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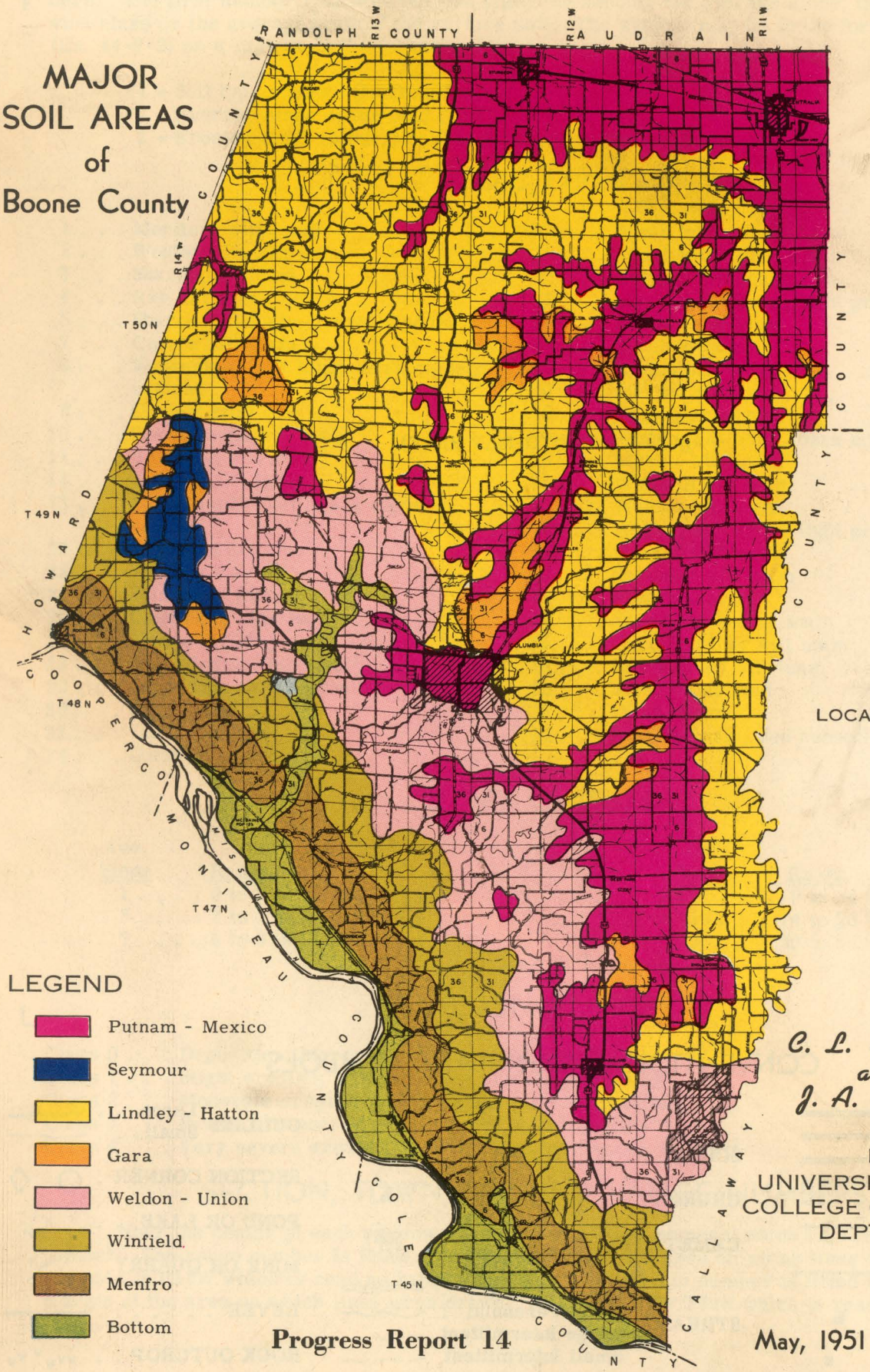
SOILS OF BOONE COUNTY

MAJOR SOIL AREAS of Boone County



LOCATION IN MISSOURI

LEGEND

- Putnam - Mexico
- Seymour
- Lindley - Hatton
- Gara
- Weldon - Union
- Winfield
- Menfro
- Bottom

