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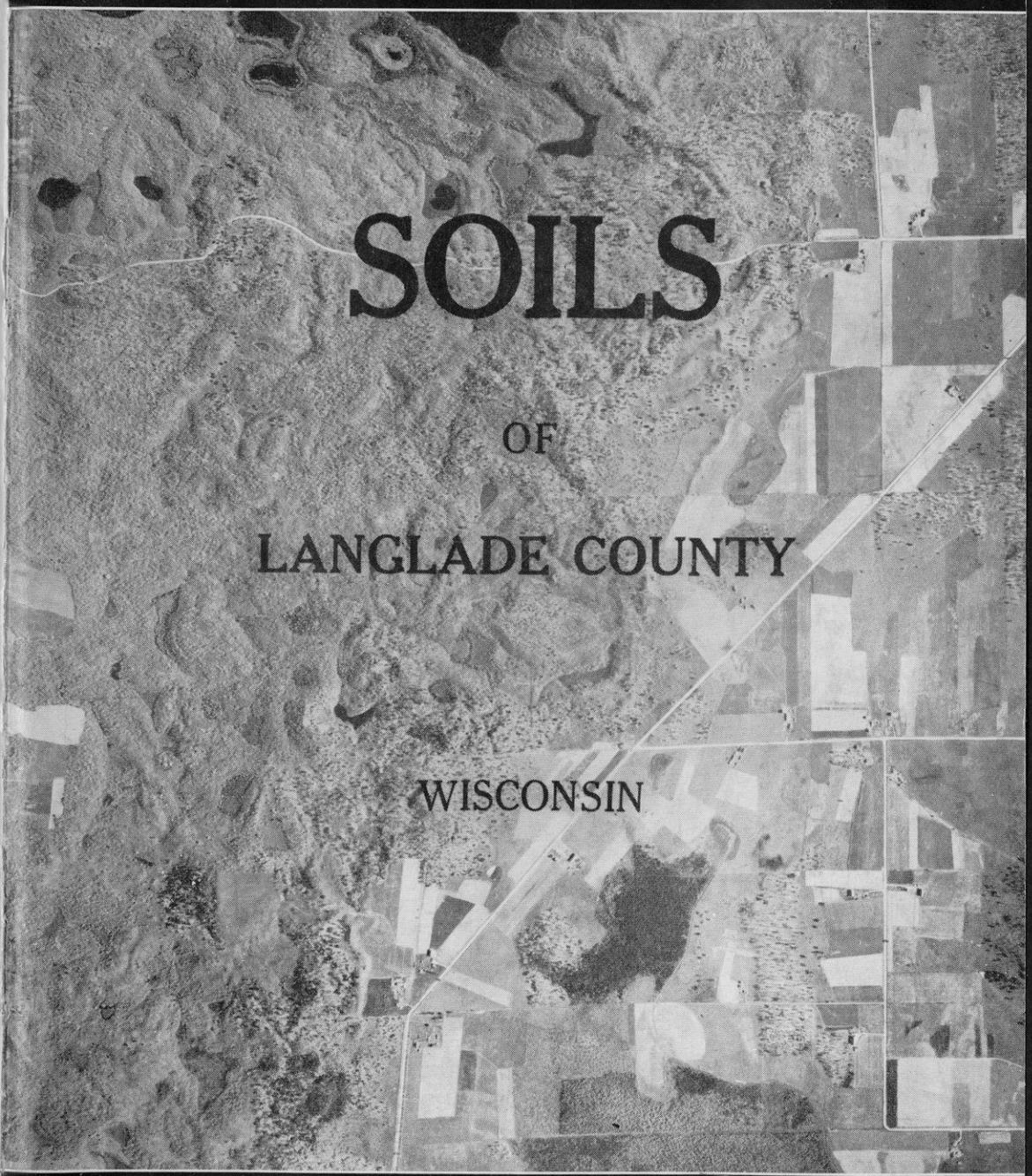
WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY
E. F. BEAN, STATE GEOLOGIST R. J. MUCKENHIRN, DIVISION OF SOILS
SOIL SURVEY IN COOPERATION WITH THE COLLEGE OF AGRICULTURE
I. L. BALDWIN, DEAN



SOILS

OF

LANGLADE COUNTY

WISCONSIN

BULLETIN NO. 74 SOIL SERIES NO. 52
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COVER PICTURE

The picture on the cover of this report shows how a small but typical part of Langlade County looks from the air. The view is of a portion of Neva Township, three miles north of the village of Deerbrook. The left (north) side of the picture shows rough land which is forested. Dark patches are lakes and swamps. The right (south) side of the picture shows fields which are on Antigo silt loam and associated soils of the Antigo Flats.

More than one half of Langlade County is occupied by rough, stony, or wet soils which are unsuited to agriculture. These are useful as forest land, wildlife refuges, and recreational areas. The remainder of the county consists of agricultural land, of which the soils of the Antigo Flats are the most extensive.

One of the chief needs of this county is an increase in the use of lime and fertilizers on the agricultural soils. Soil conservation practices are needed, especially on sloping and rolling land. Considerable areas of non-agricultural soils should be kept in forest for the production of timber.

* * *

The following persons, employed by the Wisconsin Geological and Natural History Survey or by the University of Wisconsin College of Agriculture, participated in the preparation of this map and report: F. D. Hole, R. J. Muckenhirn, G. H. Robinson, N. P. Dahlstrand, D. A. Wanless, S. Rieger, M. R. Isaacson, S. A. Wilde, H. H. Hull, V. C. Hendrickson, G. M. Volk, W. W. Hill, L. M. Wood, J. N. Steinmetz, Margaret Stitgen, and Marie Koch.

Survey inspected by I. J. Nygard, Division of Soil Survey, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture.

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CONTENTS

SOILS OF LANGLADE COUNTY

F. D. HOLE, N. P. DAHLSTRAND, AND R. J. MUCKENHIRN

HOW TO USE THE SOIL MAP AND REPORT

Unfold the colored map attached to the back cover of this report. Find the land area in which you are interested.

What is the agricultural rating of the soil? The colors tell you:

Green means *first-class* farm land.
Purple means *second-class* farm land.
Yellow means *third-class* farm land.
Grey and *brown* mean *fourth-class* farm land.

What are the names of the soils? Are the soils stony? What slopes do they have? To find out these things, see what letters are on the land area in which you are interested. Then find these letters in the list (legend) at the lower margin of the map, and read what these letters mean. The explanations in the lower left margin of the map tell how to find out about the stoniness and slope of your land.

What crop yields can you expect from these soils? See the yield data tables on pages 46 to 53.

What crop rotations and fertilizers give the best results on these soils? See the table on pages 10 and 11.

What are the soils and subsoils like? See individual soil descriptions as listed on page 14.

What is the climate like? What system of farming is generally followed? What is the history of the county? Read the chapter beginning on page 37.

HOW TO KNOW YOUR SOILS

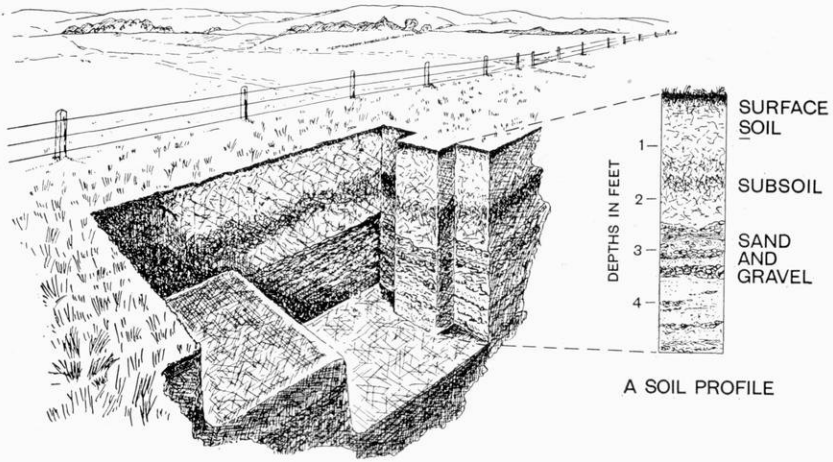

Figure 1

To find out what a soil is like, look at the side of a fresh road cut or excavation. The sketch above shows a soil profile of one type of soil.

A Soil Profile. A vertical cross-section of a soil, made up of layers of surface soil and subsoil, is called a soil profile. For example, the Antigo soil has the following four layers or "horizons":

(1) Dark colored surface soil

(2) Light colored subsurface soil

(3) Brown subsoil

(4) Sand and gravel at 3 or 4 feet

The horizons or layers are different in Kennan and other soils, as is evident from their descriptions. Each soil or soil group has a particular kind of profile. The character of the lower horizons is very important, sometimes as much so as the surface layer. Soils are classified according to the nature of their profiles, which usually extend to a depth of 4 or more feet.

Soils Change from Place to Place. As you go across a field, the soil often changes gradually. This change may be in any one layer or in several layers of the soil profile. A buried gravel bed may merge into a buried clay bed. In the subsoil, a well-drained condition may change to a water-logged condition. The slope of the land often varies. Stones are abundant in some places and not in others. Or the surface soil may change from a flour-like silt[1] loam to a gritty sandy loam. All such changes in soils from place to place can be discovered only by careful observation and use of a spade, soil auger, or post-hole digger for inspection of the soil below the surface. Soil surveyors have made thousands of inspections of both the surface and lower layers of the soils of Langlade County. Wherever they noticed definite changes in the surface soil, or deeper layers, or both, they drew lines on the map. These lines, which are soil boundaries, indicate where one kind of soil changes to another kind of soil.

WHAT THE SOIL MAP SHOWS

The soil map separates and shows the various kinds of soils by means of lines and colors. Figure 2 gives sketches of the kinds of soil profiles found in various positions on the sides of the hills and valleys of Langlade County.

In the areas of better agricultural land, care has been taken to show each important variation in the soils. However, there are numerous small patches of wet or stony land which are too small to be shown on a map of the scale used. In the rougher and stonier areas, several soil types may be found within a single boundary, but since all of them are unsuited to farming, there was no need of separation for the purposes of this report. In reconnaissance (rapid) soil surveys like this one of Langlade County, time is not taken by the surveyors to map all the soils in great detail. Instead, some of the less important or extensive soils are grouped together either as "undifferentiated" or as land types.

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[1]Silt particles are smaller in size than sand grains but larger than clay particles. Silt is flour-like when dry. It feels soft and velvety between the fingers, while sand feels gritty. Clay feels very sticky when wet.

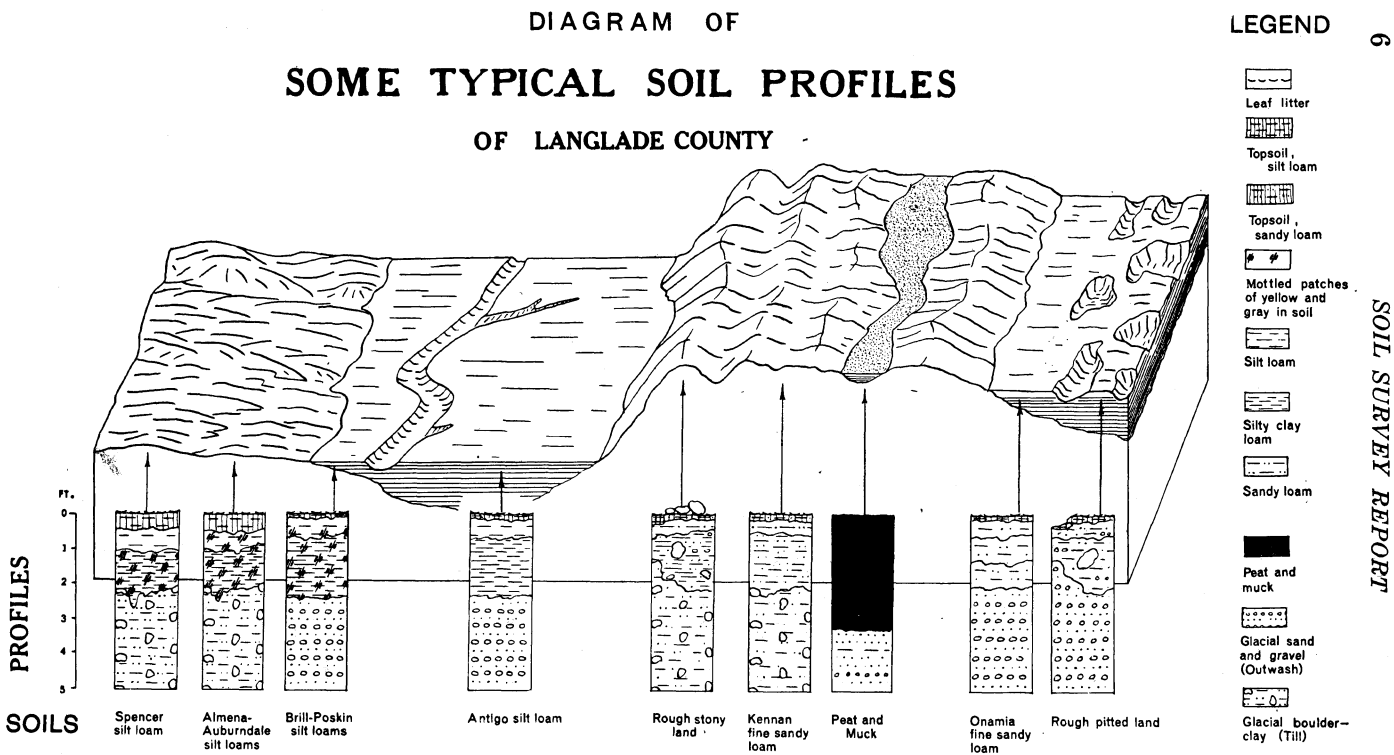

Figure 2. This diagram shows the relative positions of typical soils of Langlade County. The soil and land types, of which nine are sketched above, may be divided into three groups, on the basis of their positions in the uplands and valleys: (1) Soils of the Flats, (2) Soils of the Uplands, (3) Soils of the Lowlands.

Soil Names. While soils are classified according to the characteristics of their profiles, they are named after the names of places where they happen to occur. Thus the Antigo soil is named after the city and township of Antigo. All of the other soils in Langlade County are named after places in other counties where these same soils happened to be previously mapped. For instance, the Spencer soil is named after a town in Marathon County, Wisconsin.

