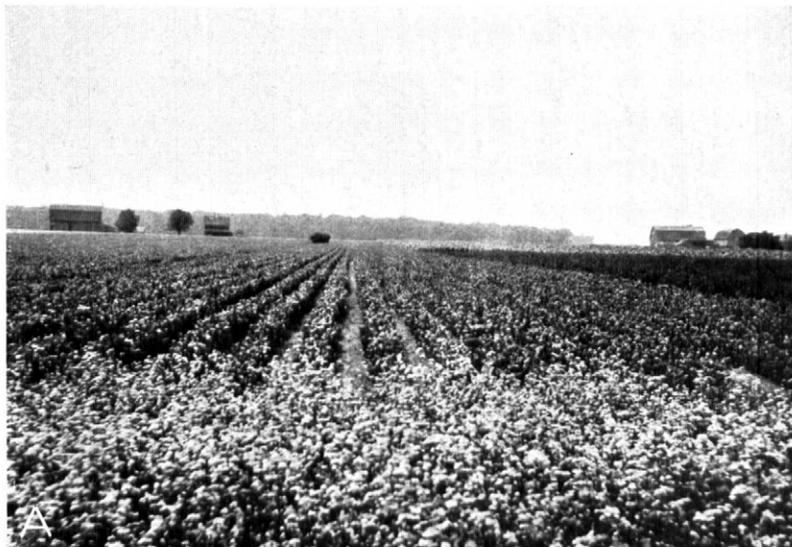
This soil is of slight agricultural importance and of small extent in the county. Owing to its occurrence in small areas, no particular kind of agriculture has been developed on it, but it is farmed in connection with other soils. It is recognized as fairly good farm land but better adapted to potatoes, some garden vegetables, truck crops, and fruit than to hay and grain crops, with the exception of rye. It is warm, easily worked, and retentive of moisture.

#### POORLY DRAINED SOILS

In group 3 are soils which have formed under conditions of poor natural drainage. As they occupy low basins and flats, conditions



A, Deep entrenchment of Black River,  $2\frac{1}{4}$  miles due east of Fargo, showing erosion of steep slope  
B, Dairy farm on Conover loam, three fourths mile southeast of Allenton



A. Crops grown on nearly level land,  $1\frac{1}{4}$  miles north of Berville. Buckwheat in foreground, navy beans and potatoes in center, and corn at extreme right. B. Area of Brookston clay loam showing sand spots,  $2\frac{1}{4}$  miles southeast of Peters, bordered by higher billowy areas of Altendale fine sandy loam.

have been favorable for the accumulation of organic matter, consequently the surface soils are dark, and prolonged saturation of the soil has resulted in gray being the predominant color of the subsoil.

**Brookston clay loam.**—In the group of soils which originally had poor drainage, the Brookston soils are the most extensive, occupying 11.2 percent of the area of the county. Of the Brookston soils, the clay loam is the most extensive and characteristic. Locally it is called "blue-clay soil". It has a dark-gray clay loam surface soil and a heavy clay subsoil, in which gray is the dominant color. The substratum material is heavy calcareous glacial till. This soil was formed in low wet situations, where drainage was very slow, owing partly to the physiographic position and partly to the dense character of the soil material. These low places received plant food in the form of organic matter which accumulated in the soil and from mineral matter brought in from the higher elevations and has suffered little loss from leaching, so that the soil, as it now occurs, contains a higher percentage of the elements essential to plant growth than the light-colored soils in higher positions. In most places, artificial drainage has been necessary to bring Brookston clay loam under the plow. In St. Clair County the surface soil shows a wide range in reaction to acid. Some of the areas are neutral or alkaline, which is normally the case with Brookston soils, but in this county some areas are medium or slightly acid. In most places, the subsoil is alkaline below a depth ranging from 18 to 24 inches.

Brookston clay loam occurs most extensively in the eastern and southern parts of the county, the largest single area lying in the extreme southern part. A characteristic feature of the soil in this and nearby areas is the presence on the surface of numerous low small sandy mounds (pl 2, B) not sufficiently large to indicate as different soils on the soil map but sufficiently numerous and conspicuous to have some bearing on the fertility and use of the land. In general, the layer of sand or fine sand, where not too thick, improves the physical or tillage properties of the soil but slightly reduces the chemical fertility. Under cultivation the sand becomes spread around and incorporated with the soil.

This soil, where properly drained, is a valuable and fertile general-farming soil. It is particularly well adapted to corn, oats, hay, and sugar beets, and it produces good pasture.

**Brookston silt loam.**—Brookston silt loam is similar to Brookston clay loam, except for a somewhat higher content of silt throughout. The surface soil, where cultivated, is loose mellow dark-gray or dark grayish-brown silt loam, 6 or 8 inches thick. The subsoil and substratum layers are like those of Brookston clay loam, except that they are somewhat less dense and are readily drained.

