History of Kansas Soil Survey

Compiled by Wesley L. Barker

October 1987

Soil Survey work has been going on in Kansas since around the turn of the century. However, this short history will deal with that time after the establishment of the Soil Conservation Service in 1935. The early soil surveys were on maps made by the surveyor using a plane table. Starting in the late 1930's, aerial photographs were used as a base map for the soil surveys. Soil scientists of that day were convinced these new aerial photographs would not work, but time has proven them to be most valuable.

Mr. Alvin W. Goke was stationed in Salina, Kansas, from approximately 1936 to 1946. He was in charge of the eastern Kansas detailed legend which was used at that time. This was a legend using the soil series as a basis for mapping the soils. It is unclear however, if his title was state soil scientist or area soil scientist.

Following World War II, Mr. Nicholas Holowaychuk was State Soil Scientist from July 1946 to June 1947. His office was at Kansas State in Manhattan. He was transferred from Montana to Kansas, and for reasons unkown to the author, he resigned after about a year in Kansas and moved to Ohio. He received his doctorate from Ohio State where he taught for many years.

Dr. Claude L. Fly was State Soil Scientist from July 1947 to 1952 when he resigned to take an overseas assignment. While headquartered at Kansas State University, Dr. Fly designed a new soil legend which was known as Fly's State Legend. This legend was also designed with the soil series concept in mind. Most, if not all, of the reconnaissance maps were printed

with Fly's legend and were mostly written by Fly and Robert Eikleberry. Most of the field work for these reconnaissance maps was completed in the early 1940's by several different soil scientists.

The Soil Conservation Service has had responsibility for soil surveys since 1935, but until 1952, the Bureau of Plant Industry had all correlation responsibilities. Saline, Geary, Ellsworth, and Brown Counties were completely mapped during that time. Saline county was written by Arvid Cline; Geary County, by Dr. O. W. Bidwell of KSU; Brown County, by Robert Eikleberry; and Ellsworth County was not published. Before 1952, most other soil surveys were made only for farm planning and special projects.

Sometime in the early 50's, Kansas used what was known as the National Code. This was a legend foreign to the series concept. Some learned people believed this legend was a detriment to the soil survey in Kansas, and it was soon discontinued.

Henry Otsuki and Dick Jackson handled the soil survey needs after Dr. Fly's resignation and before Art Nelson came to Kansas as State Soil Scientist in 1953. In July 1955, the standard soil survey or progressive soil survey was initiated in Hamilton County with C. W. McBee as party leader. The final acre was mapped in Washington County in 1987 under this system with Stanley Glaum as party leader. Also started in 1955 were Republic, Stevens, and Ford Counties with Harry Atkinson, Harold Dickey, and Darold Dodge being the respective party leaders.

Progressive soil surveys started in 1956 were in Logan, Shawnee, Reno, Butler and Finney Counties with respective party leaders being--- Elbert Bell, Walter Abmeyer, James Rockers, Harold Penner, and Rodney Harner. All other counties in the state were put on progressive status in an orderly fashion as personnel became available. The largest number of soil scientists in Kansas was 47 in 1959.

Mr. Nelson retired in December 1965, and C. W. McBee became State Soil Scientist in 1966. Mr. McBee retired in 1981 and William Roth became State Soil Scientist, the position he now holds.

All soil surveys made in Kansas have been in cooperation with the Kansas Agricultural Experiment Station.

To better coordinate the progressive soil survey and to keep soil scientists aware of all the latest information, the following state soil scientist meetings were conducted:

1957	Hutchinson
1958	Dodge City
1960	Salina (Bell Hotel)
1965	Manhattan (Waters Hall)
1968	Manhattan
1980	Salina (Heart of America)
1983	Salina (Mid-America)
1985	Salina (Heart of America)
1987	Parsons

KANSAS SOIL SURVEY FACTS
NOV. 1987

KANSAS ENCOMPASSES 82,277 SQUARE MILES OR 52,657,500 ACRES.

Kansas has 29.1 million acres of cropland, 16.9 million acres rangeland, 2.2 million acres of pastureland.

Kansas with 25.6 million prime farmland acres is second only to Texas. According to the 1982 National Resource Inventory(NRI), over 19 million acres are cropped.

Kansas has 304 named soil series. The major soils in Kansas are:

Series Name	Acres
Harney	3.98 million
Richfield	2.57 million
Ulysses	2.99 million

The dominant soil texture is silt loam.

The rainfall variation in Kansas ranges from <18 to >40 inches per year. Moisture is the only limiting factor to crop production over much of the state.

Kansas has 10.6 million acres of highly erodible cropland and nearly 25 million acres total HEL.

There are over 300,000 acres of hydric soils which may or may not be considered wetlands depending on the presence of hydrophytic plants.

The first modern soil survey was initiated in Brown County in 1946. Progressive or standard soil survey, as we know it today, began in Hamilton County in 1955 and ended in Washington County in 1987.

The number of soil scientists in Kansas has varied over time. Forty-seven is the highest in 1959, and currently there are 17 soil scientists across the state. The total number of soil scientists having worked in Kansas is 72.

Ninety-six Kansas counties have published soil surveys currently. From 1980-82, 22 soil surveys were published averaging over 7 per year.