Soil Types. Any kind of soil, such as the Antigo silt loam, is called a soil type, just as a kind of tree—the oak for example—is called a tree type or species. Two soil types can be distinguished from one another by the characteristics of the topsoil and of the subsoil. For instance, three of the soil types shown on the soil map are the Spencer silt loam, the Kennan loam, and the Kennan fine sandy loam. These three soils can be distinguished by the texture (fineness or coarseness) of the plow layer of soil. In addition, the clayey subsoil of the Spencer soil is quite different from the somewhat sandy subsoil of the two Kennan soils.

Soil Phases. A soil phase is a variety of a soil type. Where important differences in slope or stoniness are found, the soil types are subdivided into phases, which are shown on the map by symbols or are given descriptive names, such as sloping phase, level phase, stony phase, and so forth.

Slope. Since the soil map shows not only soil types but also slope phases, it gives a picture of the lay of the land. Slopes are measured in percentages. This means that the surface of the land drops or rises a certain number of feet in a hundred. A slope of 10 per cent means ten feet of rise or ten feet of fall for each hundred feet of distance. The general distribution of sloping land in the county is shown in Figure 3.

Stoniness. On the soil map the stoniness of the soil is indicated either by symbols or by names, such as Kennan stony loam, and Omega sandy loam, stony phase. The soil map, therefore, shows in a general way the amount of stones present per acre, measured in approximate number of loads. The degree of stoniness mapped, and the amounts of stones found, are as follows: (1) A moderately stony condition is indicated on the map by stone

symbols. In these areas 2 to 20 loads (cubic yards) of stones were found per acre. (2) A seriously stony condition is indicated by adding "stony phase" to the soil type name. In these areas there are over 20 loads of stones per acre. Figure 4 is a sketch of the county showing where stony land is most common.

Soils of the Flats. The flats are sand and gravel plains which are largely covered with a blanket of silt loam or sandy loam. This blanket of soil is from one and one half to 4 feet thick. The surface of the flats is level to sloping. In the eastern half of the county, some flats are so broken up by deep pits that they are called rough pitted lands and are not suited to agriculture. But most of the flats are occupied by level, well-drained soils of high agricultural value. At the edges of the flats, where the buried gravel beds are thin over bedrock, wet soils occur.

Soils of the Uplands. There are two kinds of uplands in Langlade County. On the west is gently rolling country where a blan-

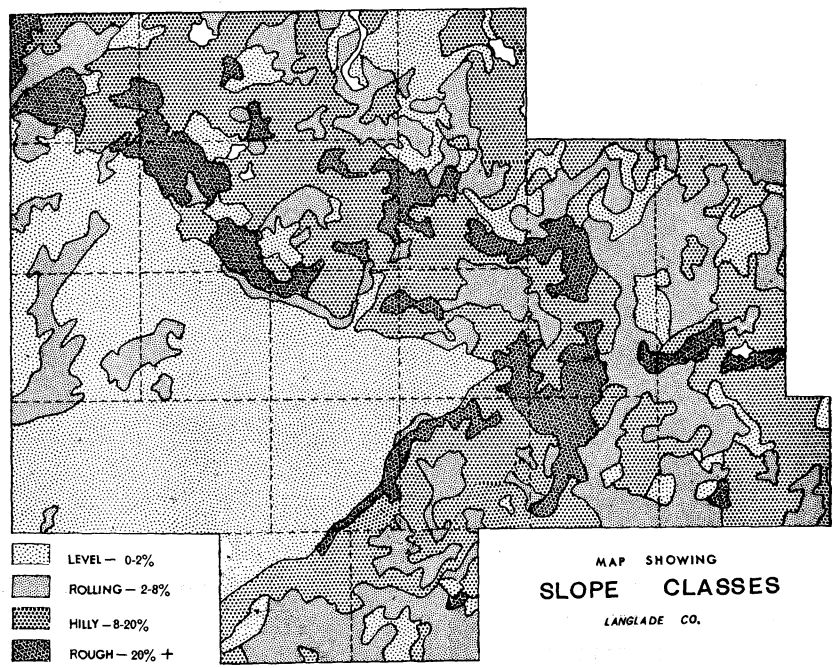

Figure 3

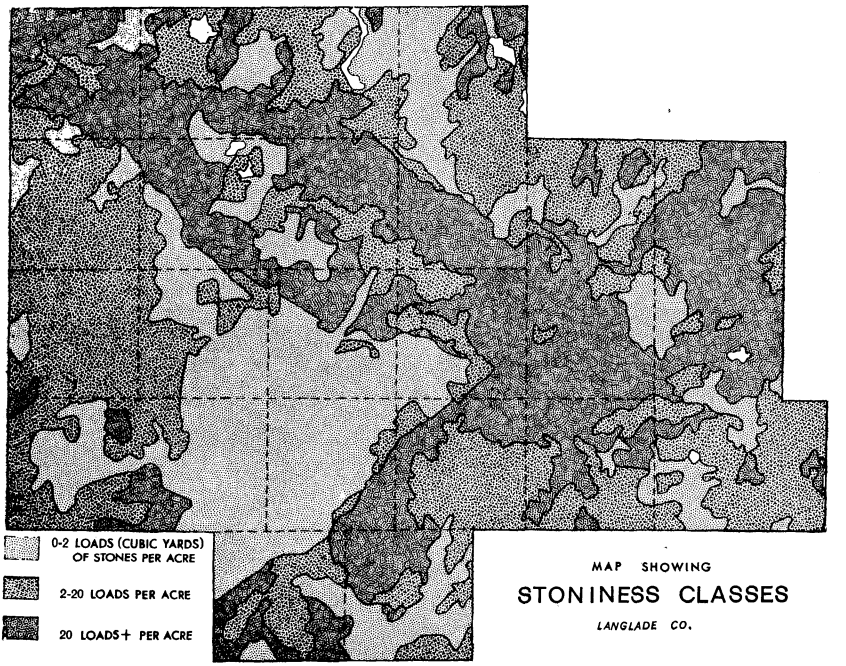

Figure 4

ket of loam soil rests on a mixture of stones, clay, and sand which is poorly drained in wet seasons. On the north, east, and south is rolling to hilly stony land. Here the upland soils are well drained.

Soils of the Lowlands. In Figure 2 a lowland soil is sketched in a sag in the uplands only. But lowland soils occur in depressions in the flats also, and along rivers. Many consist of low-lying, wet water-laid sand, silt, and clay, but there also are hundreds of peat and muck swamps in Langlade County.

HOW TO INCREASE CROP YIELDS ON THE SOILS OF LANGLADE COUNTY

Soils differ as to the crop yields which they produce. It is to be expected that, without special management, a sand will not produce as well as a silt loam. Tables 3, 4 and 5 in the Appendix of this report, present estimated crop yields on the various soils of Langlade County. The highest yields can be obtained only

Table 1

SUGGESTED CROP ROTATIONS AND FERTILIZER APPLICATIONS FOR USE ON THE SOILS OF LANGLADE COUNTY, WISCONSIN

Names of Soil Groups and Soils	Rotations*	Fertilizer Applications Per Acre							
		Corn	Oats	Alfalfa, Clover and Timothy	Red Clover and Timothy	Potatoes	Barley	Peas	Bluegrass or Timothy Pasture
First- and Second-class soils with the exception of Almena–Auburndale silt loams and Brill–Poskin silt loams	**5-year:** Corn–Small Grain–Alf.–Tim. Alf.–Tim. Alf.–Tim.	Lime** Manure # Add 100–200 lbs. 3–12–12 or 3–18–9 in row or beside hill	Add 300–400 lbs. 0–20–20 with the drill at time of planting	Lime** Dress with 200–400 lbs. 0–20–20 after first cutting, 1st and 2nd years			Add 300 to 400 lbs. 0–20–20 with drill at planting		Top dress in the spring with 150–200 lbs. ammonium nitrate
	4-year: Corn–Oats–Alf.–Clov.–Tim. Alf.–Clov.–Tim.	As above	As above	As above					As above
	3-year: Oats–Red Clov.–Potatoes				(Leave hay on field after combining seed)	Add 800 lbs. 3–12–12 in row, 1000 lbs. 6–6–18 broadcast**			

Names of Soil Groups and Soils	Rotations*	Fertilizer Applications Per Acre							
		Corn	Oats	Alfalfa, Clover and Timothy	Red Clover and Timothy	Potatoes	Barley	Peas	Bluegrass or Timothy Pasture
First- and Second-class soils including Almena–Auburndale silt loams and Brill–Poskin silt loams	**4-year:** Corn–Oats–Clov.–Tim. Clov.–Tim.	Treat as in 5-year rotation above	Treat as in 5-year rotation above		Lime** If mostly timothy in 2nd year, dress with 150–200 lbs. ammonium nitrate early in spring				Treat as in 5-year rotation above
First-class Antigo and Onamia soils	**5-year:** Corn–Peas–Alf.–Tim. Alf.–Tim. Alf.–Tim.	As above		Treat as in 5-year rotation above				Broadcast and disc in 400 lbs. 0–20–20 when planting peas seeded to alfalfa	As above

* Key to abbreviations: Alf. = Alfalfa. Clov. = Clover. Tim. = Timothy.
** Lime to a pH of 6.5. Consult your county agent for an acidity test of your soil. Do not lime for potatoes unless pH is below 5, in which case put on 500 lbs. of finely ground limestone when the small grain and legume are seeded.
# Plow under 8 to 12 tons of manure per acre.
Note: Soil tests may show that some of your fields need more or less of a particular fertilizer element than the above general recommendations provide.

by improved management on first-class soils. Table 1 lists the crop rotations and fertilizer applications recommended for the soils according to results from field experiments, soil tests, and farmers' experience on their own land.

Lime. All of the soils of Langlade County which have not been limed are acid and need to be limed for most crops. Lime is especially necessary for alfalfa and clover. Each field should be tested and limed according to requirements of the crops to be grown.

Test for Essential Elements. The county agent is ready to help each farmer with soil tests which show what a soil needs. After lime, phosphorus and potassium are of first importance.

Add Phosphorus and Potassium as Needed. Most crops, to grow well, require that 75 pounds of available phosphorus and 200 pounds of available potassium be present in the plow layer of each acre. Potatoes require twice as much of each. Even under forest conditions the plow layer of soil is usually poorer in plant foods than it should be to give good crop yields. Amounts of fertilizer usually recommended for farm crops are given in Table 1.

Use Animal Manure and Green Manure. On dairy farms, which predominate in Langlade County, the manure from livestock is a valuable source of plant nutrients and organic matter. Maximum returns from it can be obtained by spreading it daily or frequently when there is little or no snow. During the winter it is best to store it in large, deep piles so that rain and water from melting snow will not drain through it.

The organic matter from crop stubble and residues, particularly from alfalfa and red clover, tends to maintain and increase soil organic matter and nitrogen. Plowing under second-growth alfalfa and clover hay is highly desirable as a means of returning organic matter and nitrogen to the soil.

Use Soil Conservation Practices. In addition to good crop rotations, and the use of manure and commercial fertilizers, good soil management must include protection from erosion. One of the principal aids in erosion control is the selection of a crop rotation including one to three years of hay and pasture. The use of other conservation practices, especially sod waterways, strip cropping and terracing on sloping land, and drainage on lowlands, is generally necessary.

SOIL AND LAND TYPES OF LANGLADE COUNTY

This chapter contains descriptions of the individual soil and land types of Langlade County.

The nature of these soils is determined by the lay of the land, the kinds of rock materials from which the soils formed, the kinds of trees which grew in the original forests of the area, and the climate. The map below indicates that the length of the frost-

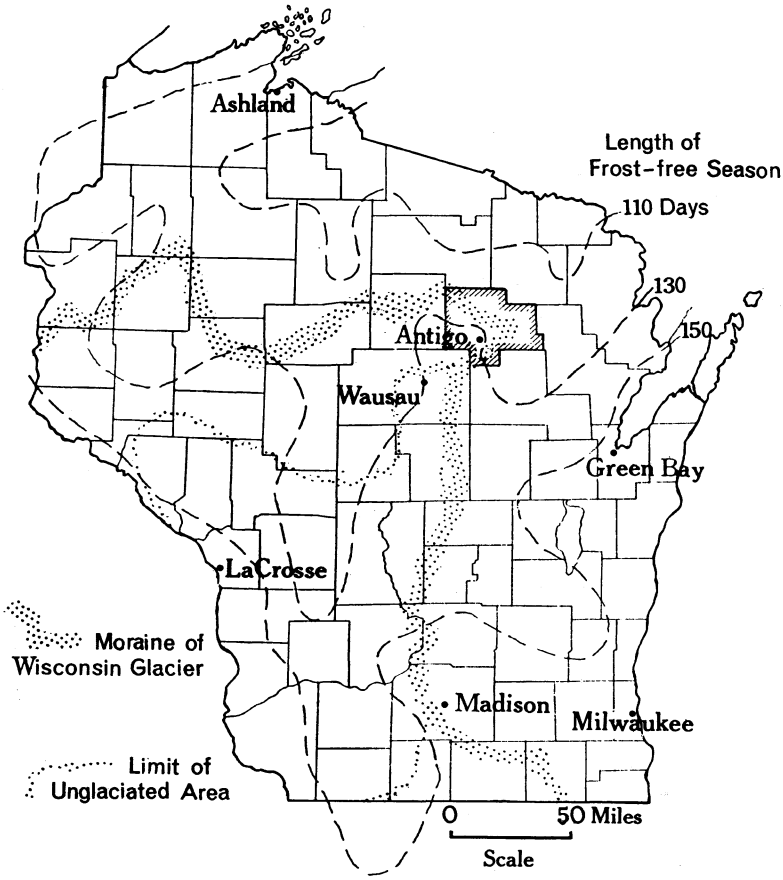

Figure 5. Langlade County lies in northeast central Wisconsin. The county seat, Antigo, is about 180 miles by highway from Madison, the capital of the state, and 35 miles from Wausau.

free season is about 130 days in Langlade County. This period is considered to be the growing season for corn, potatoes, and other tender crops. Small grains, hay, and pasture plants are not killed until temperatures fall several degrees below freezing. Consequently, the growing season for these crops is about six weeks longer than that for corn and potatoes. Table 8 in the Appendix gives a classification of the soil series and land types according to the kinds of parent materials of the soils, and according to natural drainage conditions.