Brookston silt loam occurs in the western and southern parts of the county, chiefly as small irregular areas. Where properly drained it is a fertile durable soil, rich in organic matter and other elements of soil fertility. Most of it is farmed in conjunction with lighter-colored upland soils.

**Brookston loam.**—Brookston loam is agriculturally the least important and is the least extensive soil type of the Brookston series. It differs from Brookston clay loam in having a looser sandier surface soil and a grittier more pervious subsoil and substratum. It occurs

in a few comparatively small areas in the western and southwestern parts of the county. Like the other Brookston soils, it is fertile and durable where properly drained and because of its favorable texture is readily kept in good tilth. Its importance in the agriculture of the county is limited by its small total area.

**Clyde loam.**—Clyde loam is similar to Brookston loam, except that it has a much darker and deeper surface soil containing a higher percentage of organic matter. The subsoil material is similar, though it is more distinctly gray throughout, owing to extremely poor natural drainage. This soil occupies only a small total area, mainly in the southern part of the county. Like Brookston loam, it is a very fertile soil and is highly productive when properly drained.

**Toledo clay.**—Toledo clay and Bono clay are the heaviest textured of the dark-colored poorly drained soils of St Clair County. Toledo clay is closely related to Brookston clay loam, having similar colors in the different soil layers. It differs from that soil in having a very heavy clay surface soil, smooth plastic clay subsoil, and smooth plastic clay substratum, which in most places is free from grit and pebbles.

Toledo clay, so far as chemical composition is concerned, is a fertile soil rich in organic matter, not generally acid, and with a good supply of lime in the lower part of the subsoil. It is, however, difficult to cultivate because of its heavy texture and denseness. Drainage is difficult, because of the nearly flat surface relief and dense impervious subsoil. With the exception of the thoroughly drained areas, the land is most successfully used for hay and pasture. This soil occurs chiefly in the southern part of the county.

**Bono clay.**—Bono clay has a very dark gray or black clay surface soil ranging from 8 to 12 inches in thickness. The upper part of the subsoil is dense dull-gray clay. Below a depth ranging from 20 to 30 inches is the substratum material consisting of gray or slightly reddish gray smooth calcareous clay which is apparently water-laid. Bono clay is similar to Toledo clay, except in the darker color and greater thickness of the surface soil of the Bono soil, indicating a somewhat higher content of organic matter. The soil occurs mainly in the southern part of the county and its total area is small.

**Jeddo silty clay loam.**—Jeddo silty clay loam is a soil occurring on the poorly drained flat or gently undulating plains of St Clair County. In most respects it is similar to the Brookston soils. The color of the cultivated surface soil, like that of the Brookston soils, is gray or dark gray, and the texture is heavy silt loam or silty clay loam. The subsoil is dense heavy silty clay, mottled yellow, brown, and gray in color. The substratum material is heavy dense glacial till or, possibly, in places, water-laid clay. The chief point of difference between the Jeddo soils and the Brookston soils is in the medium or high acidity of the Jeddo soils. This acid reaction is manifested in the surface layers, the subsoil, and the substratum material to a depth of 40 or more inches. The acidity is probably caused by a large amount of acid shale material in the soil.

Jeddo silty clay loam is somewhat denser and more intractable than most of the Brookston soils. It is, in general, not so desirable for the crops commonly grown in the county as are the Brookston soils. It occurs in the northern part, principally northwest of Ruby.

**Jeddo silt loam.**—Jeddo silt loam is similar throughout to Jeddo silty clay loam, except that it has a siltier or loamier surface soil and

a more gritty and more pervious subsoil. It is a slightly better soil for cultivated crops, although it is of slight agricultural importance because of its small total area. Like Jeddo silty clay loam, it occurs in the northern part of the county.

**Colwood very fine sandy loam.**—Colwood very fine sandy loam is the principal soil on several of the larger islands lying at the entrance of St. Clair River into Lake St. Clair. The surface soil is 10 or 12 inches thick and is very high in organic matter which imparts a black color. Below a depth ranging from 10 to 15 inches, the dark-colored soil overlies wet very fine sandy loam which is gray, mottled with yellow. The soil is strongly alkaline throughout.

Many variations are noticeable in the material below the dark surface layer, the principal one being the occurrence of light-textured fine sandy loam or loamy fine sand. In other places, this same material may underlie the typical very fine sandy loam at a depth ranging from 24 to 30 inches. At several places, wet medium or coarse sand and fine gravel are present at a depth ranging from 30 to 40 inches.