CURRENT ACTIVITIES--

Area soil scientists are providing soils interpretations, distributing soil survey information, and assisting field offices in ongoing SCS operations.

Automation is an important part of current soils activity.

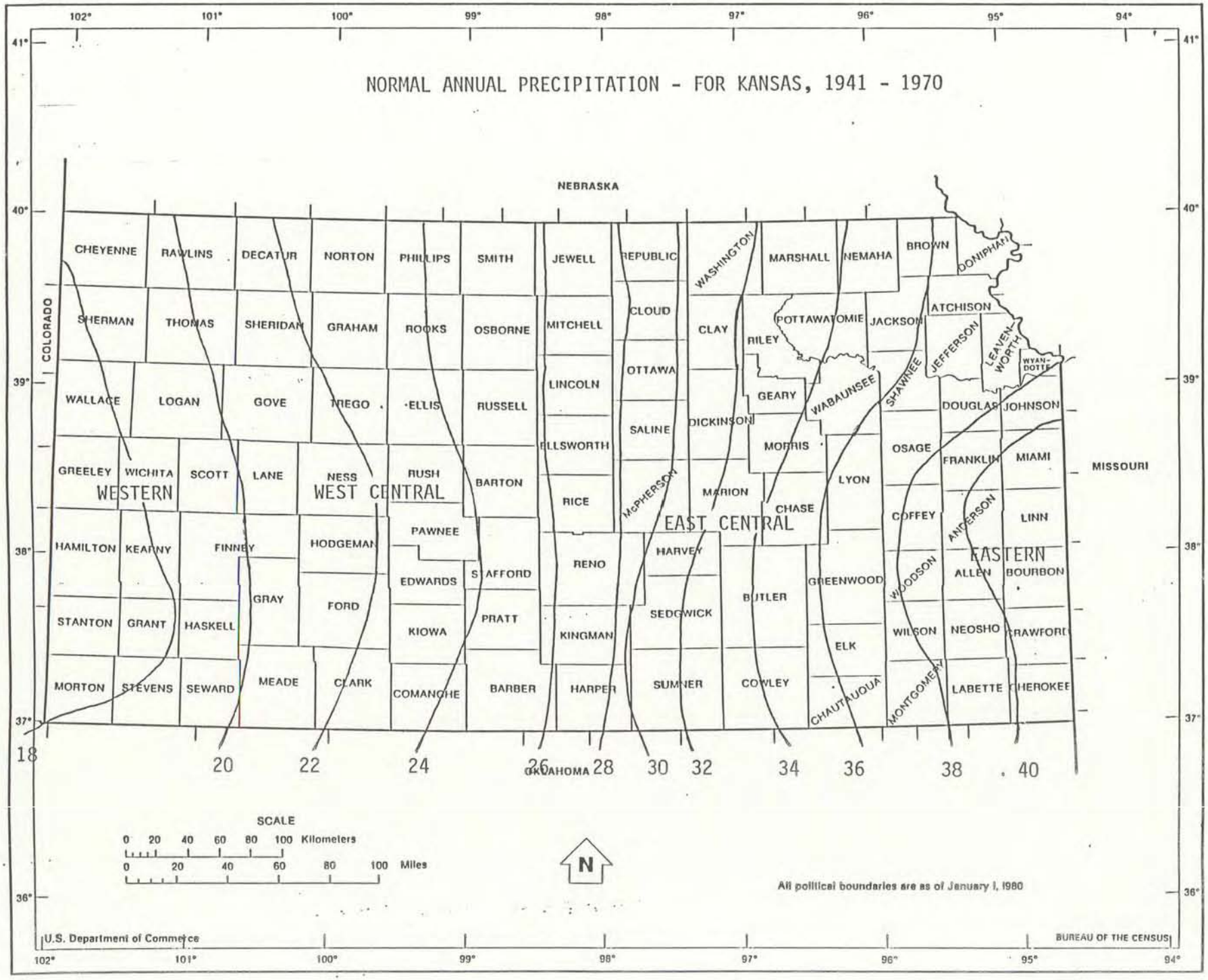
Soil scientists are editing soils data for entry into Computer Assisted Management Planning System (CAMPS). About one-third of the current soils data base will be loaded for use in CAMPS.

Updating of old surveys is underway in Saline and Geary counties. Brown and Reno counties are scheduled to be updated in FYs 89 and 90. This is an ongoing effort to insure that they are adequately meeting ours and others' needs.

Efforts in Geographic Information Systems (GIS) are to digitize soils for PL-566 watershed work.