The soils are grouped on the soil map and in this report, on the basis of agricultural value, into four classes: (1) Good farm land, (2) Fair to good farm land, (3) Poor farm land, and (4) Forest land—wet, droughty, hilly, or stony.

INDEX OF THE SOIL AND LAND TYPES OF LANGLADE COUNTY

FIRST-CLASS SOILS
(Good Farm Land)

The first-class soils are the best agricultural soils of the county. They occupy level to sloping or rolling country. The water-holding capacity of the soils is adequate for crop production in most years. Drainage is good, both internally and externally, and stoniness is not serious.

Antigo Silt Loam

Antigo silt loam developed from one and a half to 5 feet of silt resting on sand and gravel. This soil is found on terraces or outwash plains called "flats," the largest of which is the Antigo Flats (see Fig. 6 and Fig. 10). Antigo silt loam occupies 14 per cent of the area of the county. Of this total, 3 per cent consists

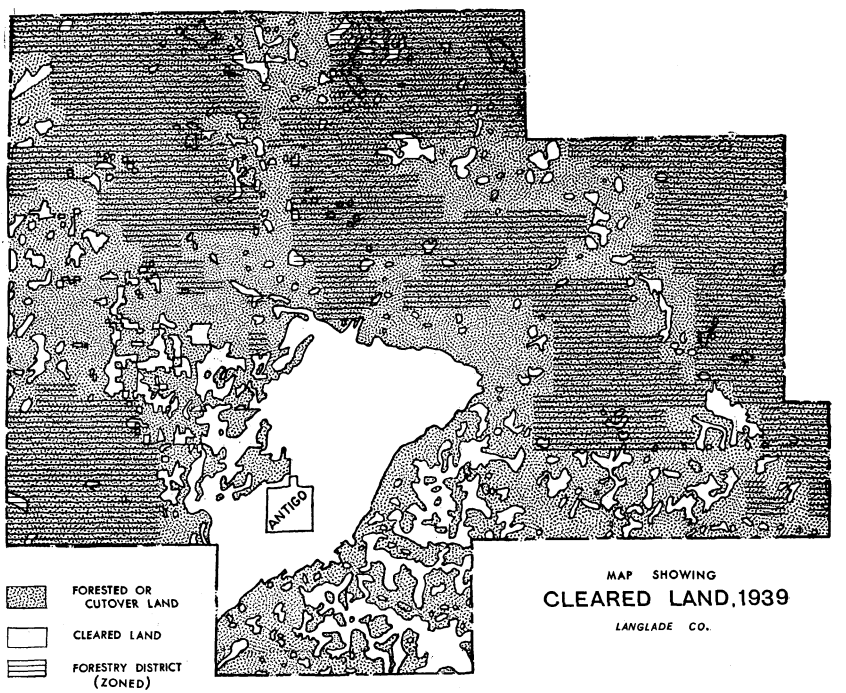

Figure 6. The city of Antigo is situated on a triangular plain called the Antigo Flats on which is found the largest continuous area of first-class soils in the county.

of the sloping or shallow phases listed below. First-class Antigo soils make up over a third of the agricultural land of Langlade County.

Name	Depth to Sand and Gravel	Per Cent of Slope	Distribution in the County
Antigo silt loam	2 to 5 feet (average 28–36 inches)	0–2	On the Antigo Flats and scattered throughout the county
Antigo silt loam, sloping phase	2 to 5 feet	2–8	At the north edge of the Antigo Flats, in southeastern townships, and scattered throughout the county
Antigo silt loam, shallow phase	1½ to 2 feet	0–2	Near stream courses in the Antigo Flats
Antigo silt loam, sloping shallow phase	1½ to 2 feet	2–8	Near stream courses in the Antigo Flats

Surface Soil and Subsoil. In the forest, these soils are covered with a layer of leaf litter about one-half inch thick. Below this is an inch of brownish black silt loam consisting of a mixture of soil and forest litter. The subsurface for ten inches down is a pale brown mellow silt loam which becomes light yellowish brown near the bottom. The subsoil is a yellowish brown silt loam or silty clay loam. Coarse sand and gravel underlie this at 18 inches in the shallow phases and at 3 feet in the typical soil.

Use and Management. The principal type of farming on the Antigo soil is dairying, and the principal crops grown are corn, oats, red clover, and alfalfa. Over 75 per cent of the corn grown is used for silage because of the need for winter feed for dairy cattle and because of the relatively short frost-free season in Langlade County. The production of milk and milk products provides the greatest part of the farmers' income. Potatoes are the main cash crop on these soils. Irrigation for potatoes is practical where large acreages are grown.

The Antigo soils need heavy applications of fertilizers, according to test, to produce maximum yields. Lime must be supplied for alfalfa and clover. Crops on the shallow and the sloping phases are more subject to drought than on the deeper and more level Antigo silt loam.

Figure 7. Harvesting potatoes from Antigo soils three miles southwest of the county seat.

Kennan Loam

Kennan loam and silt loam are included under the name Kennan loam. This is an upland soil which in places has a shallow layer of silty material resting on stony boulder-clay or glacial till. Most areas of these soils are too hilly for cultivation. However, about 3 per cent of the county, or 9 per cent of the agricultural land, is occupied by two first-class Kennan soils:

Name	Depth to Mixed Boulders, Sand, and Clay	Per Cent of Slope	Distribution in the County
Kennan loam	1 to 3 feet	2–8	Scattered throughout the county except in the Antigo Flats and in the smooth upland in the western townships
Kennan loam, level phase	1 to 3 feet	0–2	In Rolling, Wolf River, and Upham townships

Surface Soil and Subsoil. In the native forest, the surface 6 inches of soil just below the leaf litter consist of a brownish gray loam or silt loam mixed with organic matter. This is underlain by 10 to 12 inches of light-yellowish brown, fine sandy loam to silt loam. The subsoil is a brown, compact, gritty loam. The substratum is a brown, sandy loam or gravelly sandy loam. Pebbles are distributed throughout the profile.

Use and Management. The agricultural development of the Kennan loam is variable, depending on the location. In the southern townships, Rolling, Norwood, Polar, Evergreen, and part of Antigo, this soil is farmed much more than elsewhere in the county. This is probably because it occurs in broader areas and is less mixed with hilly, stony, and wet soils in the townships named than elsewhere.

The areas of Kennan loam which have been cleared support principally a dairy type of agriculture. The yields of corn, oats, timothy and clover hay, pasture, and potatoes are good. The corn is chiefly utilized for silage. Lime and commercial fertilizers are needed for best yields. Drought is not a serious hazard. Kennan loam and Kennan loam, level phase, are fairly stony soils. Stones must be removed before ordinary farm machinery can be used with ease. Soil conservation practices are needed to prevent erosion on slopes.

Onamia Fine Sandy Loam

This is a sandy soil associated with Antigo soils. It is found on scattered level areas throughout the county.

Surface Soil and Subsoil. Under virgin forest conditions, Onamia fine sandy loam has a 1-inch layer of loose litter and leaf mold. Below this are 3 inches of a gray mixture of humus and fine sandy loam. The subsurface soil is a 4- to 10-inch layer of light brown, mellow, fine sandy loam. The subsoil is a brown loam underlain by a reddish brown loam to sandy clay loam. Below a depth of about 2 feet are beds of sand and gravel.

Use and Management. Onamia fine sandy loam is a good agricultural soil, but during dry periods crops suffer from drought. Much the same type of agriculture is practiced on this soil as on Antigo silt loam.

Spencer Silt Loam

Spencer silt loam developed from a blanket of silt resting on boulder-clay or glacial till. It occupies the gently rolling uplands in the western part of the county. The outstanding feature of this soil is its imperfect drainage, even on slopes as steep as 8 per cent. The imperfectly drained condition is indicated by the mottled yellow and brown coloring of the subsoil.

Surface Soil and Subsoil. Under virgin forest conditions, Spencer silt loam has a thin mat of litter and leaf mold which is underlain by a 3-inch layer of gray mellow silt loam containing numerous fibrous roots. Beneath this is an 8-inch layer of silt loam which is yellowish brown in the upper half and light-yellowish brown in the lower half. The subsoil is a mottled light-yellowish brown silt loam. The mottling and specking with rust-colored, orange, or yellowish brown spots is usually more intense in the lower portions of the subsoil. At 24 to 30 inches below the surface a reddish brown, gritty, sticky clay loam is encountered, which usually extends downward for several feet.

Use and Management. The principal crops grown on this soil are hay, small grains, and corn. It is especially well suited to small grains, hay, and pasture, and despite its imperfect drainage it is one of the best soils in the county. Potato culture is practiced less on this soil than on the better drained soils. Fairly large amounts of lime and fertilizer are needed for the best yields on this soil. The topsoil and subsoil often become waterlogged and remain wet until fairly late in the spring. Care in management is required to provide surface drainage without causing erosion.

Figure 8. This view in Norwood Township is of strip cropping on Kennan loam and associated soils.

SECOND-CLASS SOILS

(Fair to Good Farm Land)

The soils in this class rate somewhat lower than the first-class soils because of poor drainage or because of droughtiness. With improvement, such as tiling where needed, plus skillful management, some second-class soils can be brought to a level of productivity comparable with first-class soils. One soil, Omega sandy loam, is somewhat lower in plant-nutrient content and water-holding capacity than the rest. On the whole, these are agricultural soils which will produce good to high yields when well managed, but only fair yields under mediocre management and without improvement of drainage or fertility, or both.

Almena–Auburndale Silt Loams

These soils are more poorly drained than Spencer silt loam, with which they are associated. They are found on level to slightly rolling uplands in the western portions of the county. They occupy one twentieth of the area of the county and one sixth of the agricultural land. Auburndale silt loam is usually almost flat and very poorly drained. Almena silt loam is found on slightly sloping land and is better drained than the Auburndale soil. In Langlade County the Almena and Auburndale soils have not been separated on the map, and therefore, within an area shown as Almena-Auburndale silt loams, either one or both may be present.

Surface Soil and Subsoil. Almena silt loam is similar to Spencer silt loam, as described on page 18, except that the drainage is poorer and the mottled coloring occurs higher in the profile, usually within 6 to 8 inches of the surface.

Auburndale silt loam has, beneath the forest litter, a 4-inch layer of dark-colored silt loam containing a large amount of organic matter. This is underlain by a layer of grayish brown silt loam about 6 to 8 inches thick. Below this is light gray, silty clay loam mottled with weak yellow and reddish brown spots.

The substratum of both the Almena and Auburndale soils is a reddish brown, sticky, gritty clay loam, extending downward from about 28 inches below the surface.

Use and Management. Because of the poor internal drainage, these soils are best adapted to clover-timothy hay, small grains,

and pasture. Tile drainage of Almena-Auburndale soils is unsuccessful because water moves very slowly through the subsoil to the tile drains. Tile lines placed very close together would help, but would be excessively costly. Terraces on sloping uplands can be used to divert runoff water from upper slopes away from the lower-lying Almena and Auburndale soils, which will consequently be less wet than before. Field experiments on these soils in Clark County, Wisconsin, indicate that contour tillage on slopes of 3 per cent or more gives yields equal to those from upslope and downslope tillage. Lime and fertilizer applications are essential for good yields. Alfalfa frequently winter kills on these soils and cannot be recommended except where special attention is given to fertility improvement and surface drainage. Ladino clover, however, appears to be well adapted to land which has been adequately limed and fertilized.

Brill–Poskin Silt Loams

Brill-Poskin silt loams are imperfectly drained soils associated with Antigo silt loam. They are found mainly on the level plain to the northwest of the city of Antigo and also in isolated patches throughout the county. Poskin silt loam is more poorly drained than Brill silt loam and exhibits stronger mottling in the lower surface soil and subsoil. However, the two soils were not separated in the survey of Langlade County because of their similarity in profile and agricultural value.

Surface Soil and Subsoil. Brill silt loam is similar to Antigo silt loam described on page 15, except that drainage is only fair and the soil is mottled below a depth of 15 to 18 inches.

A virgin profile of Poskin silt loam has a thin layer of forest litter over a 2-inch layer of brownish black silt loam. This is underlain by a 5-inch layer of pale brown silt loam which grades into a 5-inch layer of compact, brownish gray silt loam mottled with pale brown to strong yellowish brown. The subsoil to a depth of 24 to 28 inches is a compact brown silt loam strongly mottled with light gray to strong brown. The substratum is coarse sand and gravel.

Use and Management. The same type of agriculture is practiced on these soils as on the Antigo soils, although they are not suited to potatoes. The main source of income is from dairying. In some areas of Poskin silt loam, ditches have been dug to carry off excess water. An excessively stony area in sections 4, 5, and 8 of T.31N., R.11E. has been included in this soil type.

Kennan Fine Sandy Loam

Kennan fine sandy loam is an upland soil found throughout the county except in the Antigo Flats and the smooth upland to the west. The land is rolling, with numerous swamps and lakes. It occupies less than 2 per cent of the area of the county.

Surface Soil and Subsoil. In the virgin forest condition this soil has a thin layer of loose leaf litter. Beneath this is a 3-inch layer of dark gray, fine sandy loam containing considerable organic matter. This is underlain by a 4-inch layer of light gray, fine sandy loam containing almost no organic matter. The subsoil is a brown, compact, fine sand to fine sandy loam. The thickness of this horizon varies from 6 to 18 inches, and in some localities it is cemented. Compactness and cementation below this depth become less until, at 24 to 30 inches, the substratum of brown sandy loam is encountered.

Use and Management. This soil is devoted mainly to dairy farming. The usual crops are grown: silage corn, oats, timothy and clover hay, potatoes. Corn rarely produces much ripe grain because of early killing frosts in the autumn. The natural productivity and water-holding capacity of this soil are not as great as those of Kennan loam because of the higher content of sand. However, with the application of lime, commercial fertilizers, and manure, good yields are possible when moisture is plentiful.

Omega Sandy Loam

This is a sandy loam soil over sand. It is found on small scattered level to rolling areas in the northern and eastern portions of the county, where it is associated with sandy upland soils. It occupies 2 per cent of the area of the county.