Where areas of this soil approach the margins of true marsh, the upper black layer contains a higher percentage of organic matter and is usually thicker. During the present survey, when the water in the lake was at a high level, some areas of Colwood very fine sandy loam were classified as marsh. Such areas are a comparatively high lying phase of true marsh. Reeds, rushes, and other marsh vegetation are absent, but water stands on the land to a depth ranging from 6 to 12 inches. To a depth ranging from 10 to 15 inches the very fine sandy loam is mixed with a very high percentage of organic matter, and it overlies saturated sandy material. Hay has been mowed from some of the low areas, when the water level has not been so high. At one time, wild and tame hay were important sources of income, but low prices have practically destroyed the hay industry, except locally.

The winter population of the islands has been estimated at about 100 people. A number of farms are on Harsens Island, the products of which are corn, oats, buckwheat, clover and timothy hay, vegetables, poultry, eggs, milk, and a little fruit.

**Colwood loam.**—Colwood loam differs from Colwood very fine sandy loam in having a more silty surface soil, in most places containing more silt and clay and correspondingly less fine sand and very fine sand throughout the soil. Areas of this soil occur only near St. Clair River in the southern part of the county. The total area is small, much of the land being suburban or urban property, and the soil is of slight agricultural importance in St. Clair County.

**Maumee loam.**—The 6-inch surface layer of Maumee loam is a mixture of black finely divided muck and an appreciable amount of gray fine sand, giving a general salt-and-pepper appearance. The structure may be fine granular or granular. Between depths of 6 and 18 inches the material is very dark gray sand mixed with small aggregates or granules of organic matter. This grades into light grayish-brown sand continuous to a depth of about 35 inches. Between depths of 35 and 44 inches is a mass of wet dull-gray sand and small angular gravel. Water is held in this layer by underlying light grayish-brown, yellow, and gray plastic clay. The entire soil is alkaline in reaction.

Maumee loam is similar to Clyde loam in its surface soil and upper subsoil layer but differs from that soil in the composition of the lower subsoil layer and substratum material which is sandy rather than heavy clay or clay loam. This is a very inextensive soil in St. Clair County.

**Allendale fine sandy loam.**—Over part of the lake plain of eastern and southern St. Clair County the soil is developed from a layer of fine sand which was deposited over a heavy clay base. Where the sand layer ranges from only 2 to 3 feet in thickness and the surface is nearly flat, drainage has been poor, and dark-colored soil has formed. Allendale fine sandy loam is the most extensive soil of that kind.

Distinguishing features of this soil are the dark-gray fine sandy loam surface soil, the gray or mottled sandy subsoil, the presence of a coffee-colored layer at a depth ranging from 8 to 12 inches below the surface soil, and the occurrence of heavy clay beginning at a depth ranging from 2 to 3 feet. The coffee-colored layer, ranging from 6 to 12 inches in thickness, consists of sand which is weakly or rather firmly cemented together, approaching a true hardpan. This layer tends to check the development of deep-rooted crops as well as the movement of moisture. The soil is very strongly acid to a depth within a few inches of the heavy clay which is generally alkaline.

Because of its large area, Allendale fine sandy loam has some significance in the agriculture of the county. Where properly drained and improved, it is considered a fair soil for the production of corn, oats, buckwheat, beans, potatoes, and timothy hay. It is well adapted to cucumbers and certain other truck crops. The productivity of this soil is variable, owing chiefly to variations in the soil itself as mapped. It grades on the one hand, into areas of Wauseon and Brookston soils, which are more fertile soils, and on the other, toward the Saugatuck soils which, because of their sandy texture throughout, high acidity, and well-developed hardpan, are less fertile.

**Wauseon fine sandy loam.**—Wauseon fine sandy loam, like Allendale fine sandy loam, is derived from a deposit of fine sand overlying clay. It differs from Allendale fine sandy loam in being slightly higher in content of organic matter, in being "sweet", or neutral to alkaline, in reaction throughout, and in lacking the hardpan layer characteristic of the Allendale soil. In all these respects it is a somewhat better soil for most crops, although it has about the same range of adaptation as the Allendale soil. It is particularly better adapted to red clover, sweetclover, and alfalfa than is Allendale fine sandy loam.

Wauseon fine sandy loam is not extensive in St. Clair County, the individual areas, which lie largely in a north-and-south belt through the central part, being small and scattered.

**Granby loamy fine sand.**—To a depth of about 12 inches, Granby loamy fine sand consists of a mixture of fine sand and organic matter, resulting in a loamy fine sand texture. The proportion of organic matter present governs the color of the material, but the basic color in most places is very dark gray or almost black, with numerous gray particles of fine sand showing in it. This dark layer is underlain to a depth ranging from about 40 to 50 inches by dull-gray loamy fine sand which may be mottled somewhat with yellow or yellowish brown in the lower part. The next lower layer may be gray sand and gravel or gray plastic clay. The entire soil is alkaline in reaction.