Compiled by William Roth, State Soil Scientist, SCS, Salina, Kansas

KANSAS



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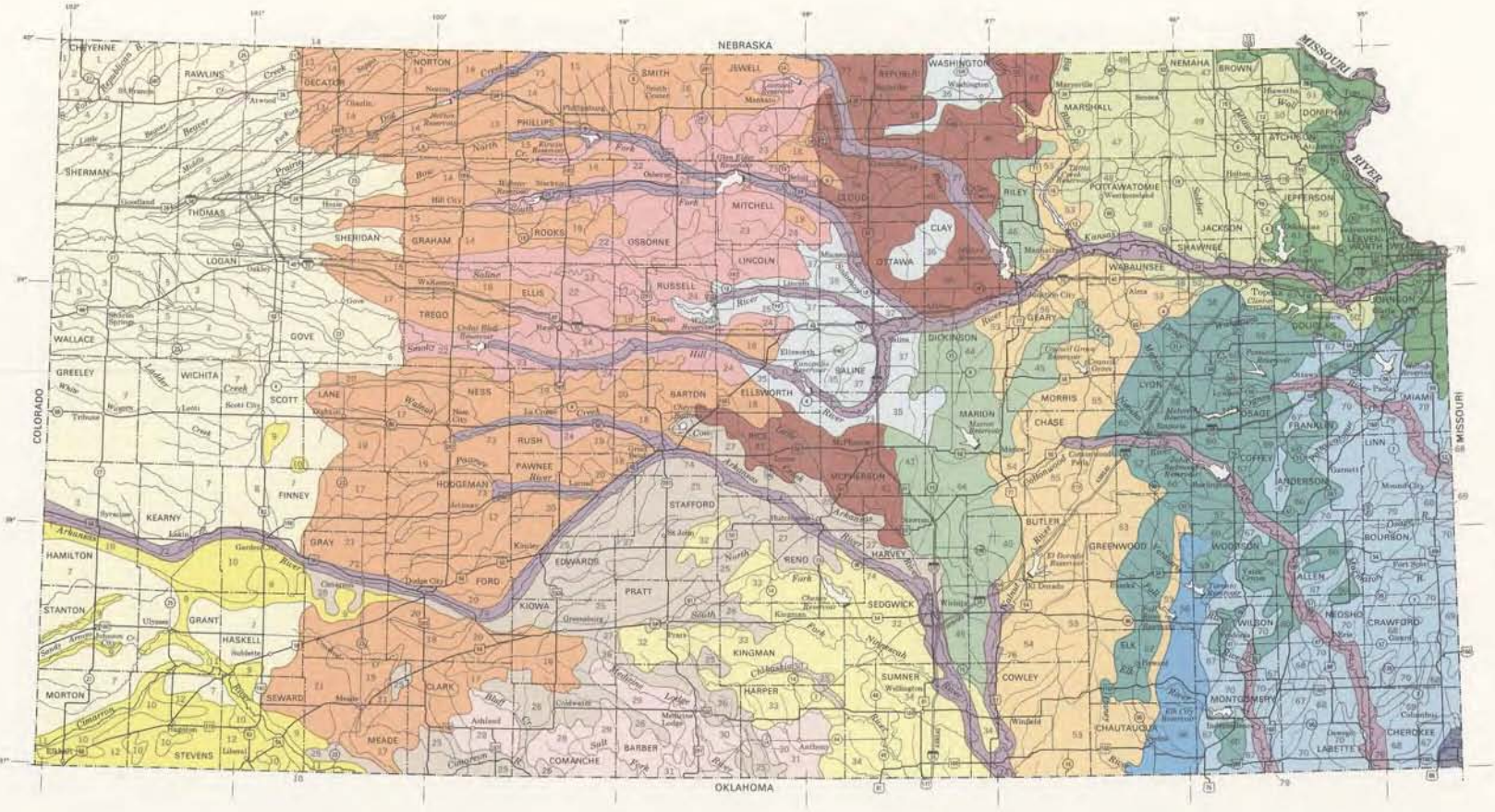

LEGEND

HIGH PLAINS
1 Colby-Ulysses
2 Keith-Ulysses
3 Ulysses-Colby
4 Manter-Ulysses
5 Colby-Kim
6 Ulysses-Elkader
7 Richfield-Ulysses
8 Ulysses-Drummond

SANDY HIGH PLAINS
9 Manter-Satanta
10 Tivoli-Vona
11 Otero-Lincoln
12 Dalhart-Vona

ROLLING PLAINS AND BREAKS
13 Uly-Holdrege
14 Holdrege-Uly
15 Uly-Penden
16 Holdrege-Harney
17 Harney-Penden
18 Harney-Crete
19 Harney-Uly
20 Harney
21 Harney-Spearville

CHALK OR LIMESTONE HILLS
22 Harney-Wakeen-Brownell
23 Harney-Corinth-Bogue
24 Harney-Wakeen-Nilson

GREAT BEND SANDY PLAINS
25 Pratt-Tivoli
26 Shellabarger-Albion
27 Naron-Farnum

ROLLING RED PLAINS
28 Carey-Woodward
29 Vernon-Woodward
30 Woodward-Quinlan
31 Grant-Pond Creek

ROLLING RED PRAIRIES
32 Blanket-Farnum
33 Farnum-Shellabarger
34 Bethany-Farnum

SANDSTONE HILLS
35 Lancaster-Hedville
36 Crete-Lancaster-Hedville
37 Geary-Wells

CENTRAL LOESS PLAINS
38 Hastings-Kipson
39 Crete-Hastings
40 Crete-Geary
41 Crete-Smolan
42 Crete-Mayberry

CENTRAL OUTWASH PLAINS
43 Ladysmith-Goessel
44 Irwin-Cline
45 Irwin-Ladysmith
46 Wymore-Irwin

LOESS AND TILL HILLS
47 Wymore-Pawnee
48 Tully-Pawnee
49 Pawnee-Burchard
50 Grundy-Pawnee
51 Marshall-Morrill
52 Martin-Pawnee

