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ENVIRONMENTAL ATLAS OF THE IOWA-KANSAS-MISSOURI-NEBRASKA CLIMATE-CHANGE STUDY REGION

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Environmental Sciences Division
Publication No. 3461

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ABSTRACT

ALLISON, L. J., C. T. HUNSAKER, R. M. CUSHMAN, T. W. WHITE, and J. D. DRAVES. 1990. Environmental atlas of the Iowa-Kansas-Missouri-Nebraska climate-change study region. ORNL/CDIAC-33. Oak Ridge National Laboratory, Oak Ridge, Tennessee. 147 pp.

In 1988 the U.S. Department of Energy (DOE) began an integrated research project to study the potential effect of changing climate on environmental resources. The area of study chosen was the four-state midwestern region of Iowa, Kansas, Missouri, and Nebraska. Baseline years are defined as 1984–1987 for agricultural crops and livestock and 1985 for water resources. Agriculture and water—resources that are sensitive to climate, interactive, and important to the study region and to the United States—were chosen for study. Essential to an integrated regional study is a comprehensive data base of environmental resources in the region, both to characterize the regional resources as they exist today and to serve as input for modeling the response of the resources to climate change. This atlas contains 45 maps and corresponding tabulated data showing the baseline agricultural and water resource data for the Iowa-Kansas-Missouri-Nebraska study region along with basic geographic reference data. This atlas may serve as input for modeling the response of resources to climate change and provides DOE project investigators with critical baseline agricultural and water resource data for the Iowa-Kansas-Missouri-Nebraska study region.

INTRODUCTION

During the past decade, there has been an increasing interest in the potential effects of climate change on the human environment. In particular, many studies have projected possible impacts on environmental resources such as forests (e.g., Pastor and Post 1988), freshwater (e.g., Meisner et al. 1988) and marine (e.g., Frye 1983) fisheries, water (e.g., Cohen 1986, Gleick 1987), and agriculture (e.g., Rosenzweig 1985). However, while such studies have demonstrated the sensitivity of environmental resources to climate change, their results must be viewed cautiously because the state of the art in climate impact assessment has several serious shortcomings:

- In most cases, environmental resources have been studied individually in their response to changing climate, and the important interactions that link them, which may enhance or minimize the effect of climate itself, have not been taken into account (Cushman et al. 1989b).

- The expected climate change, typically derived from general circulation models of the atmosphere, is generally imposed instantaneously on today's society: (1) there is no time-dependent transition to a new climate state that might allow for adaptation, either by society or by ecosystems; and (2) factors in addition to climate that could, over a time scale of decades to centuries, shape the future of environmental resources are not considered.

- The direct effects of elevated levels of atmospheric carbon dioxide (CO_2) on vegetation are often ignored. In laboratory and greenhouse studies, enhanced growth and water-use efficiency has been demonstrated for a variety of agricultural and forest species (Strain and Cure 1985). In contrast, it has also been suggested that increased competition by weeds and losses to insect pests could counteract the positive stimulatory effects of elevated CO_2 (e.g., Lincoln et al. 1984). It is not possible now to predict with confidence the overall effect of elevated CO_2 and climate change on environmental resources (Hillel and Rosenzweig 1989).

In 1988 the U.S. Department of Energy began a project of integrated research to study the potential effect of changing climate on environmental resources and to advance the state of the art in climate impact assessment. Institutions participating in this project include Oak Ridge National Laboratory, Pacific Northwest Laboratory, Resources for the Future, Sigma Xi, and Wesleyan University. The objective of the project is to develop the scientific information base and analytical tools needed to describe the nature, timing, magnitude, and uncertainty associated with the consequences of increasing atmospheric CO_2 and climate change on natural and human systems. The four-state midwestern study region of Iowa, Kansas, Missouri, and Nebraska was selected because a reasonably homogeneous geographic area was desired to facilitate method development and evaluation. The most devastating drought in recent North American history occurred in the central and western states during the 1930s. Some climate models predict that a doubled CO_2 climate would result in reduced precipitation and soil moisture in mid-continental areas of North America (e.g., Kellogg and Zhao 1988). For these reasons, the 1930s climate was selected as a plausible climate change scenario. Agriculture, water, and forestry—three resources that are sensitive to climate, interactive, and important to the study region and to the United States—were chosen for study. The project was designed to study these resources on three levels: (1) the direct biophysical response to climate; (2) the response of local decisionmakers (e.g., farmers, water district managers, and loggers) to the biophysical changes; and (3) the response of the regional economy to changes in goods and services caused by changes on the first two levels. The methodology used in the analysis links plant productivity models, expert systems describing firm-level economic responses, and input-output models of regional economies. The overall project is described in more detail in Cushman et al. (1989a).