Granby loamy fine sand is of small extent, occupying small poorly drained areas. It is a moderately productive soil, when drained and improved, and is better adapted to such crops as lettuce, celery, and other truck crops than to grain crops and sugar beets.

**Newton loamy fine sand.**—Newton loamy fine sand is similar in general appearance and composition to Granby loamy fine sand. It contains somewhat less organic matter in the surface soil and is therefore less loamy. It is also acid in most places to a depth of more than 3 feet.

Newton loamy fine sand occurs only in small areas, mostly in association with Berrien loamy fine sand. It is not regarded as a highly productive soil and is considered of comparatively low agricultural value because of its poor natural drainage, low average fertility, and sandy texture.

**Saugatuck fine sand.**—The surface layer of Saugatuck fine sand is dark-gray loamy sand 5 or 6 inches thick. Below this is a highly leached layer of grayish-white loamy sand. At a depth of about 18 inches, a 12-inch coffee-colored hardpan or layer of sand showing strong organic coloring and some degree of cementation occurs. Between depths of about 30 inches and several feet the material is yellow sand mottled somewhat with gray. This layer shows a moderately acid reaction, but above it the material is highly acid.

Saugatuck fine sand occurs mostly in the east-central part of the county generally associated with Berrien loamy fine sand. It occupies low situations and in general appears nearly level, though it is marked by many small low hummocks and intervening hollows. Drainage is poor. Approximately 35 percent of the total acreage is cultivated, the remainder being covered with small aspen, dewberry, and ferns. The crops grown are potatoes, corn, hay, and some cucumbers. Yields are poor or medium.

This soil is highly acid, is poorly drained, and according to analyses is deficient in the elements essential for crops.

**Griffin loam.**—Griffin loam occurs in comparatively narrow strips along the numerous streams within St. Clair County. Most of the land is subject to overflow and in its natural state has poor drainage. The surface soil is high in organic matter, but the mineral soil is variable in its content of clay, silt, and sand.

**Carlisle muck.**—Carlisle muck is well decomposed and is black rather than brown. The surface material is finely divided and granular. When moist, the muck below the 4- or 5-inch surface layer is a compact black soft mass, but where it has the opportunity of drying out, as along ditch banks, it becomes hard and breaks up into irregular blocks from one fourth to one half inch in diameter. The reaction is neutral or alkaline. A large proportion of this muck is underlain at a depth ranging from 18 to 35 inches by sand, marl, or, to much less extent, clay.

The water table is comparatively low, ranging from 2 to 5 feet below the surface.

Carlisle muck is the most extensive organic soil in the county. It occurs chiefly as elongated areas, trending roughly north and south, which lie inland a short distance from Lake Huron and St. Clair River. Other areas occur in the western part of the county north and south of Capac.

Possibly 1 percent of this land is cultivated, and the remainder is used as open pasture. Expense of proper drainage and susceptibility of crops to frost damage are factors retarding the agricultural development of the land. Corn and oats give poor or fair yields. Wheat and barley do not fill well and are inclined to lodge. Hungarian millet and timothy are grown successfully.

Recent information as to the proper handling of muck is presented in bulletins published by the Michigan Agricultural Experiment Station.

**Rifle peat.**—Rifle peat is intermediate between Carlisle muck and Greenwood peat in stage of decomposition of organic material. The top layer, which ranges from 10 to 15 inches in thickness, is black or brown and is fibrous rather than granular. Below this is brown material which is much rawer and coarser and which lacks the compactness found in Carlisle muck. The reaction typically ranges from neutral to strongly acid. Rifle peat occupies small areas in different parts of the county, and the total area is small. Undoubtedly much of the area has been burned over, but much of the organic covering still remains. The water level is higher than in Carlisle muck.

Practically none of the peat land is cultivated. The tree growth is largely tamarack and white cedar, with here and there a few white pine, white birch, and aspen. Some areas are devoted to pasture.

**Greenwood peat.**—Greenwood peat is brown or yellow undecomposed or only slightly decomposed peat. It is raw, coarse, fibrous, and highly acid throughout. The total acreage is very small. The water table in most places is high throughout the year, and no agricultural use is made of this material.

**Burned muck.**—Under the classification burned muck is mapped a large area of organic soils which have been considerably changed by burning. Practically all the organic soils thus affected were originally members of two types, Carlisle muck and Rifle peat. As they exist today they show wide differences. In some places practically all the visible organic matter has been removed or has been so thoroughly incorporated in the soil that the surface soil resembles that of poorly drained mineral soils, such as the Brookston, Maumee, Clyde, or Gilford. At the other extreme are areas in which only a part of the muck covering has been removed and there remain some 2 or 3 feet of muck mingled with the ash of the material burned above it. This residue in many places is still in process of removal, as the organic matter gradually wastes away and oxidizes under cultivation.