FLINT HILLS
53 Clime-Sogn
54 Dwight-Labette
55 Florence-Labette

CROSS TIMBERS
56 Steedman-Niolaze-Stephenville

SHALE AND LIMESTONE HILLS
57 Eram-Kenoma
58 Kenoma-Martin
59 Eram-Lula
60 Woodson-Kenoma

DEEP LOESS HILLS
61 Martin-Vinland
62 Sharpsburg-Shelby
63 Monona
64 Knox-Armster
65 Sharpsburg-Oska
66 Polo-Oska

CHEROKEE PRAIRIES
67 Dennis-Bates
68 Parsons-Dennis
69 Kanima-Parsons
70 Catoosa-Clareson

OZARK HIGHLANDS
71 Clarksville-Nisa

TERRACE AND FLOOD PLAIN SOILS
72 Las Animas-Bridgeport
73 Roxbury-Hord
74 Canadian-Platte
75 Detroit-Hord
76 Verdigris-Brewer
77 Fudora-Muir
78 Onawa-Haynie
79 Osage-Verdigris

GENERAL SOIL MAP
KANSAS

20 10 0 20 40 60 Miles

20 0 20 40 60 80 Kilometers

COMPILED FEBRUARY 1986, FROM 1970 NATIONAL ATLAS OF THE UNITED STATES OF AMERICA, AND 1984 KANSAS TRANSPORTATION MAP. ALBERS EQUAL AREA PROJECTION.

This General Soil Map does not show the kind of soil at a specific site. A more detailed and on site inspection is required to best evaluate land use capabilities of a specific piece of land.

FEBRUARY 1986 4-R-28,635

USDA-SCS-NATIONAL CARTOGRAPHIC CENTER, FT. WORTH, TX.-1987

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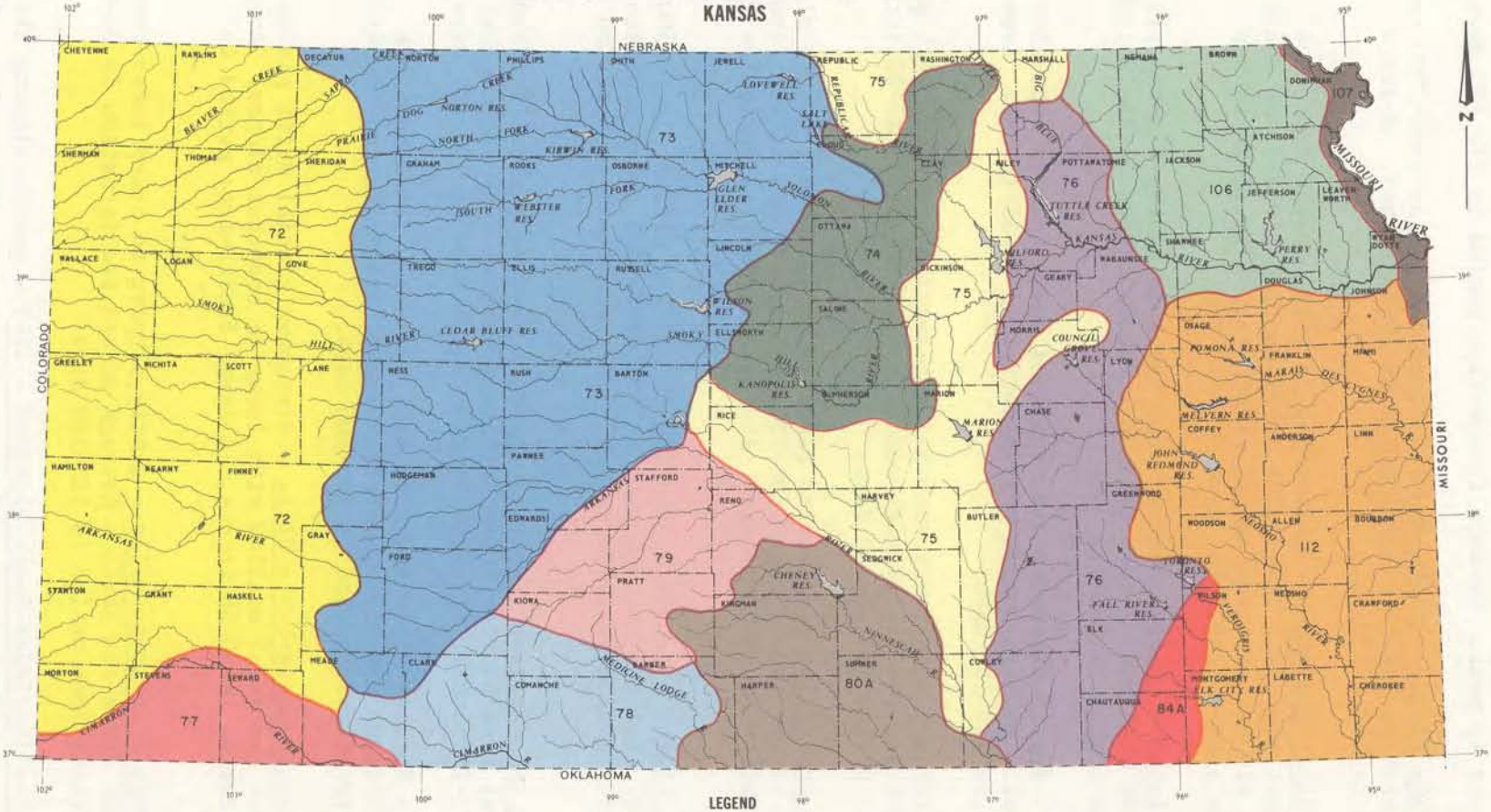
MAJOR LAND RESOURCE AREAS MAP