Essential to an integrated regional study is an integrated data base of the environmental resources in the region. Such data characterize the regional resources as they exist today and serve as input for modeling the response of the resources to climate change. Data for regional assessments should be spatially and temporally consistent. In the initial phase of the Iowa-Kansas-Missouri-Nebraska study, it was particularly important to gather, verify, summarize, and distribute to the project investigators data on agriculture and water resources. In addition to numerical data sets that are transmitted on magnetic tape or in tabular form, it is useful to display the data in maps. Analysis of spatial patterns can be important for revealing relationships between attributes within a region. This atlas documents the numeric and spatial data base for agriculture and water resources used in the Iowa-Kansas-Missouri-Nebraska study.

The documentation of data bases for regional resource assessments is important for two reasons: (1) these data bases are expensive and time consuming to develop, and (2) the data bases can often be used for studies beyond the original purpose for which they were created. This report contains

45 maps that document the baseline (mid-1980s) agricultural and water resource data for the Iowa-Kansas-Missouri-Nebraska study region along with basic geographic reference data (such as counties and population centers) used in the study. Spatial map units are usually counties or watersheds (Hydrologic Units). An additional spatial unit, the Major Land Resource Area (MLRA), as defined by the U.S. Department of Agriculture/Soil Conservation Service (U.S. Department of Agriculture/Soil Conservation Service 1981), is included because some of the agricultural analyses were conducted for a subpopulation of MLRAs within the study region. For the MLRAs in the study region, approximations as aggregations of counties are shown to facilitate integration across resources.

The appendixes contain tabulations of the data used to produce the agricultural maps and base data such as county areas and English-to-metric conversion factors. Data are expressed in English units for ease of comparison to digital data. Digital agricultural and livestock data from the U.S. Department of Agriculture/National Agricultural Statistics Service (Patton 1989a, 1989b) were obtained from John Wingard at Resources for the Future. Digital hydrologic data were obtained from the U.S. Geological Survey (Perlman 1989). The digital agricultural data were verified by consulting state agricultural statistics reports (e.g., Nebraska Department of Agriculture 1988, Iowa Department of Agriculture and Land Stewardship 1988, Kansas Department of Agriculture 1988) or county reports (e.g., Missouri Department of Agriculture 1988); the digital hydrologic data were verified by consulting Solley et al. (1988).

To facilitate use of the maps, three transparent overlay maps showing the counties, MLRAs, and hydrologic regions and subregions are included in an envelope inside the back cover.

DATA

Traditionally, national and regional data have been collected and compiled by political spatial units—counties, census districts, states, etc. Those responsible for regional environmental assessments usually desire to use spatial units that bound the environmental attributes of interest, for example, watersheds for water resources, physiographic areas for soil and geology (Hunsaker et al. 1989). The inconsistency between the spatial units used to collect data and those of interest for analysis has been a troubling issue. Data manipulation and extrapolation can contribute to uncertainty in a quantitative analysis because error can be introduced during the process of extrapolating from point data to contour or continuous data and when aggregating and disaggregating data. In our study, an example of aggregating data is the grouping of counties to approximate the Major Land Resource Areas (MLRAs) (Maps 6 and 7).