Name	Depth to Sand	Per Cent of Slope	Distribution in the County
Omega sandy loam	3 inches	0–2	Scattered patches in Parrish, Elcho, Ainsworth, Wolf River, and Rolling townships
Omega sandy loam, sloping phase	3 inches	2–8	Scattered patches in Parrish, Elcho, Ainsworth, Polar, Evergreen, and Wolf River townships

Surface Soil and Subsoil. Under the virgin forest of jack pine, red pine, white pine, and some hardwoods, these soils have a 1-inch layer of pine needles and twigs underlain by 1 to 2 inches of brownish gray sandy loam. Beneath this is a layer of grayish brown sandy loam about 2 inches thick, grading into yellowish sandy loam or loamy sand. The subsoil is about 15 to 18 inches thick. The upper part is a brown, weakly cemented sand, while the lower part is slightly more cemented, yellowish brown sand. Below a depth of 20 inches is a yellowish brown loose sand containing a few pebbles and stones. In some places the subsoil of Omega sandy loams is a strong brown, cemented sand.

Use and Management. Areas of Omega sandy loam under cultivation are devoted chiefly to dairying. Hay, small grains, silage corn, and potatoes are grown on this soil. Omega sandy loam is more droughty and lower in plant nutrients than are Antigo and Onamia soils. These two deficiencies can be met by irrigation and by generous application of commercial fertilizers.

Onamia Fine Sandy Loam, Sloping Phase

This soil is found in all townships except Price, Antigo, Rolling, Ackley, and Parrish. Its total area is 1.5 per cent of the county. The slope range is from 2 to 8 per cent. This sloping condition is the only characteristic in which this soil differs from the level Onamia fine sandy loam, already described on page 18 under First-class Soils.

THIRD-CLASS SOILS

(Poor Farm Land)

The soils in this class are rated lower than the second-class soils because of excessive stoniness, poor drainage, or droughtiness. It is seldom economical to improve these soils for tillage. Some droughty soils, such as the Chetek soils, are under cultivation. Usually these cultivated areas are small and closely associated with better soils. However, crop yields of third-class soils are low. Excessively stony and poorly drained soils are almost wholly devoted to permanent pasture.

Adolph Loam

The Adolph loam is a wet soil associated with Kennan and Spencer soils. It occurs in depressions, near streams and swamp borders.

Name	Depth to Sandy Gravelly Loam Material	Stoniness	Per Cent of Slope	Distribution
Adolph loam	2 to 4 feet	Less than 20 loads (cu. yds.) of stones per acre	0–2	In all townships except Antigo and Neva townships
Adolph stony loam	2 to 4 feet	More than 20 loads (cu. yds.) of stones per acre	0–2	In Ackley, Elcho, and Upham townships

Surface Soil and Subsoil. The 6-inch surface soil of the Adolph loam underlies the forest litter and consists of a black loam or silt loam very high in organic matter. This horizon grades into a gray, compact, silt loam. At a depth of 12 to 15 inches is a gray, mottled, compact silt loam or clay loam. In the vicinity of Kennan soils the substratum of the Adolph soil is a moderate brown, sandy, gravelly loam at a depth of 26 to 30 inches. Where Spencer and Almena-Auburndale soils predominate, the underlying material of the Adolph soil is a reddish brown, compact, gritty loam.

Use and Management. This soil has been cleared of the original forest growth of spruce, balsam fir, and swamp hardwoods to a greater extent in the areas of Spencer and Almena-Auburndale soils than in the Kennan soil country. The Adolph soil is used for permanent pasture and woodlots.

Almena–Auburndale Stony Silt Loams

These soils, although much more stony, have the same profile characteristics as Almena-Auburndale silt loams described on page 20 under Second-class Soils. Their extent is limited to 0.1 per cent of the area of the county. Because of the great number of stones, these soils are used mainly for pasture and woodlots.

Antigo Silt Loam, Sloping Stony Phase

This soil covers only 0.5 per cent of the county and is found on slopes between 2 and 8 per cent. It occurs in patches in the Wolf River Valley. The abundance of stones prevents its use for cultivated crops.

Chetek Soils, Undifferentiated

Chetek soils, undifferentiated, are sandy soils of variable texture and profile. They occupy a very small area. They are found mainly in the bottoms and on the sides of the drainage ways cut into the Antigo Flats by the tributaries of Spring Brook.

Name	Depth to Sand and Gravel	Per Cent of Slope
Chetek soils, undifferentiated	18 to 24 inches	0–2
Chetek soils, undifferentiated, sloping phases	10 to 20 inches	2–8
Chetek soils, undifferentiated, steep phases	4 to 8 inches	8–20

Surface Soil and Subsoil. Under cultivation, Chetek soils, undifferentiated, have a surface layer a foot thick of loose, brown sand to gritty loam, usually containing a moderate amount of small pebbles. The subsoil to a depth of 2 feet is a slightly cemented, brown, gravelly loamy sand. The lower part of the subsoil is a loose yellowish brown sand. The substratum is loose coarse sand and gravel. The depth to this substratum in the sloping and steep phases decreases as the slope increases.

In some places, especially where roads cross drainage ways and restrict the flow of water, a silty layer 1 to 4 inches thick covers the Chetek soils.

Use and Management. Much of the area of the Chetek soils is under cultivation because these soils are found in close association with the more productive Antigo soils. Crop yields on Chetek soils are very low because of droughtiness and low fertility. The Chetek soils should be used for grassed waterways and rotation pasture. The erosion hazards of the Antigo Flats are localized along the drainage ways which these Chetek soils occupy.

Omega Sandy Loam, Stony Phases

In northern and eastern Langlade County there are small areas of stony, sandy Omega loams having more than 20 loads (cubic yards) of stones per acre. These areas total only 0.6 per cent of the area of the county.

NAME	DEPTH TO SAND	PER CENT OF SLOPE	DISTRIBUTION
Omega sandy loam, stony phase	3 inches	0–2	In Parrish township
Omega sandy loam, sloping, stony phase	3 inches	2–8	In Parrish, Ainsworth, and Wolf River townships

Surface Soil and Subsoil. The only differences between these soils and the Omega sandy loam described on page 22, under Second-class Soils, are in slope and excessive stoniness.

Use and Management. A small portion of the area covered by the stony phases of Omega sandy loam is used for pasture. Some of the land has been planted to red pine and jack pine, to which the soils are best suited.

Onamia Fine Sandy Loam, Sloping Stony Phase

Onamia fine sandy loam, sloping stony phase, occurs on slopes of 2 to 8 per cent and is found in scattered areas throughout the county. The total area is only 0.1 per cent of that of the county.

Surface Soil and Subsoil. The soil profile, although much more stony, is essentially the same as that of Onamia fine sandy loam described on page 18, under First-class Soils.

Use and Management. Because of the abundance of stones (more than 20 loads per acre), this soil is used for pasture or forestry.

Spencer Stony Silt Loam

The excessively stony areas of Spencer silt loam have been separated out as Spencer stony silt loam. They amount to 0.2 per cent of the county area.

Surface Soil and Subsoil. Except for stoniness, the soil profile is the same as that of Spencer silt loam as described on page 18 under First-class Soils.

Use and Management. These soils are used for permanent pasture and woodlots.

Warman Loam

Warman loam is a very wet soil associated with Antigo silt loam and Brill-Poskin silt loams. The greatest acreage of this soil lies west and north of the city of Antigo. Small areas are scattered throughout the county. The total area is 1.2 per cent of the area of the county.

Surface Soil and Subsoil. The profile of Warman loam is very similar to that of Adolph loam. The surface soil to a depth of 6 inches below the forest litter is a black loam or silt loam containing much organic matter. Beneath this is a layer of gray, compact, silt loam extending to a depth of 12 to 15 inches below the surface. It grades into a mottled gray, compact, silty clay loam or clay loam. At a depth of about 30 inches there are coarse sand and gravel.

Use and Management. Because of its wet condition, very little of the Warman loam area is used for cultivated crops. The principal use is for permanent pasture and woodlots.

FOURTH-CLASS SOILS

(Forest Land—Wet, Droughty, Hilly, or Stony)

The soils of this class are non-agricultural because of excessive stoniness, droughtiness, hilliness, or poor drainage. These soils are best suited to forestry and the development of recreational areas. This fact was recognized by the Board of Supervisors of Langlade County in its zoning ordinance of 1934. This ordinance, which had the approval of all the town boards, divided the county into three use districts: (1) Forestry district, (2) Recreational district, and (3) Unrestricted district. Over a third of the county was placed in the forestry district. This land is occupied for the most part by fourth-class soils, as shown on the soil map which accompanies this report.[2]

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[2] Most of the information on forestry given in this chapter is from a previous publication: Hill, *et al*, "Langlade County, A Survey of Its Natural Resources and Their Utilization," Special Circular, Extension Service, College of Agriculture, University of Wisconsin, 1934.

Adolph Soils, Undifferentiated

These are wet soils of variable texture. They occur in depressions and low, level areas along streams and drainage ways, and occupy 0.4 per cent of the area of the county.

Name	Depth to Sandy Gravelly Substratum	Stoniness	Per Cent of Slope	Distribution
Adolph soils, undifferentiated	1 to 5 ft	Less than 20 loads (cu. yds.) of stones per acre	0–2	In Ackley, Parrish, Elcho, Ainsworth, Wolf River, and Evergreen townships
Adolph stony soils, undifferentiated	1 to 5 ft.	More than 20 loads (cu. yds.) of stones per acre	0–2	In Parrish and Elcho townships

Surface Soil and Subsoil. Although these soils vary in texture from place to place, the soil profiles resemble that of Adolph loam, as described on page 24, under Third-class Soils.

Use and Management. These soils are used for pasture or for woodlots. Virgin forest growth consisted chiefly of red maple, elm, yellow birch, black ash, aspen, and much balsam fir and white spruce. On these soils there is abundant growth of shrubs, including dogwood, mountain ash, currant, and gooseberry. The ground cover consists largely of mosses, which may form a solid carpet over the soil. Such lands are subject to early and late frosts which seriously interfere with success in replanting trees. The danger from frosts, when underplanting is attempted, may be reduced to some extent by the use of the hill-planting method on the lower spots and by the ordinary furrow method where areas have better drainage. By so doing, these lands can be materially improved by underplanting with spruce. When thinning is to be followed by underplanting, all rotten and unmerchantable timber should be removed.

Alluvial Soils, Undifferentiated

Soils developed from sediments left by flood waters occur locally along streams in southwestern and west central parts of the county. They cover 0.2 per cent of the area of Langlade County.

Surface Soil and Subsoil. The profiles of these soils vary widely. Periodic flooding changes the surface texture from season to season. In alluvial areas there are silt loams, light-colored sands, and shallow peats and mucks over sand.

Use and Management. These are non-agricultural soils. They are left idle or used for pasture or woodlots.

Kennan Loam and Kennan Fine Sandy Loam (Hilly or Stony)

These soils, most of which are hilly, occupy more than a fifth of the area of Langlade County. Hilly, sandy, or stony Kennan soils occur throughout the county except on the Antigo Flats and the smooth upland to the west. Numerous depressions containing peat and muck swamps are associated with Kennan loam and fine sandy loam. This association, as well as stoniness and hilliness, make these areas unsuited to agriculture.

Figure 9. A road cut in hilly, stony Kennan soils. Photograph by F. T. Thwaites.

NAME	STONINESS	PER CENT OF SLOPE	DISTRIBUTION
Kennan fine sandy loam, hilly phase	Less than 20 loads (cu. yds.) of stones per acre	8–20	In all townships except Ackley, Peck, Antigo, Vilas, Summit and Parrish
Kennan stony fine sandy loam	More than 20 loads (cu. yds.) of stones per acre	2–8	Same
Kennan stony fine sandy loam, level phase	Same	0–2	In Parrish, Elcho, Rolling, Upham, and Wolf River townships
Kennan stony fine sandy loam, hilly phase	Same	8–20	In all townships except Peck, Vilas, and Ackley
Kennan loam, hilly phase	Less than 20 loads of stones per acre	8–20	Same
Kennan stony loam	More than 20 loads of stones per acre	2–8	Same
Kennan stony loam, level phase	Same	0–2	In Rolling, Price, Evergreen, and Wolf River townships
Kennan stony loam, hilly phase	Same	8–20	In all townships except Summit, Parrish, Peck, Vilas, and Ackley

Surface Soil and Subsoil. Although these soils are too hilly or stony for cultivation, their profiles resemble those described on page 17, under Kennan Loam, First-class Soils, and on page 22, under Kennan Fine Sandy Loams, Second-class Soils.

Use and Management. The main forest stand on Kennan loam consists of sugar maple, yellow birch, elm, basswood, and some hemlock. The most common shrubs are hazel, dogwood, honeysuckle, high-bush cranberry, sumac, elder, raspberry, gooseberry, leatherwood. This site is the best available in the county for reforestation, both by planting and underplanting. There is a very satisfactory, mature reproduction of hardwoods and hemlock which could be greatly improved by partially cutting and underplanting with spruce. Recently burned or cutover areas can be replaced directly with Norway or white spruce, but the hardwood sprout reproduction which quickly springs up must be thinned to secure proper light conditions for spruce seedlings. In this thinning process it is desirable to leave all yellow birch and the better sugar maple reproduction in order to create a mixed hardwood-coniferous stand. The plantings of such sites

and the reduction of the hardwood sprouts are somewhat difficult and expensive, but may be justified in view of the value of the spruce to which such land is well suited.

The dominant species on Kennan fine sandy loam are hemlock and yellow birch, but there are some sugar maple and red maple. Mature stands contain no shrubs or only a little hazel, dogwood, and cherries. Burned or cutover areas of this type are usually occupied by aspen, paper birch, and pin cherry. Under present conditions, fourth-class Kennan fine sandy loam is adapted only to hemlock and yellow birch, and as hemlock is a very slow-growing tree, expensive means of encouragement are not justified. It would probably be best to protect the hemlock and yellow birch stands that now exist, and permit them to make such growth and expansion as they will. Where hardwood species, especially sugar maple, occur, they will tend to reduce the acidity of the humus and improve its quality by furnishing more available mineral nutrients, and thus in time prepare the ground for the planting of spruce and other merchantable species.

In the southern part of the county, some of the stony or hilly Kennan soils are used for pasture or are farmed along with the better soils.