Because of the close relationship and gradual mergence of one into the other, the boundaries between Brookston loam and burned muck are not everywhere distinct, and in some places they are somewhat arbitrary. In some sections the organic soil has been burned to a slight extent, but the depth of the remaining material, from 4 to 5 feet, is so great that the soil has been classified with Rifle peat.

The mineral soil which underlies the muck is of two kinds, as follows: (1) Heavy gritty or plastic clay in which various shades of gray predominate, but in which there may be mottling of yellow and yellowish brown; and (2) gray sand or loamy sand, mottled in many places with yellow or rust brown. It was not everywhere practical to closely separate these two classes, but their general locations have been indicated on the soil map.

A large area and many small areas of burned muck are in the western part of the county. Natural drainage is poor. Such areas

as are utilized for agriculture are mainly in pasture or are used for hay. The heavier areas are recognized as good sugar-beet soil, when properly drained.

#### MISCELLANEOUS SOIL MATERIALS

**Marsh.**—Marsh is closely associated with the Colwood soils, but it occupies even lower areas which are covered with water to a depth ranging from a few inches to several feet. The depth of submergence is directly dependent on the rise and fall of the lake waters.

**Coastal beach.**—Coastal beach consists of the narrow strip of bare sand, which is subject to wind and wave action, along the shore of Lake Huron.

**Rough broken land.**—Rough broken land includes the dissected and eroded slopes which mark the escarpment between the uplands and the bottom lands along Mill Creek, Black River, and Pine River.

**Made land.**—Made land consists of artificial fills.

#### SOILS AND THEIR INTERPRETATION

St Clair County is the easternmost county in Michigan, lying a short distance south of an east-west line drawn through the middle of the Lower Peninsula. As this location is in a fairly northern latitude of the United States, the soils belong to the podzolic group. In fact, true podzols are developed in some of the sandy soils, particularly in Berrien loamy fine sand.

Almost all the soils have been formed under forest cover and are derived from glacial deposits. The presence of an unusual quantity of shale seems to be the factor which has given pH values that average lower for the heavy soils than in some other south Michigan counties. Soils derived from water-lad material occupy the delta at the mouth of St. Clair River and small strips along the shore of the nearby mainland.

The original forest growth on the heavier well-drained soils consisted of oaks, beech, maple, and basswood, with some scattered pine and hemlock. Low wet areas supported a growth of elm, ash, and hickory. Sandy ridges were covered with white pine or a mixture of hardwoods and pine. Tamarack was the principal tree on muck, but some of the smaller areas were covered with hardwoods. The forest also included red (Norway) pine, birch, juniper, red cedar, white cedar, and black spruce. In one forest, consisting of a second growth of elm, hard and soft maple, beech, and oak, the original growth had been chiefly white pine. Quaking aspen (*Populus tremuloides*), locally called popple, is a common second-growth tree.

The height of the ground-water level has been the main local influence on soil development. For this reason, the soils of the area may be divided into the three groups based on differences in drainage conditions, as indicated in the section on Soils and Crops. The light-colored members of the well-drained soils of group 1 contain much less organic matter than the poorly drained soils of group 3. The mature soils of St. Clair County, developed under conditions of good drainage, are far less extensive than the less-mature and young soils.

The soil profile of St. Clair silt loam is marked mainly by its distinctly eluviated A horizon and a well-defined B horizon consisting of yellowish-brown clay which breaks up into irregular blocks ranging

from one fourth to three fourths inch in diameter. These blocks are hard when dry.

Following is a detailed profile description of St. Clair silt loam as observed in a road cut, 2 miles northwest of North Street:

- (A<sub>1</sub>) 0 to 2 inches, dark-gray or dark grayish-brown silt loam with an admixture of grass roots and organic matter. The pH value is 6.10
- (A<sub>2</sub>) 2 to 9 inches, light grayish-yellow silt loam in which very little organic matter is visible. The pH value is 5.63
- (B<sub>1</sub>) 9 to 18 inches, yellowish-brown firm but somewhat friable clay which breaks up into irregular blocks from one fourth to one half inch in diameter. Most of these blocks have a dark coating on the outside. The pH value is 6.82
- (B<sub>2</sub>) 18 to 28 inches, similar to the layer above, except that the blocks are somewhat larger, with a maximum of three fourths inch in diameter. The dark coating on the blocks is still in evidence. The pH value is 8.19
- (C) 28 to 54 inches, very light chocolate-brown heavy till clay which contains much lime carbonate visible as irregular light-gray chunks through the mass. The material effervesces with hydrochloric acid. The pH value is 8.10

The profile of the Conover soils is most representative of soils developed under conditions of intermediate drainage. Underdrainage is not so good as in the St. Clair soils, because of the lower elevation and more nearly level surface relief. On the other hand, these soils lie higher than the Brookston soils which have poor natural drainage. Compared to St. Clair silt loam, the Conover soils have somewhat darker A horizons, and, although in places the upper parts of the B horizons are similar to the corresponding layers in the St. Clair soil, in the yellow-brown color and the tendency to break into blocks, the lower parts show various degrees of yellow and gray mottling, a result of imperfect drainage.