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Prepared by
UNIVERSITY OF MISSOURI
COLLEGE OF AGRICULTURE
DEPT. OF SOILS
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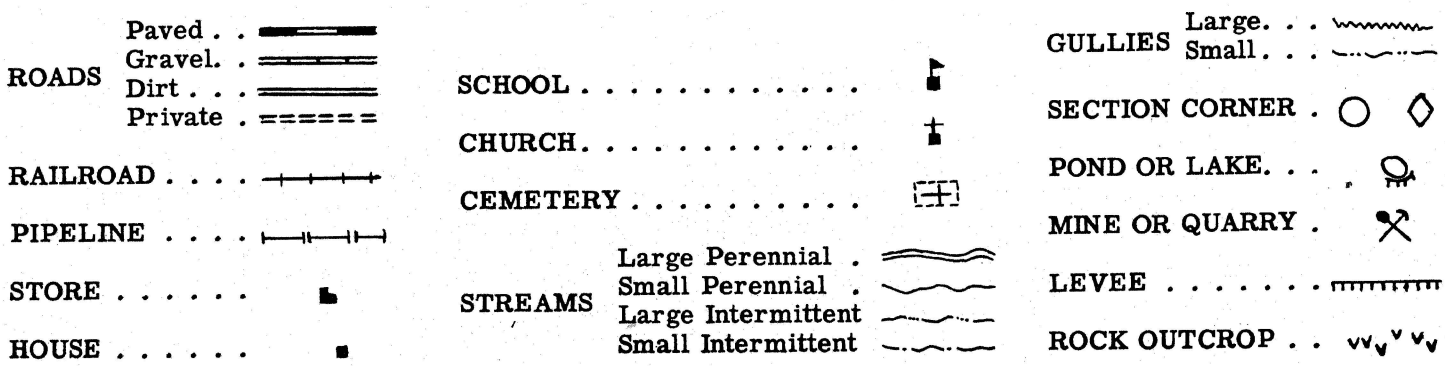
Progress Report 14 May, 1951

Here is a detailed soils photo-map representing a small area of the county. To locate this area, first note the map number (shown in white rectangle at the top-center of map). Then refer to index of photo-maps on page 4.

(ATTACH PHOTO-MAP HERE)

CONVENTIONAL SIGNS AND SYMBOLS



NUMBER SYMBOLS ON THE PHOTO-MAP

Each mapping unit delineated on the photo-map contains a symbol, consisting of three numbers. The first number indicates the soil type; the second, the average slope; the third, the erosion class or the average depth of the surface soil. The symbol may be in the form of an equation, (Ex. 44-7-2) or it may be in the following form:

44 = Soil type number (Lindley Loam)
7 = Average slope of the land (7%)
2 = Erosion class (Moderate, 2 to 6 inches surface soil remaining)

SOIL TYPES

1 . . . Moniteau silt loam
2 . . . Westerville silt loam
3 . . . Sharon silt loam
4 . . . Ray silt loam
5 . . . Sharon silt loam, gravelly phase
7 . . . Cuivre silt loam
8 . . . Westerville silt loam, dark colored variant
9 . . . Carlow silty clay
10 . . . Robertsville silt loam
11 . . . Bertrand silt loam
12 . . . Jackson silt loam
13 . . . Jackson silt loam, dark colored variant
22 . . . Wabash silty clay
23 . . . Wabash clay
24 . . . Salix clay loam
25 . . . Cass silty clay loam
26 . . . Cass silty clay
28 . . . Sarpy loamy fine sand
29 . . . Sarpy fine sandy loam
30 . . . Sarpy sand
33 . . . Gara loam
34 . . . Union silt loam
37 . . . Snead silty clay
39 . . . Mandeville silt loam
40 . . . Putnam silt loam
41 . . . Mexico silt loam, light gray variant
42 . . . Mexico silt loam
44 . . . Lindley loam
45 . . . Hatton silt loam
46 . . . Marion silt loam
48 . . . Gray glacial clay
49 . . . Mexico silt loam, dark colored variant
50 . . . Menfro silt loam
51 . . . Winfield silt loam
52 . . . Weldon silt loam
53 . . . Weldon silt loam, light gray variant
54 . . . Dennis silt loam
60 . . . Seymour silt loam
71 . . . Riverwash
72 . . . Snead stony clay loam
73 . . . Gosport stony silt loam
74 . . . Union stony silt loam
75 . . . Steep stony land
76 . . . Strip mines
144 . . . Lindley loam, red subsoil variant

SLOPE CLASSES

Ave. Slope	Range
1	0 to 2 % slopes
3	2 to 5 % slopes
7	5 to 9 % slopes
11	9 to 14 % slopes
16 . . .	14 to 20 % slopes
25 . . .	20 to 35 % slopes

50 . . . . Over 35 % slopes

EROSION CLASSES

Class 0 . . . Deposition; More than 10 inches of topsoil
Class 1 . . . Slight erosion; Over 6 inches surface remaining
Class 2 . . . Moderate erosion; 2 to 6 inches surface remaining
Class 3 . . . Severe erosion; Subsoil exposed, small gullies
Class 4 . . . Very severe erosion; Badly gullied, cultivation difficult

SECTION, TOWNSHIP, AND RANGE NUMBERS

Near the center of each section will be found a large numeral which represents the section number. The range number is found in the top margin of the area on which lines were drawn. An example is R12W which is read as range 12 west. The township number is found in the right hand margin of the area on which lines were drawn. An example is T49N which is read as township 49 north.