Muck

Areas of muck occur along drainage channels and in low areas subject to periodic overflow. They occupy about 2 per cent of the area of the county. These muck soils are a mixture of partly decomposed vegetation and fine silty material brought in by streams. Peat consists of deep deposits of plant remains and is described on page 33.

Surface Soil and Subsoil. The surface 2 to 4 inches is undecomposed forest litter. Below this are 4 to 10 inches of black decomposed peaty material. This is underlain by about 8 inches of a nearly black mixture of silt, clay, and organic matter. Bluish gray sand, clay, or clayey sand are found at a depth of about 18 inches.

Use and Management. Muck is a forest soil and provides sites for wildlife refuges in Langlade County. It may be of some value for hay or pasture if cleared and drained. Frost occurs later in the spring and earlier in the fall on muck soils because of the drainage of cold air into the low-lying muck areas. The muck

soils also warm up slowly in the spring. As a result, the growing season is much shorter on muck soils, and it is seldom possible to bring cultivated crops to maturity, even after proper drainage and fertilization have been provided.

Muck land is largely covered with a growth of alder with some water-loving hardwoods and conifers, such as red maple, black ash, and balsam fir. Shrubs include the common willow and dogwood. Nettles and bedstraw are the most typical members of the ground cover. Other plants found growing on muck are tall meadow rue, smartweed, ferns, swamp grasses, sedges, and mosses, particularly the mosses which can resist the destructive effect of periodic overflow.

Omega Sand

Omega sand occurs in the northern part of the county, especially near Post Lake. This soil occupies only 0.6 per cent of the county.

NAME	PER CENT OF SLOPE	DISTRIBUTION
Omega sand	0–2	Ainsworth and Elcho townships
Omega sand, sloping phase	2–8	Ainsworth and Vilas townships

Surface Soil and Subsoil. The surface soil to a depth of 2 to 3 inches is a dusky brown sand underlain by a 2- to 3-inch layer of pale brown sand. The subsoil to a depth of 20 inches is a brown sand, slightly cemented in places, and containing a few small pebbles. This is underlain by a yellowish brown loose sand.

Use and Management. Some areas of Omega sand have been farmed, but have not proven profitable except under the very best management. The tree growth is largely jack pine with some red pine. The undergrowth consists of under-sized willow and hazel. These loose sands are in general adapted to the planting of red pine, though on areas where the surface mulch has been destroyed by fire, jack pine should be substituted for part of the red pine. Such sites furnish too little moisture for successful growth of white pine, and the mineral plant food available is also inadequate. The little plant food and moisture present are largely in the surface mulch, and for this reason the practice of

deep plowing and planting seedlings in the furrow may not be successful. The establishment of shrubbery shelter-belts along exposed boundaries of stands on this site will give protection from wind, retard evaporation, and encourage the accumulation of mulch.

Peat

Peat is the second most extensive soil in the county. Peat occupies nearly 10 per cent of the total land area. There are several peat swamps which cover one or two square miles each, but this soil occurs mainly in the hundreds of small swamps of the county. Peat is composed of plant remains which have accumulated in former lakes, or in marshes, swamps, and ponds.

Surface Soil and Subsoil. The thickness of peat ranges from 1 foot to 8 feet. Four feet is an average figure. Most of the peat is brown to dark brown and is not well decomposed. About 50 per cent of the peat area is occupied by moss peat, with a growth of black spruce and tamarack. Thirty-five per cent of the peat area consists of woody peat, with cedar, balsam, tamarack, and swamp hardwoods. The remaining swamps have fibrous peat, with a growth of sedges.

Use and Management. Peat land is generally left idle. It produces some timber, pulpwood, fuel wood, cedar fence posts, Christmas trees, and wild berries, and it provides a refuge for wildlife. The following kinds of trees are found in peat swamps: white cedar, balsam fir, black ash, swamp and red maples, tag alder, black spruce, tamarack, elm, yellow birch. The commercial value of timber on such land depends on the proportion of conifers. There is little opportunity for introducing other species or for improvement by drainage, although proper selective cutting and thinning may help in some cases. Especially is this true in the case of cedar swamps where windfall may develop a fire hazard. In logging, it is necessary to leave some healthy older trees to secure natural reproduction.

Rough Land

Associated with Kennan and Vilas soils are rough, hilly areas made up of a mixture of boulders, sand, silt, and clay. Associated

with sloping Antigo, Onamia, and Omega soils are rough, pitted areas of gravel and sand. These land types occupy 17 per cent of the total area of the county.

NAME	DISTRIBUTION
Rough pitted land (loam)	In Elcho, Norwood, Polar, Ainsworth, Evergreen, Langlade and Wolf River townships
Rough pitted land (fine sandy loam)	Same
Rough pitted land (sandy loam)	In Elcho, Ainsworth, Evergreen, and Wolf River townships
Rough stony land (loam)	In all townships except Vilas, Ackley, and Rolling townships
Rough stony land (sandy loam)	In all townships except Summit, Vilas, Ackley, Peck, Rolling, Antigo, and Norwood townships

Surface Soil and Subsoil. The soils in these areas are chiefly shallow, stony Vilas, Kennan, Antigo, Onamia, and Omega soils. Slopes are over 20 per cent.

Use and Management. These land types are in cutover country and support a second growth of trees. Small areas adjacent to farm land are used for pasture.

Loam and fine sandy loam soils in these areas are suited to plantations of Norway spruce, white spruce, and yellow birch. Sandy loams are adapted to plantings of red pine and white pine.

Vilas Sandy Loam and Vilas Stony Sandy Loam

Vilas sandy loam has a more sandy substratum than do Kennan soils. A notable area of Vilas soils is in the vicinity of Sawyer Lake in Wolf River Township.

NAME	STONINESS	PER CENT OF SLOPE	DISTRIBUTION
Vilas sandy loam	Less than 20 loads (cu. yds.) of stones per acre	2–8	In Parrish, Rolling, Norwood, Elcho, Upham, Ainsworth, Langlade, and Wolf River townships
Vilas sandy loam, hilly phase	Same	8–20	In Parrish, Elcho, Langlade, Upham, Rolling, Norwood, Ainsworth, and Wolf River townships
Vilas stony sandy loam	More than 20 loads of stones per acre	2–8	In Price and Wolf River townships
Vilas stony sandy loam, hilly phase	Same	8–20	In Parrish, Norwood, Neva, Upham, Elcho, Price, Ainsworth, Evergreen, Langlade, and Wolf River townships

Surface Soil and Subsoil. Under virgin forest conditions, Vilas sandy loam has a ½-inch layer of litter over a black, sandy loam horizon about 2 inches thick. This is underlain to a depth of 4 to 8 inches by a layer of yellowish brown sandy loam. The subsoil to a depth of 2 feet is a somewhat cemented, brown sandy loam. The substratum is a yellowish brown gritty sand. Pebbles, cobbles, and some boulders are found throughout the profile.

Use and Management. Originally Vilas sandy loam supported mixed stands of white and red pine. The present growth consists chiefly of second-growth aspen, jack, red, and some white pine. The undergrowth includes hazel and other shrubs. Sites of this type are usually suitable for the planting of both white and red pine. However, due to the fact that white pine is subject to the weevil and to blister rust, it should be planted in a limited quantity, preferably in a mixture with other species. White pine should not be planted on exposed, treeless sites.

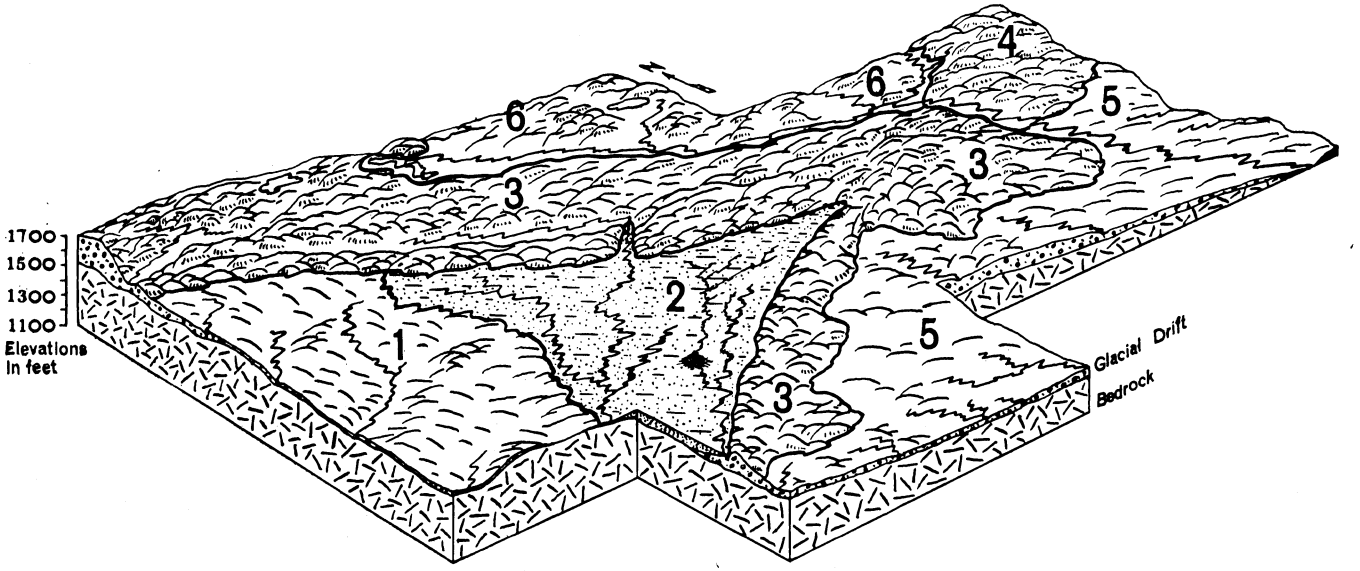
Wet Shallow Loams, Undifferentiated

In Ackley Township west of Black Brook are nearly 12,000 acres of level to gently rolling, shallow, poorly drained soils. They occupy 2 per cent of the area of the county.

NAME	STONINESS	PER CENT OF SLOPE
Wet shallow loams, undifferentiated	Less than 20 loads (cu. yds.) of stones per acre	0–2
Wet stony shallow loams, undifferentiated	More than 20 loads of stones per acre	0–2

Surface Soil and Subsoil. These soils are 18 to 30 inches deep and are mottled, brown silt loams and loams. The underlying material is sticky "rotten granite." The soils are wet practically the year around. There are some small areas with fair drainage.

Use and Management. Attempts have been made in the past to cultivate the wet shallow loams, undifferentiated, but areas which were formerly cleared are now idle. The vegetation consists chiefly of poplar, willow, pin cherry, and maple. These soils should be left in forest, which, under good management and protection from fire, would provide to the county or private landowner a considerable return in fuel, pulpwood, fence posts, and timber.



BLOCK DIAGRAM SHOWING

LANDSCAPE TYPES

LANGLADE CO.

1 THE SMOOTH UPLAND
2 THE ANTIGO PLAIN
3 THE ROUGH UPLAND
4 THE ROLLING UPLAND
5 THE SOUTHERN SLOPING UPLAND
6 THE NORTHERN SLOPING UPLAND

Figure 10

Recommended forestry practices for wet shallow loams, undifferentiated, are given on page 28, under Adolph soils, undifferentiated. There are some slightly better drained areas of wet shallow loams, undifferentiated, which support a growth of hardwoods, balsam fir, and white spruce.

LANGLADE COUNTY AND ITS FARMS

Lay of the Land. The county is irregular in shape. Its greatest length from north to south is 30 miles, and from east to west is 38 miles. It includes 24⅓ townships, and has a total area of 870.5 square miles, or 557,092 acres. Water covers 7,968 acres of the county. There are over 300 lakes in the county. Wolf River in the northeast drains southeast to Green Bay, while on the west, Eau Claire, Pine, and Prairie rivers flow southwest to join the Wisconsin River. Figure 10 is a sketch of six landscape types in Langlade County.

The county lies on part of a broad highland which occupies the northern third of Wisconsin. This Northern Highland is made of granite and other ancient rocks and is covered with a blanket of boulders, sand and clay, which an ice-sheet or glacier laid down thousands of years ago. Bedrock comes to the surface only along the Wolf River and in Ackley Township. At the city of Antigo the drift or blanket of boulders, sand, and clay is nearly 60 feet thick. Three miles north of the village of Parrish, the glacial drift is about 240 feet thick.

A belt of ridges and hills extends in the form of an elbow from the northwest corner of the county to the center, thence toward the southwest. This belt, known as the Rough Upland (see Fig. 10), was built by two portions or lobes of the ice-sheet which moved into the county from the east and north.

The highest point in the county, about 1,800 feet above sea level, is near Kent in Langlade Township. The lowest point, 1,100 feet above sea level, is on the Wolf River at the southern boundary of the county. The difference in elevation between the two points is 700 feet. The city of Antigo is 1,499 feet above sea level. The village of Phlox, in Norwood Township, is about 150 feet lower than Antigo.

A blanket of flour-like silt, which probably was laid down during dust storms a long time ago, covers the smooth upland in the southwestern part of the county, the Antigo Plain, and scattered

portions of the rest of the county. This is the material from which the Antigo silt loam and other silty soils formed.

Ground-water Supply. Ground water is abundant in Langlade County. Water is drawn almost entirely from the glacial drift. The water table stands at from about 10 to 100 feet below the surface. Farmers on the Antigo Flats obtain irrigation water for potatoes from streams, from open pits, and from screened wells. Open pits on the Flats are about 20 feet deep. Screened wells are probably more satisfactory in the long run because the wells do not destroy good farm land and do not silt in, as do the open pits. Ground water is soft[3] in the western half of the county and hard[4] in the eastern half of the county.

CLIMATE OF LANGLADE COUNTY

The climate of Langlade County is typically continental, with wide variations in temperature between winter and summer. The summers are cool with but few really hot days. The winters are rather long and the weather is very cold for short periods. Snow covers the ground throughout most winters, usually beginning in the latter part of November. The latest and earliest killing frosts on record came on June 13 and August 7, respectively. The average date for the last killing frost in the spring is May 8, and the first in the fall is September 23. This gives an average frost-free season of 138 days at the county seat.

At Antigo the highest temperature recorded during the years 1894 through 1946 was 101° F., and the lowest, –40° F. The mean annual temperature was 42.2° F. The mean July temperature was 68.5° F.; the mean January temperature was 13.8° F.