KANSAS



LEGEND

STATE BOUNDARY
COUNTY BOUNDARY
DRAINAGE
DAM WITH RESERVOIR
PERENNIAL LAKE
INTERMITTENT LAKE

		APPROXIMATE ACRES
72	CENTRAL HIGH TABLE LAND	10,750,000
73	ROLLING PLAINS AND BREAKS	11,300,000
74	CENTRAL KANSAS SANDSTONE HILLS	2,760,000
75	CENTRAL LOESS PLAINS	4,800,000
76	BLUESTEM HILLS	4,770,000
77	SOUTHERN HIGH PLAINS	1,300,000
78	CENTRAL ROLLING RED PLAINS	2,200,000
79	GREAT BEND SAND PLAINS	2,100,000
80A	CENTRAL ROLLING RED PRAIRIES	2,500,000
84A	CROSS TIMBERS	525,000
106	NEBRASKA AND KANSAS LOESS-DRIFT HILLS	3,000,000
107	IOWA AND MISSOURI DEEP LOESS HILLS	370,960
112	CHEROKEE PRAIRIES	6,400,000

SCALE 0 10 20 30 40 50 60 70 80 MILES
0 20 40 60 80 100 120 KILOMETERS

SOURCE:
FAMILY OF MAPS SCS DWG. NO. 5.5-32,550 (REV. 1-76)
AND INFORMATION FROM SCS FIELD PERSONNEL
ALBERS EQUAL AREA PROJECTION

USDA-SCS-FORT WORTH, TEXAS 1984

7-7-80
5.5-37,424

72 Central High Tableland - relatively smooth loess-mantled plains 2000-4000 feet above sea level. Average annual precipitation is 16-21 inches, widely fluctuating from year to year. Average freeze-free period is 170-185 days.

73 Rolling Plains and Breaks - loess-mantled dissected plains 1500-2300 feet above sea level. Average annual precipitation is 20-25 inches. Avarage freeze-free period is 160-175 days.

74 Central Kansas Sandstone Hills - undulating to hilly deeply dissected plains 1300-1800 feet above sea level with loess-mantled divides and shale and sandstone side slopes. Average annual precipitation is 25-28 inches. Average freeze free period is 170-180 days.

75 Central Loess Plains - mostly loess covered level to gently sloping plains 1200-1800 feet above sea level. Average annual precipitation is 25-30 inches. Average freeze-free period is 165-180 days.

76 Bluestem Hills - deeply dissected limestone and shale uplands 1000-1500 feet above sea level. Average annual precipitation is 30-35 inches. Average freeze-free period is 170-190 days.

77 Southern High Plains - relatively smooth loess-mantled and sandy high plains 2500-4000 feet above sea level. Average annual precipitation is 15-20 inches. Average freeze-free period is 180-190 days.

78 Central Rolling Red Plains - dissected plains with relatively smooth divides and steep to broken side slopes 1500-2500 feet above sea level. Average annual precipitation is 20-30 inches. Average freeze-free period is 185-195 days.

79 Great Bend Sand Plains - gently undulating to rolling plains, 1500-2500 feet above sea level that are mantled with eolian sands and loamy sediments. Average annual precipitation is 21-28 inches. Average freeze-free period is 180-190 days.

80A Central Rolling Red Prairies - gently sloping dissected plains 1200-1500 feet above sea level mantled with loess and loamy outwash. Average annual precipitation is 23-25 inches. Average freeze-free period is 190-200 days.

84A Cross Timbers - Rolling hills 800-1300 feet above sea level that are underlains with sandstone and shale. Average annual precipitation is 34-36 inches. Average freeze-free period is 190-200 days.

106 Nebraska and Kansas Loess-Drift Hills - dissected glacial drift plains 1000-1500 feet above sea level mantled with loess on smoother slopes. Average annual precipitation is 30-36 inches. Average freeze-free period is 170-190 days.

107 Iowa and Missouri Deep Loess Hills - gently sloping to steep loess-covered hills, 800-1100 feet above sea level. Average annual precipitation is 34-36 inches. Average freeze-free period is 180-190 days.

112 Cherokee Prairies (includes Ozark Highland - 116) - gently sloping dissected plains that are underlain by sandstones, limestones, and shales. Thin loess mantles the northern part. Elevation is 700-1200 feet above sea level. Average annual precipitation is 35-42 inches. Average freeze-free period is 185-200 days.