INDEX FOR LOCATION OF PHOTO-MAP

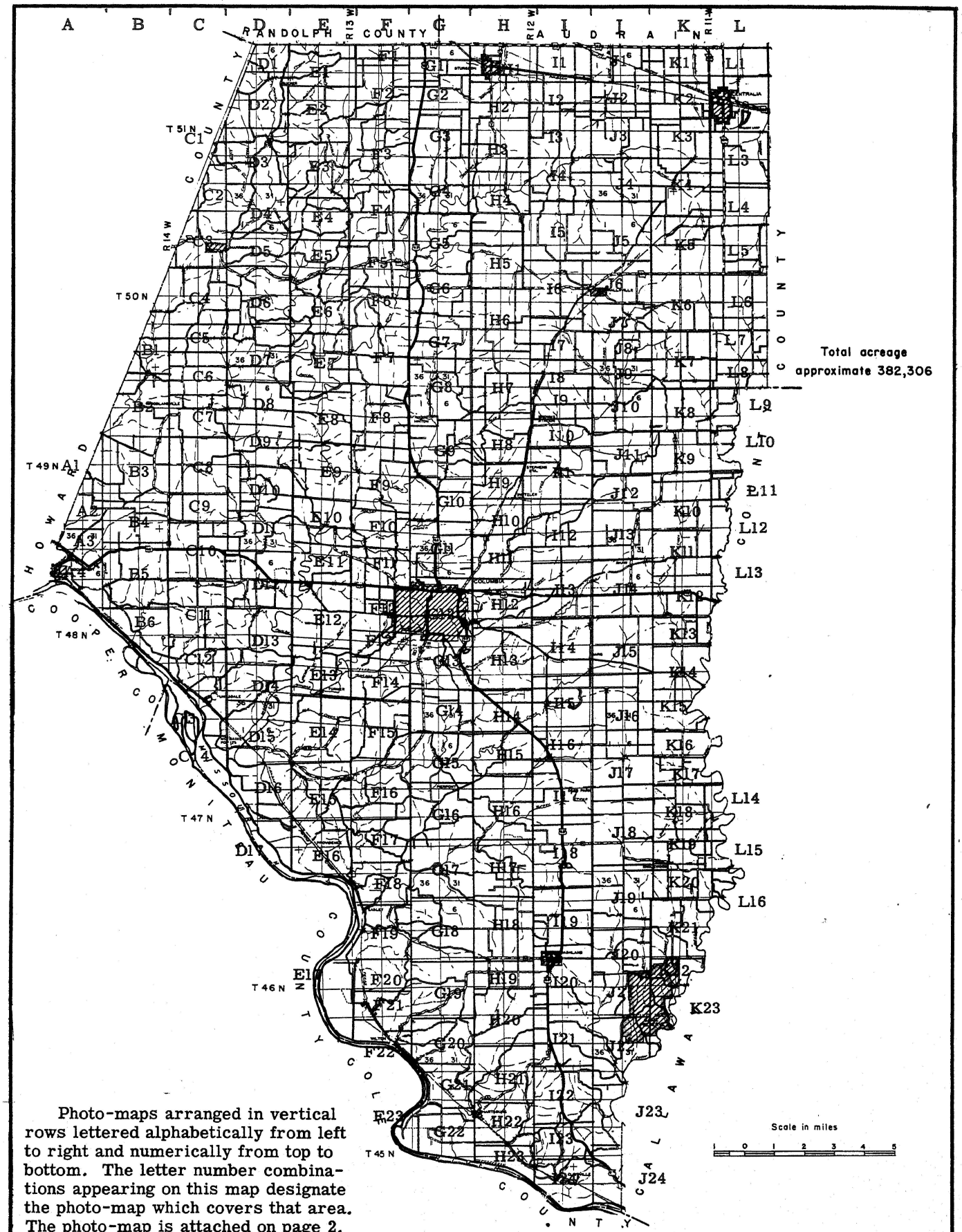


Photo-maps arranged in vertical rows lettered alphabetically from left to right and numerically from top to bottom. The letter number combinations appearing on this map designate the photo-map which covers that area. The photo-map is attached on page 2.

DISCUSSION OF SOIL TYPES*

SOILS OF THE SMALL CREEK BOTTOMS

No. 1--Moniteau silt loam. Light gray, silty soil, of low fertility. The gray color has resulted from poor drainage and aeration. This condition still exists and has a detrimental effect on crops such as corn. Moderate crop yields are obtained in favorable years with the use of fertilizer. In general, these soils are best suited for growing of hay and pasture crops.