The mean annual precipitation is 29.86 inches, nearly two thirds of which comes during the spring and summer.

The climate is favorable to the production of small grains, forage crops, and potatoes. The growing season is in general too short and too cool to grow corn for grain, except in the case of early maturing varieties. Corn can, however, be grown successfully for silage.

See Table 7 in the Appendix for the more important climatic data from the United States Weather Bureau Station at Antigo.

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[3] About 25–100 parts per million of dissolved solids.
[4] About 100–300 parts per million of dissolved solids.

SETTLEMENT AND DEVELOPMENT OF LANGLADE COUNTY

Langlade County was organized in 1879 by Squire A. Taylor as New County, but the name was changed to its present form the following year in honor of Charles de Langlade, a leader of the French and Indians who has been heralded as the first white citizen of Wisconsin. The first permanent white settler in what is now Langlade County was W. L. Ackley, who built the first log cabin near the junction of the east and west branches of the Eau Claire River in 1853. Antigo, the county seat, was staked out and plotted by Francis A. Deleglise, between 1878 and 1882. There are now 17 civil towns in Langlade County.

For the first 10 to 20 years after permanent settlement, lumbering was the principal enterprise. During the same period there was a great increase in the number of farms. After the virgin pine and hardwoods had been logged off, farming operations expanded. Langlade County is now (1947) principally a dairying community. Potato production is important, especially on the Antigo Flats.

Since 1880, when the first census[5] was taken, the population of Langlade County has steadily increased as can be seen by the following figures taken at ten-year intervals: 1880—685; 1890—9,465; 1900—12,553; 1910—17,062; 920—21,471; 1930—21,544; 1940—23,227. In 1905, one fifth of the population was foreign-born, including Germans, Bohemians, Canadians, and Poles. The proportion of foreign-born has decreased greatly since that time. In 1940, 40 per cent of the population lived in Antigo and White Lake, which were the two incorporated places in the county. The remaining 60 per cent of the population lived on farms or in unincorporated places. Forty per cent of the people in the county depended directly on farming for a livelihood. This rural-farm population had a density of 10.7 persons per square mile.

In 1945, 40.2 per cent of the county was in farms, 15 per cent in cropland, and 12 per cent in cropland harvested.

In 1940, the most common size of farm was 80 acres, although the average farm was larger. The proportion of tenancy has al-

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[5] Statistics in this and the following chapter are taken from two sources: U.S. Census; "Langlade County Agriculture," 1946, Wis. Crop and Livestock Reporting Service. Figure 11 presents data from the U.S. Census reports.

ways been low, being 7.2 per cent in 1945. The total value of farm real estate rose after each world war. Since 1920, the value of land has decreased actually, and also relatively, with regard to the value of land and buildings combined.

The trend in the Langlade County public school system has been toward consolidation. Rural, state graded, and high schools are available in most parts of the county. Bus transportation is provided for pupils living at a considerable distance from schools.

According to the 1940 census, Antigo had a population of 9,495. A number of industries are located at Antigo, including a railway repair shop, shoe and glove factories, a veneer and plywood factory, and canning and dairy industries. White Lake, with a population of 548, is a lumbering town. Logs are brought in by truck and railroad to the sawmill and processed there.

In the rough areas of the county are numerous lakes suitable for summer resorts or for wildlife refuge developments. Many lakes have not as yet been exploited because of lack of suitable public roads leading to them.

Two railroad lines traverse Langlade County from north to south: the Chicago and Northwestern, and the Minneapolis, St. Paul and Sault Ste. Marie. One Federal and four State highways run through the county and are numbered on the soil map accompanying this report. There is a system of excellent county trunk highways and a network of lesser roads.

AGRICULTURAL PRODUCTION IN LANGLADE COUNTY

The principal crops grown in Langlade County in 1944 were as follows, listed in order of importance by acreage: tame hay (clover and timothy; alfalfa), 33,880 acres; oats, 17,780 acres; potatoes, 7,950 acres; corn (88 per cent for silage), 7,090 acres; canning peas, 890 acres; barley, 800 acres; wheat, 110 acres; buckwheat, 60 acres; rye for grain, 40 acres.

Potato growing is highly developed in Langlade County.

By far the greatest hay acreage consists of timothy alone or mixed with red clover. The alfalfa acreage has shown some increase during the last 20 years, but is still relatively small. Fruits and berries are grown on most farms, especially in the hilly section of the county.

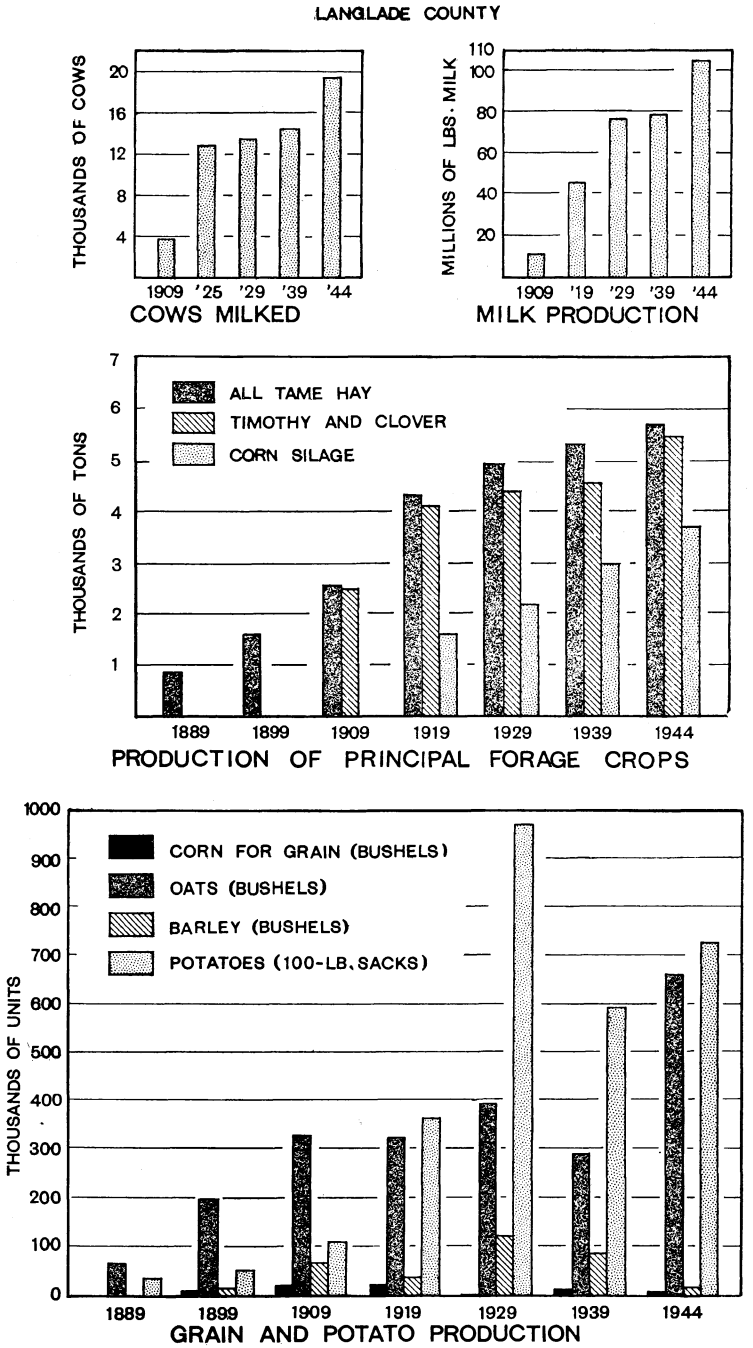
LANGLADE COUNTY
THOUSANDS OF COWS
20
16
12
8
4
1909 '25 '29 '39 '44
COWS MILKED
MILLIONS OF LBS. MILK
110
100
80
60
40
20
1909 '19 '29 '39 '44
MILK PRODUCTION
THOUSANDS OF TONS
7
6
5
4
3
2
1
ALL TAME HAY
TIMOTHY AND CLOVER
CORN SILAGE
1889 1899 1909 1919 1929 1939 1944
PRODUCTION OF PRINCIPAL FORAGE CROPS
THOUSANDS OF UNITS
1000
900
800
700
600
500
400
300
200
100
0
CORN FOR GRAIN (BUSHELS)
OATS (BUSHELS)
BARLEY (BUSHELS)
POTATOES (100-LB. SACKS)
1889 1899 1909 1919 1929 1939 1944
GRAIN AND POTATO PRODUCTION

Figure 11

The farmers derive their largest income from the sale of dairy products. In 1944, the farm income came from the following sources: milk, 47.0 per cent; potatoes, 24.6 per cent; cattle and calves, 8.6 per cent; chickens and eggs, 6.0 per cent; hogs, 3.9 per cent; grains, 1.9 per cent; fruits, 1.4 per cent; hay, 1.4 per cent; peas for canning, 0.8 per cent; turkeys, sheep, wool, etc., 0.4 per cent; seeds, 0.2 per cent; miscellaneous products (largely fuel wood, pulpwood, sawlogs, railroad ties, and fence posts), 3.8 per cent.

The livestock population in the county in 1946 was as follows, listed in order of numbers of animals: cattle, 30,900; milk cows and heifers, 20,300; hogs, 3,700; horses and mules, 2,600; sheep, 1,400.

On nearly every farm chickens are kept, mainly for eggs. In 1939, there were 86,912 chickens. In the same year, 432,480 dozens of eggs were produced.

APPENDIX

CONTENTS

ACREAGE OF SOIL AND LAND TYPES

Table 2

ACREAGE AND PROPORTIONATE EXTENT OF THE SOIL AND LAND TYPES MAPPED IN LANGLADE COUNTY, WISCONSIN

	Acres		Per Cent	
	Individual	Totals	Individual	Totals
First-class Soils (Good Farm Land)				
Antigo silt loam		77,079		13.8
Antigo silt loam	58,455		10.5	
Antigo silt loam, sloping phase	15,040		2.7	
Antigo silt loam, shallow phase	3,023		0.5	
Antigo silt loam, sloping shallow phase	561		0.1	
Kennan loam		15,361		2.8
Kennan loam	14,534		2.6	
Kennan loam, level phase	827		0.2	
Onamia fine sandy loam	6,250	6,250	1.1	1.1
Spencer silt loam	12,354	12,354	2.2	2.2
	111,044	111,044	19.9	19.9
Second-class Soils (Fair to Good Farm Land)				
Almena–Auburndale silt loams	31,037	31,037	5.6	5.6
Brill–Poskin silt loams	17,052	17,052	3.0	3.0
Kennan fine sandy loam	9,283	9,283	1.7	1.7
Omega sandy loam		11,563		2.1
Omega sandy loam	3,142		0.6	
Omega sandy loam, sloping phase	8,421		1.5	
Onamia fine sandy loam, sloping phase	8,155	8,155	1.5	1.5
	77,090	77,090	13.9	13.9
Third-class Soils (Poor Farm Land)				
Adolph loam and stony loam		22,783		4.1
Adolph loam	21,633		3.9	
Adolph stony loam	1,150		0.2	
Almena–Auburndale stony silt loam	356	356	0.1	0.1
Antigo silt loam, sloping stony phase	2,585	2,585	0.5	0.5
Chetek soils, undifferentiated		1,511		0.3
Chetek soils, undifferentiated	628		0.1	
Chetek soils, undifferentiated, sloping phases	483		0.1	
Chetek soils, undifferentiated, steep phases	400		0.1	
Omega sandy loam		3,360		0.6
Omega sandy loam, stony phase	473		0.1	
Omega sandy loam, sloping stony phase	2,887		0.5	
Onamia fine sandy loam, sloping stony phase	721	721	0.1	0.1
Spencer stony silt loam	1,131	1,131	0.2	0.2
Warman loam	6,793	6,793	1.2	1.2
	39,240	39,240	7.1	7.1

Table 2 (Continued)
ACREAGE AND PROPORTIONATE EXTENT OF THE SOIL AND LAND TYPES MAPPED IN LANGLADE COUNTY, WISCONSIN

	Acres		Per Cent	
	Individual	Totals	Individual	Totals
Fourth-class Soils (Forest Land—Wet, Droughty, Hilly, or Stony)				
Adolph soils, undifferentiated		2,599		0.4
Adolph soils, undifferentiated	1,832		0.3	
Adolph stony soils, undifferentiated	767		0.1	
Alluvial soils, undifferentiated	1,260	1,260	0.2	0.2
Kennan loam and Kennan fine sandy loam (hilly or stony)		124,778		22.4
Kennan fine sandy loam, hilly phase	16,356		2.9	
Kennan stony fine sandy loam	14,631		2.6	
Kennan stony fine sandy loam, level phase	798		0.1	
Kennan stony fine sandy loam, hilly phase	37,663		6.8	
Kennan loam, hilly phase	9,858		1.8	
Kennan stony loam	21,119		3.8	
Kennan stony loam, level phase	2,080		0.4	
Kennan stony loam, hilly phase	22,273		4.0	
Muck	13,139	13,139	2.4	2.4
Omega sand		3,129		0.6
Omega sand	2,553		0.5	
Omega sand, sloping phase	576		0.1	
Peat	54,296	54,296	9.7	9.7
Rough land		96,786		17.4
Rough pitted land (loam)	16,926		3.0	
Rough pitted land (fine sandy loam)	22,681		4.1	
Rough pitted land (sandy loam)	6,288		1.1	
Rough stony land (loam)	41,687		7.5	
Rough stony land (sandy loam)	9,204		1.7	
Vilas sandy loam and stony sandy loam		14,026		2.5
Vilas sandy loam	3,191		0.6	
Vilas sandy loam, hilly phase	5,237		0.9	
Vilas stony sandy loam	1,584		0.3	
Vilas stony sandy loam, hilly phase	4,014		0.7	
Wet shallow loams and stony loams, undifferentiated		11,737		2.1
Wet shallow loams, undifferentiated	7,425		1.3	
Wet stony shallow loams, undifferentiated	4,312		0.8	
	321,750	321,750	57.7	57.7
Water		7,968		1.4
Total Land Area, Langlade County		549,124		98.6
Total Water Area, Langlade County		7,968		1.4
Total Area, Langlade County, Wisconsin		557,092		100.0