A description of a Conover loam profile, as it occurs three eighths mile east of North Street follows;

- (A<sub>1</sub>) 0 to 3 inches, very dark grayish-brown loam containing fairly well decomposed organic matter. The material is medium acid.
- (A<sub>2</sub>) 3 to 9 inches, light grayish-brown loam which is medium acid.
- (B<sub>1</sub>) 9 to 14 inches, dark yellowish-brown friable clay which breaks into irregular pieces from one eighth to three eighths inch in diameter. The pieces have a darker color on the outside than on the inside. The material ranges from slightly acid to neutral.
- (B<sub>2</sub>) 14 to 28 inches, fairly compact clay which breaks into larger pieces than in the B<sub>1</sub> layer. The color is light yellow mottled with gray, and the material is alkaline.
- (C) 28 to 40 inches, friable till clay which is strongly alkaline and mottled light yellow, yellowish brown, and chocolate brown.

Soils of poor drainage (in group 3) are typified by members of the Brookston series. They are characterized by dark surface soils, comparatively high in organic matter, and by heavy clay subsoils, in which the chief color is some shade of gray. In St. Clair County, the influence of an unusually large quantity of shale material in the glacial drift has expressed itself in the acidity of the upper layers of the profile.

A profile of Brookston clay loam in a ditch, 2 miles west of Marine City, is described as follows:

- (1) 0 to 3 inches, very dark gray clay loam, in which the granules range from one sixteenth to one eighth inch in diameter. The material is slightly acid.

- (2) 3 to 7 inches, dark-gray, bluish-gray, and rust-brown clay loam. The granules range from one eighth to one fourth inch in diameter, are hard when dry, and are not easily crushed. The material is slightly acid.
- (3) 7 to 36 inches, dark bluish-gray and yellowish-brown very compact but slightly friable clay. Some shale was noticed in this layer.
- (4) 36 to 40 inches, bluish-gray heavy clay containing aggregates of lime carbonate.
- (5) 40 to 72 inches, bluish-gray and chocolate-brown heavy clay showing very little weathering. This material is alkaline.

St. Clair silt loam, Conover loam, and Brookston clay loam (described above) may be regarded as representative of the three groups of soils in the county. St. Clair silt loam, representative of the well-drained soils, is the heaviest-textured soil of group 1. The other well-drained soils are marked by high percentages of very fine sand or fine sand and are derived from gravelly or sandy material.

Soils of the Fox series, of which Fox fine sandy loam is the most representative member in St. Clair County, have profile characteristics essentially similar to those of the St. Clair soils, the differences being caused by differences in composition of the parent material. Following is a profile description of Fox fine sandy loam:

- (A<sub>1</sub>) 0 to 3 inches, grayish-brown material containing a small quantity of organic matter.
- (A<sub>2</sub>) 3 inches to a depth ranging from 14 to 18 inches, grayish-yellow or light brownish-yellow material which ranges from medium to strongly acid.
- (B) A layer of dark reddish-brown gravelly sandy clay, from 24 to 28 inches thick, which is distinctly sticky when wet, and hard when dry. The material is medium acid.
- (C) Stratified pervious calcareous sand and gravel.

Oshtemo loamy fine sand is similar to Fox fine sandy loam, except that the B horizon carries much less clay, with only moderate coherence of the gravel and sand, and the parent material, or substratum, contains less gravel, more sand, and is not so calcareous as that of the Fox soil.

Plainfield fine sand is related to the Fox and Oshtemo soils in that it is derived from outwash materials. The surface soil contains little organic matter, and the B horizon of fine sand is defined more by its color, which is light reddish yellow, than by any texture development. Acidity is also higher, and it extends down into the C horizon.

Coloma loamy fine sand is similar to Plainfield fine sand in essential characteristics. It is, however, derived from sandy drift, has a rough or rolling surface relief, and contains somewhat more fine-earth material and, in places, stones and boulders.

Following is a profile description of Tuscola very fine sandy loam:

- (A<sub>1</sub>) 0 to 3 inches, light grayish-brown very fine sandy loam which is slightly acid.
  - (A<sub>2</sub>) 3 to 14 inches, grayish-brown very fine sandy loam which is slightly acid.
  - (B) 14 to 30 inches, light reddish-brown heavy very fine sandy loam or very fine sandy clay, which ranges in acidity from slightly acid to neutral.
  - (C) 30 to 60 inches, yellow very fine sandy loam or fine sandy loam, which is alkaline.
- From 60 inches to a depth ranging from 6 to 8 feet, pale-yellow loamy very fine sand or loamy fine sand, which is alkaline in reaction. Below this depth is light chocolate-brown heavy clay. The material above the deep clay deposit is lacustrine.