No. 2--Westerville silt loam. First bottom soil that has a brown surface and grayish brown or gray subsoil below a depth of 18 to 24 inches. The gray color is the result of restricted subsoil drainage, which has a noticeable effect on corn in that yields are lower on Westerville than on the associated Sharon soil which is brown throughout. Areas occurring in small bottoms are used largely for pasture. Large areas are used almost exclusively for corn or other grain crops.

No. 3--Sharon silt loam. Brown, deep, well drained, fertile first bottom which is superior to Westerville in productivity. The brown color throughout indicates that there is good internal drainage and aeration. Overflows keep a fresh supply of minerals and plant nutrients available. Alfalfa and corn grow well without special treatment. Nitrate fertilizers, however, show beneficial effects.

No. 4--Ray silt loam. Brown, deep, well drained, fertile soil in the Missouri River bottom and adjoining small creek bottoms. The fertile, erosive river hill soils have furnished most of the silty sediments. A wide range of crops including corn and alfalfa grow well.

No. 5--Sharon silt loam, gravelly phase. Soil similar to No. 3 but gravelly lenses occur at depths ranging from six inches to three feet. The gravel may hinder cultivation. It also has the effect of lowering the moisture-holding capacity of the soil. However, natural fertility is high as these soils occur in areas having outcrops of fresh or unweathered limestone on the upland slopes.

No. 7--Cuivre silt loam. Poorly drained small bottoms occuring in the region of gently sloping prairie soils. The immediate surface soil is dark but the lower layers are gray due to lack of sufficient internal drainage. The natural fertility is high enough that good pastures are maintained.

No. 8--Westerville silt loam, dark colored variant. Dark colored high bottoms. The surface is silty but heavier textures occur below a depth of 2 feet. The location is generally at the base of upland slopes which have limestone or limestone and shales near the surface. Seepage of water from these upland areas has brought in lime and caused the dark color. This soil is often wet. The natural fertility is high and where surface drainage can be provided, productivity is high.

No. 9--Carlow silty clay. Dark gray, heavy textured, poorly drained, high bottom. Areas occur mostly in the Perche Creek bottom south of Highway 40. Drainage is deficient and fertility is inferior to most of the first bottom soils. The heavy texture and wetness limit crops to pasture, small grain and soybeans.

SOILS ON TERRACES OR BENCHES

No. 10--Robertsville silt loam. Light gray, silty, poorly drained terrace land which is low in fertility. The gray indicates poor drainage and aeration, low organic matter and high acidity. Meadow crops such as timothy and lespedeza give best results. Cultivated crops should be grown only after lime, fertilizer and organic matter have been added. Wet seasons generally result in low crops yields.

No. 11--Bertrand silt loam. Brown, silty, deep, well drained, fertile terrace land. This soil type occurs largely in the river hill country. The same mantle of fertile, silty, windblown material as covers the river hills has been deposited on these terraces. This windblown material, known as loess, has undergone little weathering and therefore Bertrand soils are high in fertility. The gentle

* The general features of the soil types are more briefly grouped for comparative purposes on pages 10 and 11.

to nearly level slopes, the favorable physical properties and the high inherent fertility make this soil type very desirable for a variety of crops including alfalfa and corn.

No. 12--Jackson silt loam. This soil type has a brown silty surface 12 to 18 inches in depth, a gray, silty subsurface layer, and a gray silty clay or silty clay loam subsoil. The gray layer is evidence that this soil is poorly drained and related to Robertsville (No. 10). The brown surface indicates that drainage of the immediate surface is much better than in Robertsville. The poor internal drainage of this soil has a noticeable detrimental effect on corn, alfalfa, and clovers. However, corn, and clovers can be grown.

No. 13--Jackson silt loam, dark colored variant. Dark colored, medium textured terrace having a silty clay subsoil. The dark color indicates a good supply of organic matter. Limestone ledges generally occur near these terraces. The added calcium has helped maintain the fertility on Jackson, and clovers thrive better. This soil type will produce well under frequent cultivation.

SOILS OF THE MISSOURI RIVER BOTTOM

No. 22--Wabash silty clay loam. See the discussion of soil No. 23 to which this soil is similar. Both soils have a very dark gray clay subsoil. However, the silty clay loam surface of soil No. 22 is more open and allows better root, water, and air penetration. Consequently, yields are higher, especially for corn.

No. 23--Wabash clay. Very dark colored, very heavy textured, but fertile bottomland which is difficult to cultivate when either wet or dry. For this reason it is locally known as gumbo. The subsoil is a very dark clay. A drainage porblem occurs in that these soils occupy the low areas of the bottom next to the bluffs. The heavy texture and wetness limit corn production. However, soybeans and wheat thrive.

No. 24--Salix clay loam. Very dark brown, deep, fertile and productive high bottom near McBaine. Organic matter content is high as evidenced by the dark color. There is enough sand in the soil to give good tilth. Overflow occurs only occasionally. This is a good soil in every respect.