ESTIMATED YIELDS BY SOIL TYPES

Table 3

CULTIVATED CROP YIELDS

Estimated Yields of Cultivated Crops on the Soils of Langlade County, Wisconsin

Agricultural Rating	Principal Features	Names of Soil and Land Types	Crops and Estimated Yields Per Acre							
			Oats		Barley		Corn for Ensilage		Potatoes	
			Improved Management	Average Management	Improved Management	Average Management	Improved Management	Average Management	Improved Management	Average Management
			Bushels	Bushels	Bushels	Bushels	Tons	Tons	Bushels	Bushels
First-class Soils (Colored green on the soil map)	Easy to cultivate, moderately fertile, respond well to fertilizers, well drained, except Spencer which is moderately well drained	Antigo silt loam	55	40	35	18	9	6	350	150
		Antigo silt loam, shallow phase	50	35	28	14	8	5	275	100
		Onamia fine sandy loam	47	30	------	------	8	5	250	100
		Antigo silt loam, sloping phase	50	35	35	18	9	6	350	150
		Antigo silt loam, sloping shallow phase	50	30	------	------	8	5	200	90
		Kennan loam	55	40	30	15	8	5	275	95
		Kennan loam, level phase	55	40	30	15	8	6	275	95
		Spencer silt loam	50	35	30	20	8	5	275	95
Second-class Soils (Colored purple on the soil map)	Each soil has one or more characteristics which make it less desirable for cultivation than First-class Soils	Almena–Auburndale silt loams	50–30	30–20	------	------	7	4	------	------
		Brill–Poskin silt loams	50–30	30–20	------	------	7	4	------	------
		Kennan fine sandy loam	45	30	------	------	7	4	225	90
		Omega sandy loam	35	25	------	------	6	4	250	90
		Omega sandy loam, sloping phase	35	25	------	------	6	4	225	90
		Onamia fine sandy loam, sloping phase	35	25	------	------	6	4	200	80
Third-class Soils		**Recommended for permanent pasture—See Table 5**								
Fourth-class Soils		**Recommended for forestry—See Table 6**								

ESTIMATED YIELDS BY SOIL TYPES

Table 4

HAY YIELDS

Estimated Yields of Hay on the Soils of Langlade County, Wisconsin

Agricultural Rating	Principal Features	Names of Soil and Land Types	Hay Mixtures and Estimated Yields in Tons Per Acre					
			Alfalfa–Clover–Timothy–Brome			Clover–Timothy		
			Improved Management		Average Management	Improved Management		Average Management
			1st Yr.	2nd Yr.	Per Yr.	1st Yr.	2nd Yr.	Per Yr.
			Tons	Tons	Tons	Tons	Tons	Tons
First-class Soils (Colored green on soil map)	Easy to cultivate, moderately fertile, respond well to fertilizers, well drained except Spencer which is moderately well drained	Antigo silt loam	3	2½	1½	3	2	1½
		Antigo silt loam, shallow phase	2½	2	1½	2½	1½	1
		Onamia fine sandy loam	2½	2	1½	2½	1½	1
		Antigo silt loam, sloping phase	3	2½	1½	3	2	1½
		Antigo silt loam, sloping shallow phase	2½	2	1½	2½	1½	1
		Kennan loam	2½	2	1½	2½	1¾	1½
		Kennan loam, level phase	2½	2	1½	2½	1¾	1½
		Spencer silt loam	3½	2½	1¾*	3½	2	1¾

*Omit alfalfa under average management.

Agricultural Rating	Principal Features	Names of Soil and Land Types	Hay Mixtures and Estimated Yields in Tons Per Acre					
			Alfalfa–Clover–Timothy–Brome			Clover–Timothy		
			Improved Management		Average Management	Improved Management		Average Management
			1st Yr.	2nd Yr.	Per Yr.	1st Yr.	2nd Yr.	Per Yr.
			Tons	Tons	Tons	Tons	Tons	Tons
Second-class Soils (Colored purple on soil map)	Each soil has one or more characteristics which make it less desirable for cultivation than First-class Soils	Almena–Auburndale silt loams				3½	2	1
		Brill–Poskin silt loam				3½	2	1
		Kennan fine sandy loam	2½	2	1½	2½	1½	1
		Omega sandy loam	2½	2	1½	2½	1½	1
		Omega sandy loam, sloping phase	2½	2	1½	2½	1½	1
		Onamia fine sandy loam, sloping phase	2½	2	1½	2½	1½	1
Third-class Soils		**Recommended for Permanent Pasture—See Table 5**						
Fourth-class Soils		**Recommended for Forestry—See Table 6**						

ESTIMATED YIELDS BY SOIL TYPES

Table 5

PASTURE YIELDS

Estimated Yields of Pasture on the Soils of Langlade County, Wisconsin

Agricultural Rating	Principal Features	Names of Soil and Land Types	Pasture Mixtures and Estimated Yields in Cow Days Per Acre # — Alfalfa–Brome, Improved Management Rotational Grazing	Clover–Timothy, Improved Management Rotational Grazing	Renovated Clov.–Tim., Improved Management Permanent Pasture	Blue Grass, Good Management Permanent Pasture	Blue Grass, Unimproved Permanent Pasture
			cda #	cda	cda	cda	cda
First-class Soils (Colored green on the soil map)	Easy to cultivate, moderately fertile, respond well to fertilizers, well drained except Spencer which is moderately well drained	Antigo silt loam	140	115	115	100	75
		Antigo silt loam, shallow phase	120	105	105	90	75
		Onamia fine sandy loam	120	105	105	85	75
		Antigo silt loam, sloping phase	120	105	105	85	75
		Antigo silt loam, sloping shallow phase	120	105	105	80	70
		Kennan loam	130	110	110	85	75
		Kennan loam, level phase	140	110	110	85	75
		Spencer silt loam	150	125	125	90	75
Second-class Soils (Colored purple on the soil map)	Each soil has one or more characteristics which make it less desirable for cultivation than First-class Soils	Almena–Auburndale silt loams		120	120	85	65
		Brill–Poskin silt loams		120	120	90	75
		Kennan fine sandy loam	125	110	110	80	65
		Omega sandy loam	100	90	90	65	40
		Omega sandy loam, sloping phase	100	80	80	60	40
		Onamia fine sandy loam, sloping phase	100	90	90	65	50

 # cda—Cow days per acre: the number of days an acre will support one cow, or the number of cows an acre will support for one day.

Agricultural Rating	Principal Features	Names of Soil and Land Types	Pasture Mixtures and Estimated Yields in Cow Days Per Acre # — Alfalfa–Brome, Improved Management Rotational Grazing	Clover–Timothy, Improved Management Rotational Grazing	Renovated Clov.–Tim., Improved Management Permanent Pasture	Blue Grass, Good Management Permanent Pasture	Blue Grass, Unimproved Permanent Pasture
			cda #	cda	cda	cda	cda
Third-class Soils (Colored yellow on the soil map)	Steepness of slope, stoniness, poor drainage, or droughtiness are the principal limitations of these soils	Adolph loam				100 [1]	60
		Adolph stony loam				100 [1]	60
		Warman loam				100 [1]	60
		Almena–Auburndale stony silt loams				85	65
		Spencer stony silt loam				90	75
		Antigo silt loam, sloping stony phase				85	75
		Onamia fine sandy loam, sloping stony phase				65	50
		Omega sandy loam, stony phase					40
		Omega sandy loam, sloping stony phase					40
		Chetek soils					30
Fourth-class Soils	**Recommended for Forestry—See Table 6**						

[1] When drained.

Table 6

FOREST YIELDS*

Estimated Yields of Forests on Soils of Langlade County, Wisconsin

Soil Types, Phases, and Land Types	Estimated Average Yields of Natural Well-stocked Stands						
	At 100 Years			At 50 Years			At 100 Years
	Northern Hardwood	Ash–Elm Bottom-lands	White and Red Pine	Aspen	Jack Pine	Balsam	Black Spruce
	Thousands of Board Ft. (Scribner Rule)			Standard Rough Cords			
First-class Soils							
Antigo silt loam	14		18	30	35		
Antigo silt loam, shallow phase	14		18	30	35		
Onamia fine sandy loam	14		12	30	35		
Antigo silt loam, sloping phase	12		18	30			
Antigo silt loam, sloping shallow phase	12		18	30			
Kennan loam	10		12	30	35	35	
Kennan loam, level phase	10		12	30	35	35	
Spencer silt loam	10		12	30	35	35	
Second-class Soils							
Almena–Auburndale silt loams	8			20		30	
Brill–Poskin silt loams	6	10		20		25	
Kennan fine sandy loam	10			20			
Omega sandy loam	6		15	20	25		
Omega sandy loam, sloping phase	6		15	20	25		
Onamia fine sandy loam, sloping phase	10		15	20	25		

*This table prepared with the aid of S. R. Gevorkiantz, Silviculturist, Lake States Forest Experiment Station, and S. A. Wilde, Professor of Forest Soils, University of Wisconsin.

Soil Types, Phases, and Land Types	Estimated Average Yields of Natural Well-stocked Stands						
	At 100 Years			At 50 Years			At 100 Years
	Northern Hardwood	Ash–Elm Bottom-lands	White and Red Pine	Aspen	Jack Pine	Balsam	Black Spruce
	Thousands of Board Ft. (Scribner Rule)			Standard Rough Cords			
Third-class Soils							
Adolph loam	6	8		15		25	
Adolph stony loam	6	8		15		25	
Warman loam	6	8		15		25	
Almena–Auburndale stony silt loams	8			20		30	
Spencer stony silt loam	10		12	30	35	35	
Antigo silt loam, sloping stony phase	12		18	30			
Onamia fine sandy loam, sloping stony phase	10		15	20	25		
Omega sandy loam, stony phase	6		15	20	25		
Chetek soils			8	15	20		
Fourth-class Soils							
Kennan stony or hilly loams	10			20			
Rough lands (loams)	10			20			
Kennan stony or hilly fine sandy loams	10			20			
Rough land (fine sandy loams)	10			20			
Vilas sandy loams			15	15	25		
Rough land (sandy loams)			15	15	25		
Omega sand			6	10	15		
Omega sand, sloping phase			6	10	15		
Adolph soils, undifferentiated		6		15		20	
Alluvial soils		6		15		20	
Wet shallow loams		6		15		20	
Muck						20	20
Peat						20	20

CLIMATIC DATA

Table 7

AVERAGE TEMPERATURE AND PRECIPITATION DATA

Monthly, Seasonal, and Annual Temperature and Precipitation at Antigo (Elevation 1,499 Feet), Langlade County, Wisconsin

Month	Temperature			Precipitation			
	Mean	Absolute Maximum	Absolute Minimum	Mean	Total Amount for the Driest Year (1906)	Total Amount for the Wettest Year (1904)	Snow Average Depth
	°F.	°F.	°F.	ins.	inches	inches	ins.
December	19.3	60	—28	.99	0.43	2.70	8.7
January	13.8	55	—36	1.04	1.51	0.20	10.2
February	15.5	59	—40	1.01	0.32	1.15	9.7
Winter	16.2	60	—40	3.04	2.26	4.05	28.6
March	27.4	78	—23	1.40	1.35	0.90	8.7
April	42.1	88	— 2	2.36	1.66	2.30	4.8
May	54.4	100	17	3.48	4.01	8.60	0.4
Spring	41.3	100	—23	7.24	7.02	11.80	13.9
June	63.9	99	26	4.35	2.81	7.55	0.0
July	68.5	101	34	3.86	2.02	5.18	0.0
August	65.5	98	30	3.29	1.75	3.74	0.0
Summer	66.0	101	26	11.50	6.58	16.47	0.0
September	58.3	94	13	3.97	2.25	7.41	Trace
October	46.3	84	4	2.49	1.26	5.52	0.7
November	31.8	73	—12	1.62	2.45	0.25	5.7
Fall	45.5	94	—12	8.08	5.96	13.18	6.4
Year	42.2	101	—40	29.86	21.86	45.50	48.9

Table 8

A CLASSIFICATION OF SOIL SERIES AND LAND TYPES

A Classification of the Soil Series and Land Types of Langlade County, Wisconsin According to Parent Materials and Natural Drainage Conditions

Parent Material		Internal Drainage	Soil Series	Land Types[1]	
				Very Wet Soils	Rough Land
Glacial Till (Mixed Boulders, Sand, Silt, and Clay)	Silt Layer Present on Top	Rapid			Rough stony land (loam)
		Good	Kennan		
		Moderate	Spencer		
		Slow to Very Slow	Almena–Auburndale		
		Nil	Adolph	Wet, shallow loams undifferentiated	
	No Silt Layer Present on Top	Very Rapid	Vilas		Rough stony land (sandy loam)
		Rapid	Kennan		

[1]Undifferentiated as to series.

Table 8 (Continued)

A CLASSIFICATION OF SOIL SERIES AND LAND TYPES

A Classification of the Soil Series and Land Types of Langlade County, Wisconsin According to Parent Materials and Natural Drainage Conditions

Parent Material		Internal Drainage	Soil Series	Land Types	
				Very Wet Soils	Rough Land
Glacial Outwash (Sand and Gravel)	Silt Layer Present on Top	Very Rapid to Rapid	Antigo		Rough pitted land (loam)
		Slow to Very Slow	Brill–Poskin		
		Nil	Warman		
	No Silt Layer Present	Very Rapid	Chetek		Rough pitted land (sandy loam)
		Rapid	Omega Onamia		Rough pitted land (fine sandy loam)
Recent Alluvium				Alluvial soils	
Organic Matter				Peat [2] and Muck [3]	

[2]Peat is composed of organic matter which is only partially decomposed.
[3]Muck is composed of organic matter which is well decomposed.

GEOLOGY AND PHYSIOGRAPHY[6]

Langlade County lies in the Northern Highland, a part of a southern prong of the Canadian Shield of granite and other ancient crystalline rocks. Granite is the dominant bedrock, but quartzite, quartzite conglomerate, diorite, and schist are also present. Glacial drift covers most of the county. The unsorted materials which the ice-sheet left are called till. Ridges and rolling uplands of till constitute the moraines of the county. Outwash, which is stratified, water-laid glacial drift, covers about a fourth of the area of the county. At Ormsby in Peck Township the outwash of the Antigo Plain thins against the till of the smooth, low Morley Hills, whose highest areas lie two and a half miles southwest of Ormsby. The surface of the smooth moraine province (smooth upland of Fig. 10) is thought to extend under the Antigo Plain fill. This buried morainic topography probably has a relief of 50 to 100 feet. The presence of more than 300 lakes and more than 1,500 swamps in Langlade County indicates that the surface drainage of most of the area is poorly developed.