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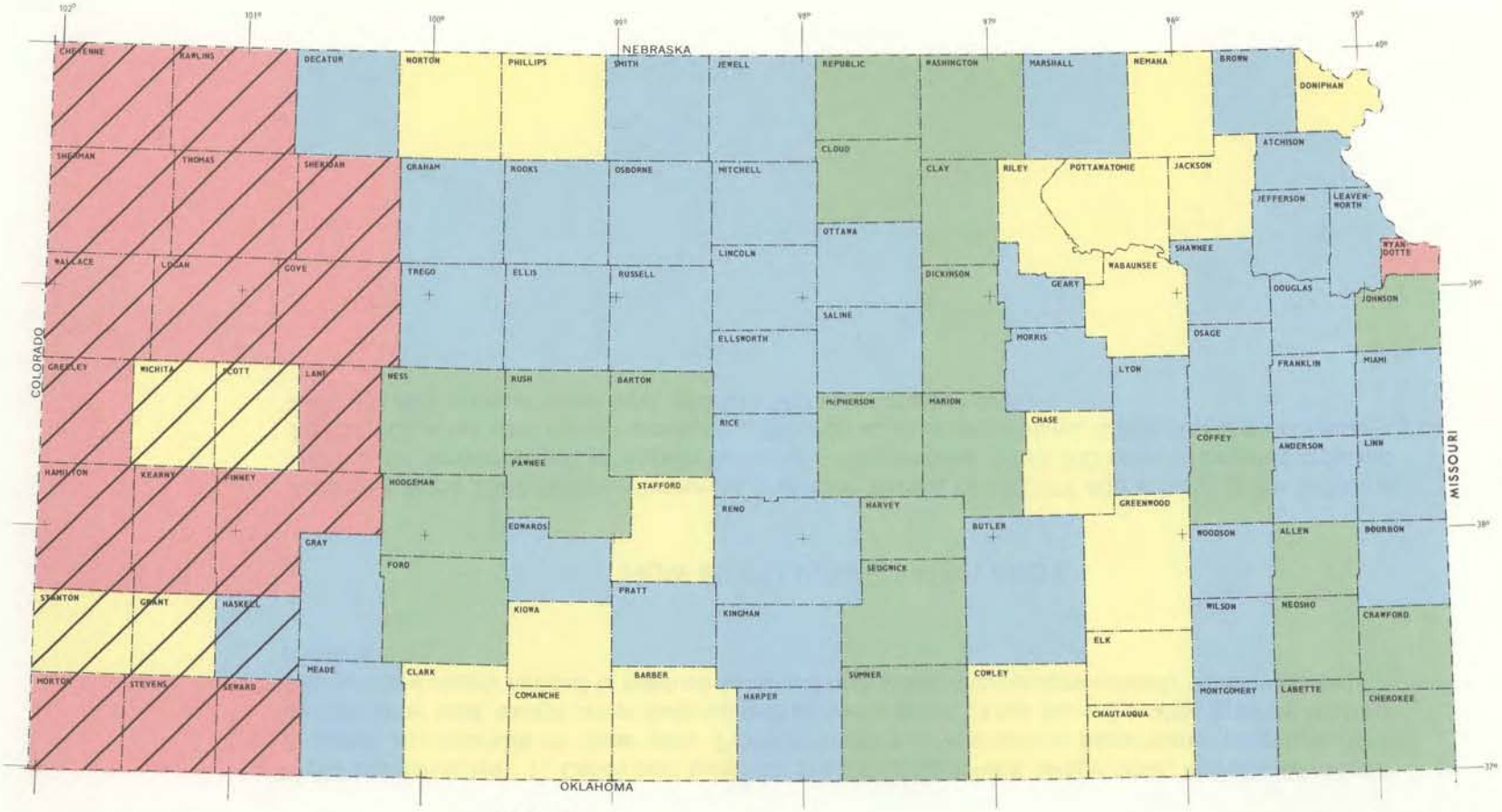


LEGEND

PRIME FARMLAND

- 0 -25%
- 25-50%
- 50-75%
- 75-100%
- PRIME ONLY WHERE IRRIGATED

GENERAL PRIME FARMLANDS

KANSAS

0 25 50 75 100 MI

0 50 100 150 KM

SOURCE:
1982 NRI, DATA COMPILED
BY SCS FIELD PERSONNEL.

JANUARY 1986 4-R-39536

USDA-SCS-NATIONAL CARTOGRAPHIC CENTER, FT. WORTH, TX.-1986

WHAT IS PRIME FARMLAND?

Prime farmlands are: 1. Lands best suited for producing food, feed, forage, fiber, and oilseed crops. 2. Lands also available for these uses. Prime farmland can be cropland, pastureland, rangeland, forest land, or other land, except urban built-up land or water areas. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when managed properly.