No. 25--Cass silty clay. Very dark brown to nearly black, heavy textured, fertile bottom. At a depth of 2 to 3 feet, sand lenses are found. These lenses of sand improve the internal drainage and give rise to a more productive soil than the associated Wabash. Surface drainage is a problems since these soils occupy low lying areas. Cultivation is difficult in wet or dry periods. Small grains, soybeans, and clovers grow well.

No. 26--Cass clay. See the discussion of Cass silty clay, (No. 25). This soil differs from No. 25 only in having a heavier surface texture. Consequently, cultivation is more difficult than on Cass silty clay loam.

No. 28--Sarpy loamy fine sand. First, see the discussion of soil No. 29. Areas of soil No. 28 have more sand than areas of No. 29. Therefore the moisture holding capacity is reduced to such an extent that corn yields are lower. Legumes produce very well and incorporation of these as green manure crops will improve the moisture holding capacity and greatly increase corn yields.

No. 29--Sarpy fine sandy loam. Light brown, permeable, very fertile soil which is easily tilled. The soil is excellent for alfalfa and clover production. Corn yields are high when organic matter and nitrogen are added. Intensive cultivation may be practiced with no harmful results.

No. 30--Sarpy sand. Deep deposits of fresh sand. Fertility is high but the moisture content may be low. Once legume roots reach a depth of 2 feet, survival is good. The extreme sandiness causes much of this land to be left idle.

No. 33--Gara loam. Dark gray, loamy surface soil over a sticky, gritty clay loam subsoil which occurs on slopes averaging about 6 per cent. This gradient and the friable surface make erosion severe under cultivation. Therefore erosion control methods are important. Good crops of corn, legumes, and small grain can be produced. Gara loam provides good permanent pastures. When not eroded, bluegrass thrives. Areas which are mapped 3 and 4 erosion are not suited for cultivation. A program of pasture rejuvenation is necessary to bring returns on eroded areas.

No. 34--Union silt loam. Light brown soil with a yellowish brown or reddish brown, permeable subsoil. Limestone is the dominant source of soil material. The light brown surface indicates a low content of organic matter. The reddish brown subsoil indicates good internal drainage and aeration. The soil is used for pasture and bluegrass will grow well. Where slopes are 7 per cent or less, cultivation can be practiced with good results.

No. 37--Snead clay loam. Dark colored, heavy textured, fertile soil underlain at shallow depths, (14 to 20 inches) by shale and limestone. Slopes are generally 7% or greater. Natural fertility is high. Good pastures may be obtained with no special treatment and bluegrass grows well. Only a small per cent of the land is in cultivated crops.

No. 39--Mandeville silt loam. Light colored, medium textured soil of low inherent fertility. Organic matter and phosphorous are very low. The subsoil is a silty clay, and physical properties are such that make the soil very responsive to treatment. Pasture is the dominant land use. The inferior quality of the pastures is mainly due to the inferior quality of the soil.

No. 40--Putnam silt loam. Nearly level soil with a grayish brown silty surface, an underlying light gray silty subsurface, and a dense, clay subsoil known as a "claypan". The total depth of silty material is about 15 inches of which 8 inches is surface and 7 inches is subsurface. The light color of the subsurface has resulted from poor drainage caused by the claypan. Incorporation of organic matter and fertilizer will greatly improve production. Corn, soybeans, small grain, and pasture crops are grown successfully.

No. 41--Mexico silt loam, light gray variant. See discussion of soil No. 42 to which this soil is very similar.

No. 42--Mexico silt loam. This soil has a dark gray silty surface underlain by a light brownish gray subsurface. A dense and slowly permeable subsoil begins at a depth of about 15 inches. This soil is similar to Putnam but the subsurface is light brownish gray instead of gray and is more friable. Erosion control methods including terraces are highly desirable where the soil is to be cultivated. Loss of the silty surface is serious as the clay subsoil is undesirable for crop production. Main crops grown are pasture, corn, small grain, and sweet clover.

No. 41--Mexico silt loam, light gray variant, varies as the name implies. That is, the surface color is lighter. Yields are less than on soil No. 42.

No. 44--Lindley loam. Light colored, shallow soil with a sticky, yellow-brown, gritty clay loam subsoil. It is locally known as "White Oak land". The uneroded soil has about 7 inches of topsoil but on many slopes only 2 to 3 inches remain. All plant nutrients are low and the slopes vary from 6 to 25 per cent. Because of the dissected surface, and the low fertility of the soil, most of the land is used for pasture. Many areas are still in white oak forest.

No. 45--Hatton silt loam. Light colored soil with a silty surface, and a yellow brown clay subsoil similar to the subsoil of Lindley. The soil occupies the narrow, gently sloping ridgetops in areas of Lindley. About 2 feet of silty material occurs over sandy plastic glacial clay. Crops grown are the same as for Lindley, but yields are slightly higher due to the deeper surface.