In addition to the Conover soils, previously described, a number of imperfectly drained soils occur, the most extensive of which is Nappanee silt loam. A large total area occurs in St. Clair County in which the soil is typically developed. However, in Greenwood Township are more nearly level and less well drained areas which are no less extensive. Both profiles are described.

Following is a profile description of typical Nappanee silt loam as observed 3 miles east of Starrville:

- (A<sub>1</sub>) 0 to 4 inches, very dark grayish-brown silt loam which is medium acid
- (A<sub>2</sub>) 4 to 8 inches, light grayish-brown heavy silt loam which breaks into blocks from one fourth to three eighths inch in diameter. This material is medium acid
- (B) 8 to 30 inches, heavy plastic light chocolate-brown clay mottled with a little bluish gray and yellowish brown. When dry the material breaks into blocks from one eighth to three eighths inch in diameter. The material is slightly acid in the upper part and neutral below.
- (C) Below a depth of 30 inches, slate-gray heavy calcareous clay which breaks into blocks from one fourth to one half inch in diameter.

A second profile description of Nappanee silt loam, as observed three eighths mile southwest of Fargo, is as follows:

- (A<sub>1</sub>) 0 to 2 inches, grayish-brown silt loam, in which the structure granules rub into a floury mass. The material is strongly acid.
- (A<sub>2</sub>) 2 to 7 inches, light grayish-yellow silt loam with ocherous-yellow mottlings. The material has a nut structure and is strongly acid.
- (B<sub>1</sub>) 7 to 15 inches, gray and ocherous-yellow heavy silty clay which breaks into blocks from one fourth to one half inch in diameter. The blocks are lighter colored on the outside than on the inside. The material is strongly acid.
- (B<sub>2</sub>) 15 to 30 inches, drab heavy clay mottled with yellow and yellowish brown, which breaks into blocks from one half to 1 inch in diameter. The material is medium acid in the upper part but becomes slightly acid with depth.
- (C) Below a depth of 30 inches, bluish-gray, yellow, and yellowish-brown dense clay containing lime carbonate. Lamination is evident in this horizon.

Macomb loam is an imperfectly drained or poorly drained soil derived from loose rather coarse drift. The soil contains gravel and stones throughout. The profile consists of the following layers:

- (1) 0 to 3 inches, very dark grayish-brown loam which is medium acid
- (2) 3 to 9 inches, medium acid dark grayish-brown loam
- (3) 9 to 22 inches, light-yellow fine sandy clay containing mottlings of ocherous yellow. The material is slightly acid or neutral.
- (4) 22 to 30 inches, yellowish-brown fine sandy clay which is strongly coherent and alkaline.
- (5) Below a depth of 30 inches, bluish-gray and yellowish-brown heavy clay containing lime carbonate.

On the St. Clair flats are a number of areas lying a few feet above the level of Colwood very fine sandy loam areas, which are better drained and have been included with Berrien loamy fine sand. Following is a typical profile description of this soil as it occurs three eighths mile northwest of school no. 2 on Harsens Island:

- (1) 0 to 4 inches, dark-gray loamy fine sand mixed with organic matter. The material is medium acid.
- (2) 4 to 15 inches, light grayish-yellow light-textured fine sandy loam which is coherent when dry. The material is medium acid.
- (3) 15 to 27 inches, very pale grayish-yellow coherent loamy fine sand. The material is slightly acid.
- (4) 27 to 32 inches, the B horizon of reddish-yellow sticky fine sandy loam which is neutral in reaction.

- (5) 32 to 45 inches, pale-yellow and gray wet very fine sandy loam containing small shells which are easily crushed. The material is alkaline in reaction.

In addition to the Brookston soil, previously described, the soils having poor natural drainage include the Allendale, Jeddo, Saugatuck, Clyde, Newton, Granby, Maumee, Wauseon, Colwood, and Griffin soils.

Following is a profile description of Allendale fine sandy loam as observed 1 mile southwest of Sparlingville:

- (1) 0 to 4 inches, very dark grayish-brown fine sandy loam which is strongly acid.
- (2) 4 to 8 inches, light-gray leached fine sand which is strongly acid.
- (3) 8 to 14 inches, coffee-colored or rust-yellow fine sand, most of which is loosely to rather firmly cemented by iron oxide and organic matter. The material in this layer is highly acid.
- (4) 14 to 18 inches, reddish-yellow loamy fine sand which is neutral in reaction.
- (5) 18 to 28 inches, pale-yellow loamy fine sand which also has a neutral reaction.
- (6) 28 to 30 inches, yellowish-brown fine sandy clay which is very coherent and shows concentration above the clay. This material is alkaline.
- (7) Below a depth of 30 inches, bluish-gray and chocolate-brown heavy impervious clay which is alkaline in reaction.