Two lobes of ice of the Cary substage left a clear record in the county.[7] The Langlade lobe on the northeast brought in granite from Oneida, Forest, and Florence counties and some iron formation rocks from the Iron Ranges. The drift is sandy, with a high content of quartz grains. The Green Bay lobe on the southeast brought in some dolomitic limestone from Oconto and Marinette counties, and from Michigan, and also coarse-grained granites from Oconto and Shawano counties. Pebble counts in the southeastern half of the county show a content of up to 54 per cent of dolomitic limestone in the fresh glacial drift. The surface of the drift of the Green Bay lobe slopes generally to the southeast and has better drainage than the drift of the Langlade lobe area.[8]

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[6] See page 37 of this report for more general information on the geology and physiography of Langlade County.

[7] See the map of the continental glacier, Plate VII, Page 80, in Martin, L., "The Physical Geography of Wisconsin," Wis. Geol. & Nat. Hist. Survey Bul. No. 36, Educational Series No. 4, 1916.

[8] See Thwaites, F. T., "Pleistocene of Part of Northern Wisconsin," Geol. Soc. of Am., Bul. 54 : 87–144. 1943.

Six physiographic provinces have been distinguished in Langlade County (see Fig. 10).[9]

1. The Smooth Upland Province on the west rises to 1,600 feet above sea level in the Morley and Bavaria hills in Vilas and Summit townships. The thin drift in this area may be Iowan in age. In Ackley Township both outwash and moraine are very thin. The disintegrated granite substratum causes poor internal drainage.
2. The Antigo Plain Province slopes gently to the south and southwest at about ten feet per mile. The southeast edge of the plain rises slightly to join the end moraine of the Green Bay lobe. Most of the outwash of this flat was contributed by streams issuing from the territory of the Langlade lobe. The break in the end moraine of the Langlade lobe just northeast of Neva was occupied by a stream of glacial melt waters. The surface drainage of the moraine of the Green Bay lobe is chiefly southeast, away from the Antigo Flats. The Antigo Plain is constricted on the south where the Smooth Upland Province approaches the Rough Upland.
3. The Rough Upland Province, in the shape of an elbow with the joint near Kent in Langlade Township, is a thick marginal moraine belt built by Cary ice. It is made of rough ridges and knobs, sags and kettle holes. There is evidence in counties to the west that ice of the Cary substage once extended beyond the limits of the zone of rough moraine. It is possible to consider the moraine as a recessional moraine built by Cary ice after a relatively rapid retreat from a maximum advance which left no terminal moraine.
4. The Rolling Upland Province of Wolf River Township extends eastward from Lily where the Wolf River severs a morainal dam. This province has considerable ground moraine (see Fig. 12).
5. The Southern Sloping Upland Province lies to the south of the Rough Upland and Rolling Upland provinces, and includes areas of both level and rough land. Dolomite pebbles are present in the fresh till, just as they are in the southern

[9] Aldrich and Thwaites, unpublished manuscript in the files of the Wisconsin Geological and Natural History Survey.

limb of the Rough Upland. Aerial photographs of Norwood and Rolling townships show a streaked pattern of unknown origin trending southeast down the slope of the Southern Sloping Upland.

6. The Northern Sloping Upland Province to the north of the Rough Upland contains rough moraine country and also outwash plains and some terraces along the Wolf River and its tributaries, the Hunting, Pickerel, and Lily rivers.

In the Antigo Plain Province, the Smooth Moraine Province, and scattered portions of other provinces of Langlade County, the upper soil horizons are developed in a blanket of silt up to 30 inches thick. It is possible that this silt was deposited by wind as the Cary glacier was retreating from the county. It is probable that the roots of wind-felled trees and possibly burrowing rodents have mixed into the silt cap some gravel and sand from the underlying drift.

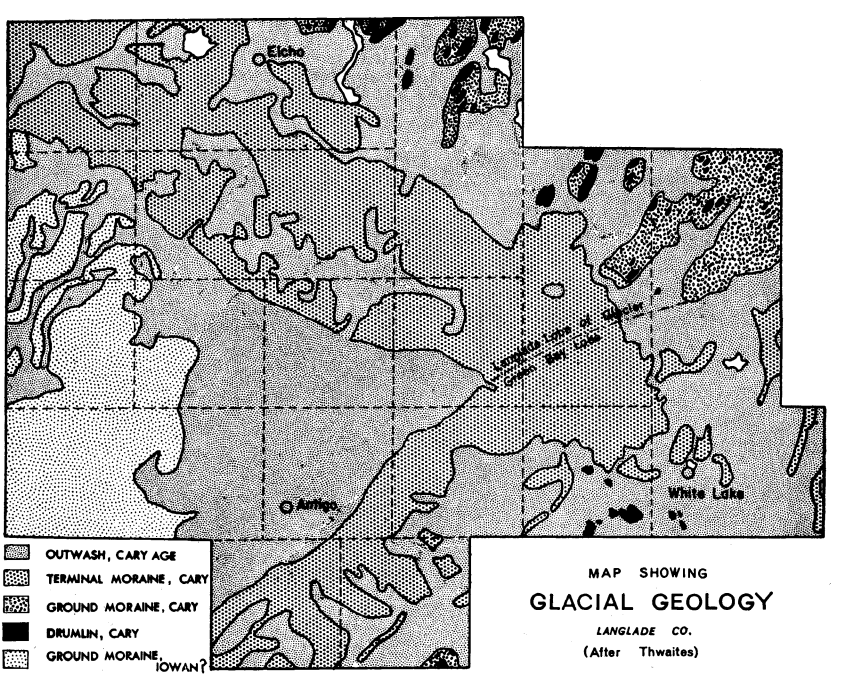


Figure 12

REPORTS ON SOIL SURVEYS IN WISCONSIN WITH DATES OF PUBLICATION

REPORTS BY COUNTIES

Adams, 1924
*Brown, 1929 US
Buffalo, 1917
Calumet, 1925 US
Columbia, 1916
*Crawford, 1930 US
Dane, 1917
Door, 1919
*Fond du Lac, 1914
Green, 1930
Green Lake, 1929
*Iowa, 1914
Jackson, 1923
Jefferson, 1916
*Juneau, 1914
*Kewaunee, 1914
Kenosha, Racine and, 1923
*La Crosse, 1914
Langlade, 1947
Manitowoc, 1926 US
*Milwaukee, 1919
Monroe, 1931
*Outagamie, 1922
Ozaukee, Washington and, 1926
Pierce, 1930
Portage, 1918
Racine and Kenosha, 1923
Rock, 1922
Sauk, 1925 US
Sheboygan, 1929 US
Trempealeau, 1927 US
Vernon, 1928 US
*Walworth, 1924
Washington and Ozaukee, 1926
*Waukesha, 1914
Waupaca, 1921
*Waushara, 1913
Winnebago, 1927 US
*Wood, 1918

REPORTS BY REGIONS

*Northern Wisconsin, 1918
*North Central Wisconsin, 1903
North Part of North Central Wisconsin, 1916
*South Part of North Central Wisconsin, 1918
*Northwestern Wisconsin, 1911
*North Part of Northwestern Wisconsin, 1914
*Northeastern Wisconsin, 1916

REPORTS FOR THE STATE AS A WHOLE

*Soils of Wisconsin, 1927
Preliminary Study of the Profiles of the Principal Soil Types of Wisconsin, 1930
Soils of Wisconsin (Leaflet), 1947

COUNTY REPORTS, IN PREPARATION

Barron
Bayfield

NOTE: The soil survey reports and maps were prepared by the Division of Soils of the Wisconsin Geological and Natural History Survey in cooperation with the United States Department of Agriculture. The reports marked "US" were published by the U.S.D.A. The reports marked with an asterisk (*) may be consulted in libraries, but are no longer available for distribution, except to libraries and public agencies maintaining files for reference.

RECONNAISSANCE

SOIL MAP

LANGLADE COUNTY

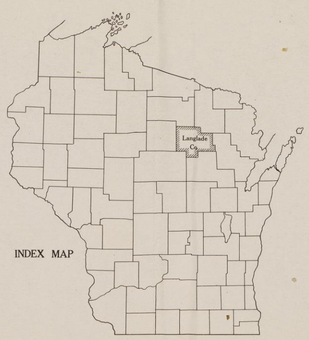
WISCONSIN

WISCONSIN GEOLOGICAL AND NATURAL HISTORY SURVEY
E. F. BEAN, STATE GEOLOGIST
WISCONSIN COLLEGE OF AGRICULTURE
L. L. BALDWIN, DEAN
R. J. MUCKENHIRN, IN CHARGE SOIL SURVEY

COOPERATING AGENCIES:
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY, SOILS AND AGRICULTURAL ENGINEERING
DIVISION OF SOIL SURVEY
GEOGRAPHY DEPARTMENT, UNIVERSITY OF WISCONSIN
WISCONSIN DEPARTMENT OF AGRICULTURE

SOILS SURVEYED BY:
F. D. HOLE, N. P. DAHLSTRAND, D. A. WANLESS, S. RIECER, M. R. ISAACSON, S. A. WILDE, H. H. HILL, V. C. HENDRICKSON, G. M. VOLK, W. W. HILL, AND L. M. WOOD OF THE WIS. GEOL. AND NAT. HIST. SURVEY.

INDEX MAP



SOILS SURVEYED IN 1932, 1945-46.
TO ACCOMPANY LANGLADE COUNTY REPORT, 1947.

BASE MAP FROM MAP SECTION, FOREST PROTECTION HEADQUARTERS, WISCONSIN CONSERVATION DEPARTMENT.

DRAFTED BY JOE STEINMETZ

LEGEND

CONVENTIONAL SIGNS

County Boundary
U. S. Township Line
Civil Township Line
Section Line
National Forest Boundary
Road or Highway
Trail or Lane
Fire Lane
Railroad
Stream
Intermittent Stream
Stony Area — 2-20 loads (cubic yards) of stones per acre
Soil Boundary

House
School
Church
Creamery
Sawmill
Cemetery
Gravel Pit
Dam
Airport
Fire Tower
Fish Hatchery

STONINESS AND SLOPE

Stoniness and slope are indicated in the soil names. The word "stony" in a soil name means there are more than 20 loads (cubic yards) of stones per acre. Stone symbols within an area bounded by a soil boundary or dashed line indicate 2-20 loads per acre.

Soils on the Flats have uniform or simple slopes classified as:

Level	0-2%
Sloping	2-8%
Steep	6-20%

These soils are level unless named as sloping or steep.

Soils on the Uplands have short, broken or complex slopes classified as:

Level	0-2%
Rolling	2-8%
Hilly	8-20%
Rough	20%+

These soils are rolling unless named as level, hilly, or rough.

Pitted Lands are similar in topography to rough Uplands.

Scale 1 inch = 1 mile

1 ½ 0 1 2 3 Miles

LEGEND

FIRST CLASS SOILS
(GOOD FARM LAND)

FLATS		UPLANDS	
Antigo silt loam	Al	Kennan loam	Kl
Antigo silt loam, sloping phase	Alo	Kennan loam, level phase	Kll
Antigo silt loam, shallow phase	Ala	Spencer silt loam	Ss
Antigo silt loam, sloping shallow phase	Alg		
Onamia fine sandy loam	Of		

SECOND CLASS SOILS
(FAIR TO GOOD FARM LAND)

FLATS		UPLANDS	
Brill-Poskin silt loams	BP	Almena-Auburndale silt loams	AA
Omega sandy loam	Ol	Kennan fine sandy loam	Kf
Omega sandy loam, sloping phase	Olo		
Onamia fine sandy loam, sloping phase	Ofo		

THIRD CLASS SOILS
(POOR FARM LAND)

FLATS		UPLANDS	
Antigo silt loam, sloping stony phase	Aln	Adolph loam	Am
Chetek soils, undifferentiated	C	Adolph stony loam	An
Chetek soils, undifferentiated, sloping phases	Co	Almena-Auburndale stony silt loams	AAs
Chetek soils, undifferentiated, steep phases	Cp	Spencer stony silt loam	St
Omega sandy loam, stony phase	Ols		
Omega sandy loam, sloping stony phase	Oln		
Onamia fine sandy loam, sloping stony phase	Ofn		
Warman loam	Wl		

FOURTH CLASS SOILS
(FOREST LAND- WET, DROUGHTY, HILLY or STONY)

FLATS AND PITTED LANDS		UPLANDS					LOWLANDS	
Omega sand	Os	Adolph soils, undifferentiated	As	Kennan loam, hilly phase	Klh	Rough stony land, (sandy loam)	Rs	Vilas stony sandy loam, hilly phase	Vlh	Alluvial soils, undifferentiated	A
Omega sand, sloping phase	Oso	Adolph stony soils, undifferentiated	Au	Kennan stony fine sandy loam, hilly phase	Kth	Rough stony land, (loam)	Rl	Wet shallow loams, undifferentiated	Ws	Muck	M
Rough pitted land, (loam)	Rp	Kennan fine sandy loam, hilly phase	Kfh	Kennan stony loam, level phase	Ksl	Vilas sandy loam	Vs	Wet stony shallow loams, undifferentiated	Wt	Peat	P
Rough pitted land, (fine sandy loam)	Rf	Kennan stony fine sandy loam	Kt	Kennan stony loam, hilly phase	Ksh	Vilas sandy loam, hilly phase	Vsh				
Rough pitted land, (sandy loam)	Rm	Kennan stony fine sandy loam, level phase	Ktl	Kennan stony loam	Ks	Vilas stony sandy loam	Vl				

See stoniness and slope legend at left.

WHAT SOILS DO I HAVE ON MY FARM?

WHAT CROPS WILL GROW WELL ON THESE SOILS?

HOW SHOULD I MANAGE MY SOIL TO MAKE IT YIELD ITS BEST?

WHERE SHOULD FORESTS BE GROWN?

Information on these and other important questions is given in this Soil Report. Anyone interested in the land of Langlade County, Wisconsin will find this report useful . . . . . .