No. 48--Gray glacial clay. In the northern part of the county where the level prairie (Putnam) breaks off into the rolling timber land (Lindley) small areas of highly weathered glacial till are exposed. These areas give rise to a soil having 5-6 inches of gray silty material, underlain by a gray, inert clay. Areas of this type are of very low fertility, and generally covered with wild grass.

No. 49--Mexico silt loam, dark colored variant. This soil is similar to type No. 42, but has a darker surface soil and a more friable and permeable subsoil. It occurs on gently slopes. All of the land is in cultivation, and is considered one of the better upland soils in the county.

No. 50--Menfro silt loam. Brown, deep, well drained, fertile soil occuring on moderate to steep slopes in the river hills adjacent to the river bottom. The uniform brown color and the medium texture of the subsoil are indicators of the high quality. Steep topography and erosion are serious limitation to the use of land for cultivation. Most of it is used for pasture. Alfalfa will thrive without soil treatment. Orchards and tobacco are special crops successfully grown.

No. 51--Winfield silt loam. The Winfield soil is related to the Menfro but differs from the latter in that it has gray mottling in the subsoil starting at a depth of about 2 feet. Acidity will be a little greater and the general fertility level is slightly lower than that of Menfro. Differences are great enough to be evident on deep rooted crops such as alfalfa or fruit trees. The texture of subsoil, slope of land, and use of land are the same as on Menfro silt loam.

No. 52--Weldon silt loam. This is a pale brown soil, about 12 inches in depth, with a yellow brown plastic silty clay subsoil. It is associated with the Winfield soil, but is less productive than the latter. The surface is moderately hilly and erosion is severe. Most of the land is in pasture. Areas suitable for cultivation are used for corn and small grains. Yields are low. The soil is responsive to lime and fertilizer. Erosion control is necessary.

No. 53--Weldon silt loam, light gray variant. Similar to type No. 52, but occurs on almost level areas and therefore has acquired lighted color. All of it is in cultivation.

No. 54--Dennis silt loam. A dark, deep mellow soil that grades into a yellow brown, friable silty clay subsoil. It occurs on low slopes in regions where shale and limestone are near the surface. Well adapted to all grain crops, including corn. Pastures are good without soil treatment.

No. 60--Seymour silt loam. This represents the dark soil area around Woodlandville. The silty surface soil averages about 12 to 15 inches in depth. The subsoil is a gray brown, plastic silty clay. Erosion is severe, and has modified the depth of the soil on many slopes. Practically all the land is in cultivation, and is considered one of the better upland soil areas in the county.

No. 71--Riverwash. These areas are sand bars and other areas subject to very frequent overflow. They are generally too hazardous for crop production.

No. 72--Snead stony clay loam. This soil is too stony for cultivation. The soil material is very dark and heavy textured. Tame grasses thrive where soil is of sufficient depth. Walnut, elm, and associated trees make up the forest on this land.

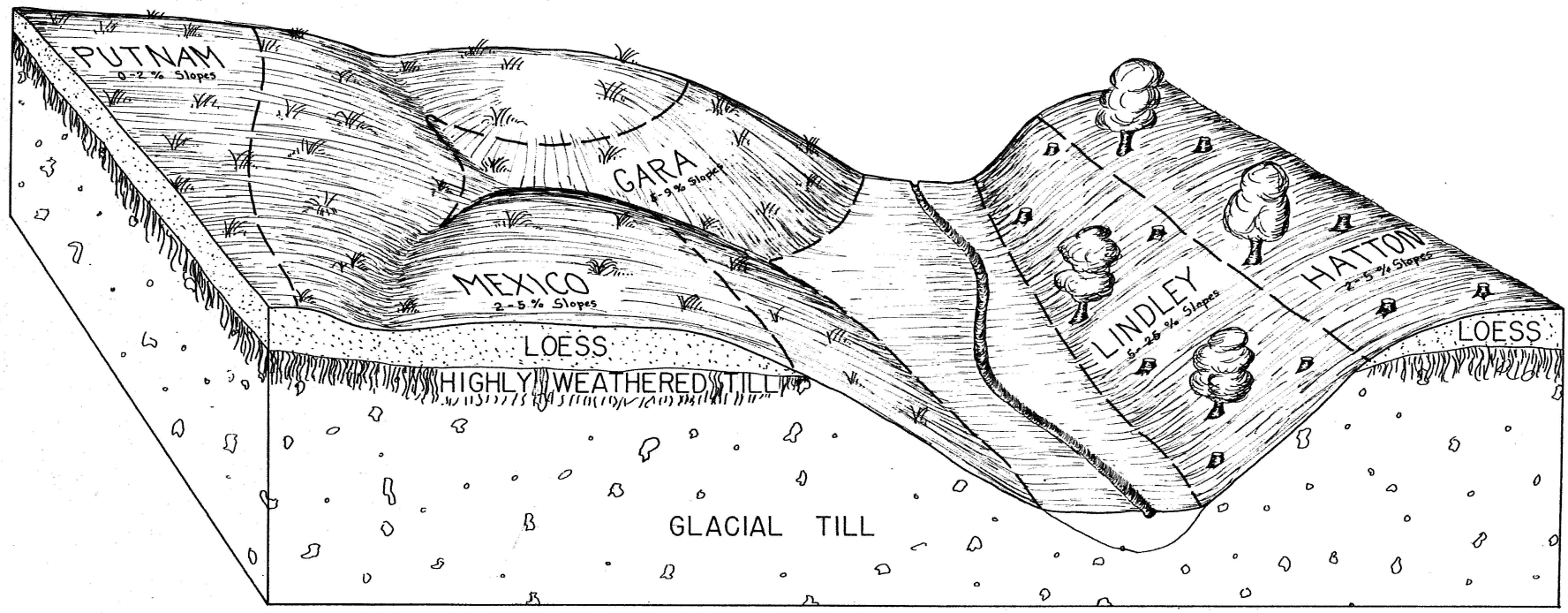
No. 73--Gosport stony silt loam. This soil is non-arable due to high stone content. The shallow soil material between stones is light brown in color. White oak forest is the dominant cover. Pastures are poor.