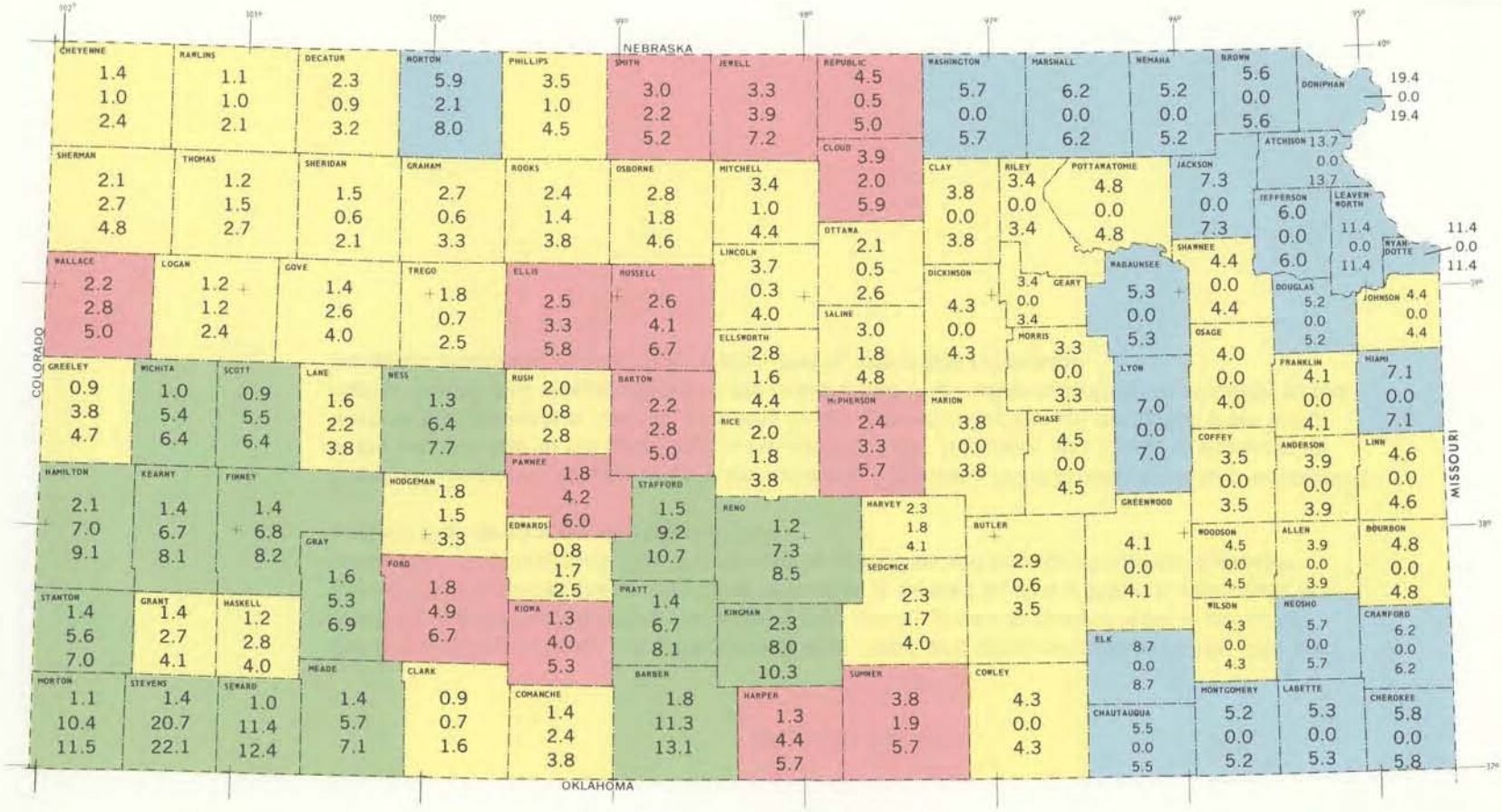
HOW MUCH PRIME FARMLAND?

According to the 1982 National Resources Inventory, Kansas has 25,602,400 acres of prime farmland, which is the second largest acreage in the nation. This includes 2,769,300 acres of irrigated cropland, 16,237,700 acres nonirrigated cropland, 1,345,400 acres of pastureland, 4,665,300 acres of rangeland, 251,400 acres of forest land, and 333,300 acres of other land.

JANUARY 1986 BACK 4-R-39536

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



LEGEND

TONS/ACRE/YEAR

LINE 1 - SHEET & RILL
LINE 2 - WIND
LINE 3 - TOTAL

CROPLAND - AVERAGE SOIL LOSS (TONS/ACRE/YEAR)

- COMBINED COUNTY AVERAGE LESS THAN 5 TONS
- COMBINED COUNTY AVERAGE MORE THAN 5 TONS
- COUNTY AVERAGE WIND EROSION GREATER THAN 5 TONS
- COUNTY AVERAGE WATER EROSION GREATER THAN 5 TONS

EROSION AREAS
KANSAS

0 25 50 75 MI

0 50 100 KM

SOURCE:
1982 NRI, DATA COMPILED
BY SCS FIELD PERSONNEL.

JANUARY 1986 4-R-39534

USDA-SCS-NATIONAL CARTOGRAPHIC CENTER, FT. WORTH, TX. 1986

EROSION AREAS

Soil is a vital resource for the production of food, fiber, and other necessities of life. The food and fiber are renewable resources--a fresh crop can be grown to replace what is consumed. The soil that produces these renewable resources is formed so slowly that it is essentially non-renewable. The long-term loss of productivity caused by soil erosion should be of greater concern than temporary shortages of food.

Sheet, rill, and wind erosion are a major concern in Kansas. Wind erosion is more predominant in the western half of the state than in the eastern half. Normally, less forage is produced in western than in eastern Kansas, resulting in less ground cover for soil protection from wind. Higher rainfall and steeper slopes in the eastern half of the state contribute significantly to the increased amount of erosion from water, that is, sheet and rill erosion.