Saugatuck fine sand has the profile characteristics of a podzol soil but has been developed under the influence of a high water table. Following is a profile description as observed three eighths mile west of Kimball:

- (1) 0 to 4 inches, dark grayish-brown loamy fine sand which is very strongly acid.
- (2) 4 to 12 inches, leached very strongly acid light-gray fine sand.
- (3) 12 to 28 inches, a coffee-brown hardpan, in which the sand is thoroughly cemented by iron oxide and organic matter. This material is very strongly acid.
- (4) 28 to 36 inches, pale-yellow fine sand, also strongly acid.
- (5) 36 to 60 inches, pale-yellow fine sand, containing much moisture, even during extended droughts. The material reacts strongly acid.

Colwood loam and Colwood very fine sandy loam are marked by a 10- to 15-inch surface layer of mineral soil containing a high percentage of very fine sand and so much organic matter as to cause a black color. Below this layer is mottled yellow and gray very fine sandy loam or very fine sand, which may occur in alternate layers with fine sand. The soil material is composed of water-laid fine sediments and is strongly alkaline throughout.

Griffin loam includes the wet first-bottom soils containing widely different admixtures of sand, silt, and clay.

#### SUMMARY

The surface features of St. Clair County are characterized by a smooth plain, the northern part of which is interrupted by several comparatively narrow belts of rolling or hilly country.

The average length of the frost-free season is 157 days.

The chief source of farm income is from the dairy industry, most of the milk being shipped to Detroit. The principal crops are corn, oats, wheat, rye, barley, buckwheat, navy beans, potatoes, sugar beets, and hay. Truck crops are also grown.

The soils are variable, but they have been divided into three groups, based on the degree of natural drainage. St. Clair silt loam is the

most extensive soil of the well-drained group; Conover loam, Conover silt loam, and Nappanee silt loam are imperfectly drained; and the Brookston soils and Allendale fine sandy loam are representative of the soils which originally, at least, had poor natural drainage. All these soils are capable of producing good or fair yields.

The improvement of the soils of St. Clair County depends on improvement in drainage conditions

Although there has been a marked depression in the farm industry, the opportunity for further expansion in dairying is evident in St. Clair County. Some farms are now idle, largely because of the movement of the residents to nearby cities. Real-estate values along Lake Huron and St. Clair River are very high, but inland farms, which are sandy or lacking in drainage, may be bought for a reasonable price.

Authority for printing soil survey reports in this form is carried in Public Act No. 269, Seventy-second Congress, second session, making appropriations for the Department of Agriculture as follows:

There shall be printed, as soon as the manuscript can be prepared with the necessary maps and illustrations to accompany it, a report on each soil area surveyed by the Bureau of Chemistry and Soils, Department of Agriculture, in the form of advance sheets bound in paper covers, of which not more than 250 copies shall be for the use of each Senator from the State and not more than 1,000 copies for the use of each Representative for the congressional district or districts in which a survey is made, the actual number to be determined on inquiry by the Secretary of Agriculture made to the aforesaid Senators and Representatives, and as many copies for the use of the Department of Agriculture as in the judgment of the Secretary of Agriculture are deemed necessary.



# Accessibility Statement

---

This document is not accessible by screen-reader software. The U.S. Department of Agriculture is committed to making its electronic and information technologies accessible to individuals with disabilities by meeting or exceeding the requirements of Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended in 1998. Section 508 is a federal law that requires agencies to provide individuals with disabilities equal access to electronic information and data comparable to those who do not have disabilities, unless an undue burden would be imposed on the agency. The Section 508 standards are the technical requirements and criteria that are used to measure conformance within this law. More information on Section 508 and the technical standards can be found at [www.section508.gov](http://www.section508.gov).

If you require assistance or wish to report an issue related to the accessibility of any content on this website, please email [Section508@oc.usda.gov](mailto:Section508@oc.usda.gov). If applicable, please include the web address or URL and the specific problems you have encountered. You may also contact a representative from the [USDA Section 508 Coordination Team](#).

## **Nondiscrimination Statement**

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotope, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the

Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at [http://www.ascr.usda.gov/complaint\\_filing\\_cust.html](http://www.ascr.usda.gov/complaint_filing_cust.html) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

- (1) mail: U.S. Department of Agriculture  
Office of the Assistant Secretary for Civil Rights  
1400 Independence Avenue, SW  
Washington, D.C. 20250-9410;
- (2) fax: (202) 690-7442; or
- (3) email: [program.intake@usda.gov](mailto:program.intake@usda.gov).

USDA is an equal opportunity provider, employer, and lender.