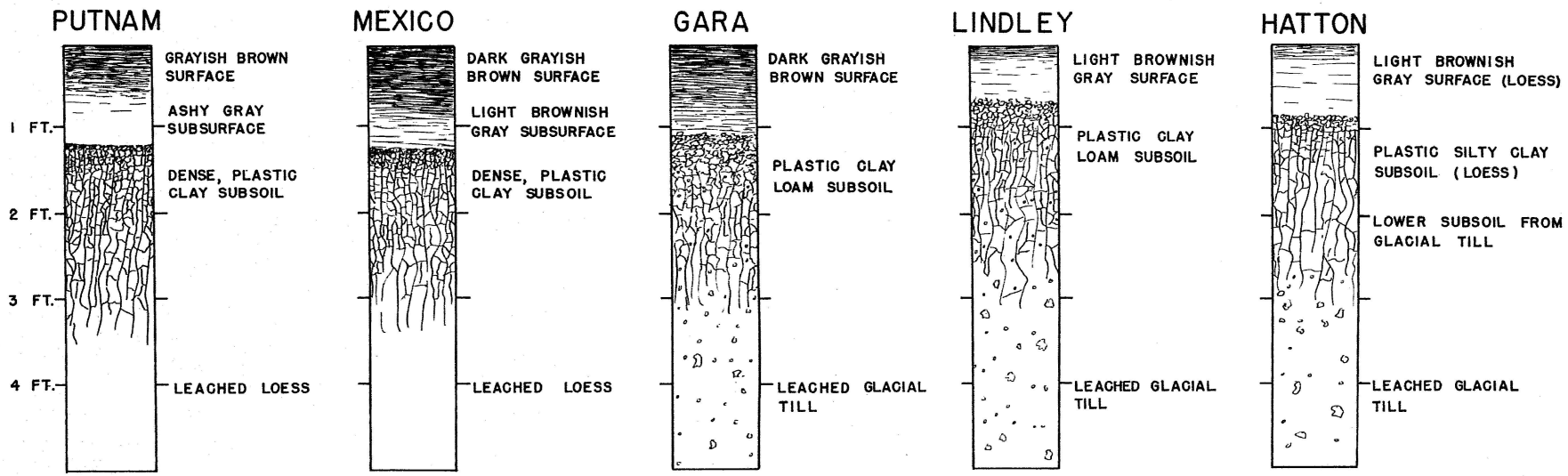
No. 74--Union stony silt loam. This soil is too stony for cultivation, but much of it can be used for pasture. The soil material is pale brown at the surface and reddish brown in the lower depths. Practically all of this land is in forests of white oak, walnut, and elm.

No. 75--Steep stony land. This type of land has outcrops of limestone ledges and limestone bluffs. Maple, elm, walnut, and oak are dominant forest trees.

No. 76--Stripmines. Areas in Boone county which have been stripped for coal are essentially useless for agriculture. They may eventually be of some value for pasture or forest.

No. 144--Lindley loam, reddish subsoil variant. See the discussion of Lindley loam (No. 44) to which this soil is very similar. Areas of 144 have a redder and more friable subsoil than areas of 44, and are somewhat more productive. Much of this soil is used for pasture. Cultivation results in very severe erosion.