JANUARY 1986 BACK 4-R-39534

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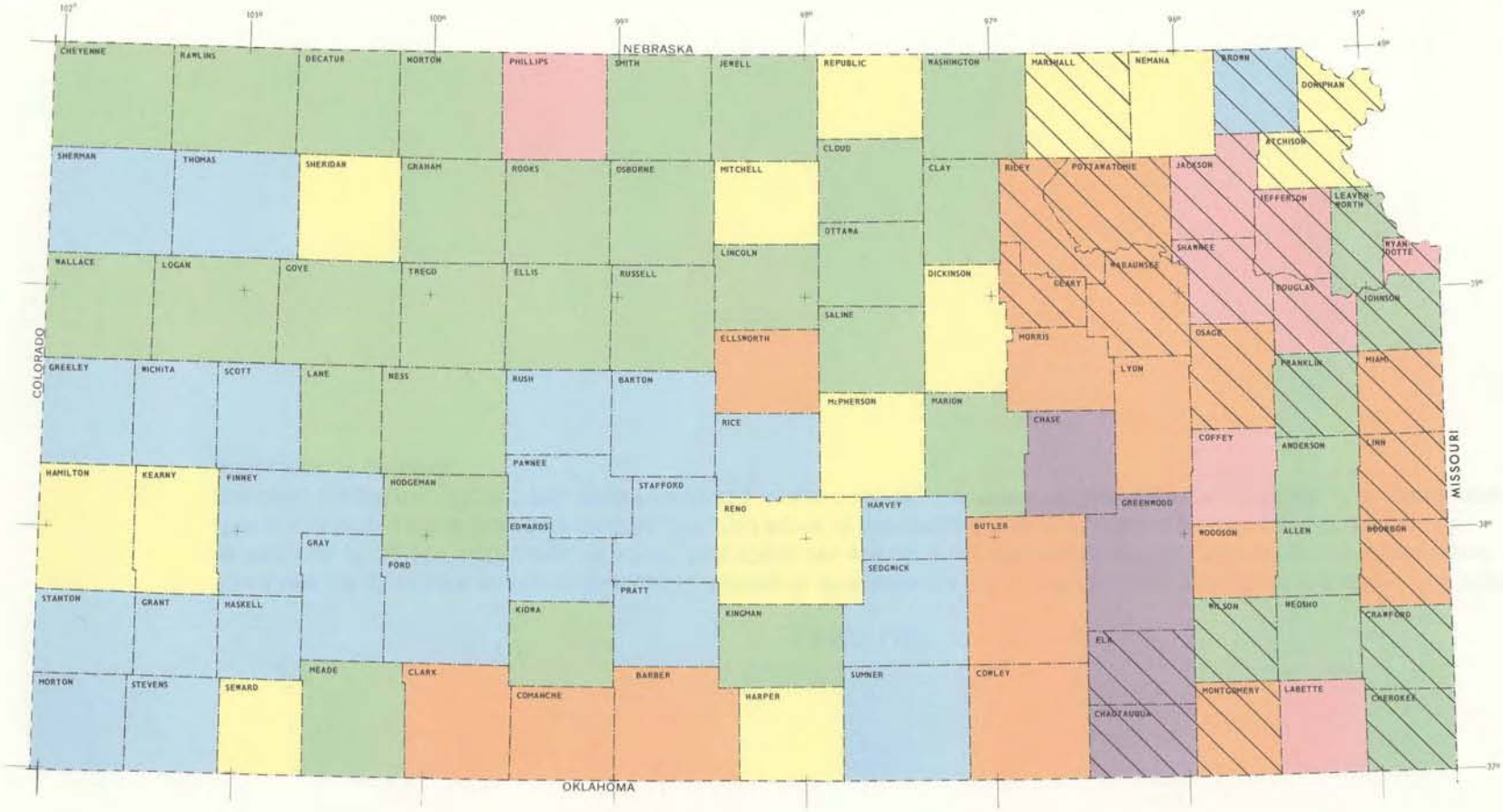

LEGEND

- GREATER THAN 75% CROPLAND
- 65 - 75% CROPLAND
- 50 - 65% CROPLAND
- NEARLY EQUAL CROPLAND AND GRASSLAND
- 50 - 75% GRASSLAND
- GREATER THAN 75% GRASSLAND
- GREATER THAN 5%FORESTLAND

LAND USE
KANSAS

0 25 50 75 MI

0 50 100 KM

SOURCE:
1982 NRI, DATA COMPILED
BY SCS FIELD PERSONNEL.

FEBRUARY 1986 4-R-39679

USDA-SCS-NATIONAL MAPPING DIVISION, FT. WORTH, TX. 1986

LAND USE

Land use, by its nature, concerns everyone. Kansas is diversified in the use of the land throughout the state. The state is made up of 52,657,500 acres, of which 288,300 acres are covered with water and 584,500 acres are federal land. The major land uses of the remaining 51,784,700 acres of non-federal land in Kansas are as follows: cropland, 56 percent; rangeland, 33 percent, pastureland and native pasture, 4 percent; urban, 1 percent; forest, 2 percent; and other land, 4 percent.