RELATIONSHIP OF SOME UPLAND SOIL SERIES TO PARENT MATERIAL, SLOPE AND NATIVE VEGETATION

GENERAL FEATURES OF THE SOILS

Field No. of Soil	Soil Type	Surface Color	Main features	Upland slope range (percent)	Agriculture land class (7 classes)
1.	Moniteau silt loam	Light gray	Bottomland, overflow, inferior to No. 2 and No. 3		4
2.	Westerville silt loam	Brown	Bottomland, deep, productive		2
3.	Sharon silt loam	Dark brown	Bottomland, deep, very productive		1
4.	Ray silt loam	Brown	Bottomland, permeable, very productive		1
5.	Sharon silt loam, gravelly phase	Dark brown	Bottomland, similar to No.3, but gravelly subsoil		3
7.	Cuivre silt loam	Dark gray	Bottomland, prairie section, medium productive		3
8.	Westerville silt loam, dark variant	Black	Bottomland, heavy texture, slowly drained		3
9.	Carlow silty clay	Dark gray	Bottomland, heavy texture, medium productive		3
10.	Robertsville silt loam	Light gray	Benchland, clay subsoil, inferior to No. 11 and No. 12	1 - 3	4
11.	Bertrand silt loam	Brown	Benchland, permeable, very productive	1 - 3	1
12.	Jackson silt loam	Grayish brown	High bottomland, medium productive	1 - 3	3
13.	Jackson silt loam, dark variant	Dark gray	High bottomland, clay subsoil, superior to No. 12	1 - 3	3
22.	Wabash silty clay	Black	River bottom, dark heavy land		2
23.	Wabash clay	Black	River bottom, gumbo		3
24.	Salix clay loam	Dark brown	High bottom, deep, very productive		1
25.	Cass silty clay loam	Dark brown	River bottom, deep dark soil over sand		1
26.	Cass silty clay	Dark brown	River bottom, deep dark soil over sand		2
28.	Sarpy loamy fine sand	Light brown	River bottom, deep, open, overflow		1
29.	Sarpy very fine sandy loam	Light brown	River bottom, deep, open, overflow		1
30.	Sarpy sand	Light brown	Loose sand, recent deposition		4
33.	Gara loam	Dark gray	Shallow soil over clay loam subsoil, medium productive	5 - 11	3
34.	Union silt loam	Light brown	Brown limestone soil, medium productive, erosive	3 - 16	4 & 6

37.	Snead silty clay	Black	Dark shallow soil over shale and limestone	5 - 14	5
39.	Mandeville silt loam	Light brown	Shallow brown soil, erosive	9 - 19	5 & 6
40.	Putnam silt loam	Grayish brown	Level prairie, clay subsoil, medium productive	0 - 2	3
41.	Mexico silt loam, light gray variant	Grayish brown	Similar, but inferior to No. 42	2 - 5	4
42.	Mexico silt loam	Dark gray	Similar to No. 40, slightly sloping	2 - 5	3
44.	Lindley loam	Yellowish brown	Shallow soil over clay loam subsoil, erosive, inferior	5 - 25	5
45.	Hatton silt loam	Pale brown	Similar to No. 44	3 - 7	4
46.	Marion silt loam	Light gray	Ridgeland, clay subsoil, inferior	1 - 3	4
48.	* Dense glacial clay	Grayish brown	Shallow soil, over dense gray clay, inferior	2 - 5	6
49.	Mexico silt loam, dark variant	Dark gray	Prairie, similar to No. 42, but darker	2 - 5	3
50.	Menfro silt loam	Brown	Deep, open soil from loess on river hills	5 - 50	3 & 5
51.	Winfield silt loam	Brown	Similar to No. 50, but heavier subsoil	5 - 30	3 & 5
52.	Weldon silt loam	Grayish brown	Yellowish brown friable clay subsoil, low productive	3 - 11	4 & 5
53.	Weldon silt loam, light gray variant	Grayish brown	Similar to No. 52	3 - 7	4 & 5
54.	Dennis silt loam	Dark brown	Dark, deep, productive, on low slopes	3 - 7	3
60.	Seymour silt loam	Dark gray	Dark soil over clay subsoil, productive	3 - 7	2
71.	* Riverwash	Light brown	Recent river deposits		
72.	Snead stony clay loam	Black	Dark shallow soil over limestone	9 - 30	6 & 7
73.	Gosport stony silt loam	Light brown	Shallow soil, over partially weathered shale	9 - 30	6 & 7
74.	Union stony silt	Light brown	Shallow brown soil from limestone	9 - 30	6 & 7
75.	* Steep stony land		Limestone bedrock on steep slopes		
76.	* Strip mines and dumps		Waste land		
144.	Lindley loam, red subsoil variant	Grayish brown	Shallow soil over red clay loam subsoil, erosive, inferior.	5 - 14	5

* Miscellaneous land types.