Data in this report are mapped for the spatial units used by the agency distributing the data. The U.S. Geological Survey (USGS) provides water use data by both county and hydrologic units to facilitate regional analysis. Some of the MLRAs and hydrologic units extend into states other than those of the Iowa-Kansas-Missouri-Nebraska study region. However, data are analyzed only for those portions of the MLRA or hydrologic unit within the study region.

The classification of geographic areas according to the relative homogeneity of one or more environmental attributes can be useful in reducing uncertainty if the classification scale is appropriate to the environmental disturbance being evaluated. Examples of geographic classifications include the MLRAs, physiographic provinces, and ecoregions (Bailey 1983, Omernik 1987). MLRAs are characterized by a particular pattern of soils, climate, water resources, and land uses (U.S. Department of Agriculture/Soil Conservation Service 1981); thus, they are relevant to agricultural planning. Hydrologic Units (Seaber et al. 1984), based on water flow paths and topography, delineate the land area (watershed) that contributes surface flow to streams and rivers. They provide a stable, standard, uniform geographical framework for water- and related land-resource planning for regional and national studies.

The sources of data used in this atlas are described in the following paragraphs.

Data Base Title: 1972–1988 County Crop Estimates

Date Obtained: April 1989

Description: Statistics for land planted and harvested, with associated crop yields and production for 1972–1988, were obtained from the U.S. Department of Agriculture/National Agricultural Statistics Service. Data were extracted for Iowa, Kansas, Missouri, and Nebraska for 1984–1987 for selected categories of crops: corn for grain, all hay, sorghum, soybeans, and all wheat. Individual state agricultural statistics offices are responsible for determining individual county estimates. The number of years of data may vary based on the funding situation for obtaining the county estimates.

Source: Patton, George. 1989a. 1972–1988 County Crop Estimates magnetic tape. U.S. Department of Agriculture/National Agricultural Statistics Service, Washington, D.C.

Comment: A zero on the map or in the tabulated data indicates counties with zero production or without data estimates at the county level (George Patton, U.S. Department of Agriculture/National Agricultural Statistics Service, personal communication to William Easterling, Resources for the Future, April 1989).

Counties with small acreages may be combined into one "county" coded as 888. These combined counties were excluded from the analyses and mapping since it was impossible to determine which counties were included in the category. In addition, county values may be withheld to protect privacy.

Data Base Title: 1972–1988 County Livestock Estimates

Date Obtained: April 1989

Description: Statistics for livestock inventoried by county for 1972–1988 were obtained from the U.S. Department of Agriculture/National Agricultural Statistics Service. Data were extracted for Iowa, Kansas, Missouri, and Nebraska for 1984–1987 for two selected categories of livestock: total cattle by head and total hogs by head. Individual state agricultural statistics offices are responsible for determining individual county estimates of livestock. The number of years of data may vary based on the funding situation for obtaining the county estimates. In Nebraska, livestock data are available only at the Crop Reporting District level after 1985.

Source: Patton, George. 1989b. 1972–1988 County Livestock Estimates magnetic tape. U.S. Department of Agriculture/National Agricultural Statistics Service, Washington, D.C.

Comment: Counties with small acreages may be combined into one "county" coded as 888. These combined counties were excluded from the analyses and mapping since it was impossible to determine which counties were included in the category. In addition, county values may be withheld to protect privacy.

Data Base Title: 1985 Water Use Data

Date Obtained: July 1989

Description: Water-use estimates for 1985 were compiled by district offices of the U.S. Geological Survey (USGS) in cooperation with state and local agencies on the basis of information for 222 water-resources subregions (Seaber et al. 1984) and for each county in the United States (Solley et al. 1988). Estimates of water use have been compiled by the USGS every 5 years since 1950; the 1985 estimates are the most current data available. Data were extracted for Iowa, Kansas, Missouri, and Nebraska for several categories of water use: surface-water and groundwater withdrawals for irrigation, total withdrawal for irrigation, total consumption for irrigation, total withdrawals for thermoelectric generation, consumption from thermoelectric generation, and total use from other sectors, which included mining and other industrial uses.

Data Source: Perlman, Howard. July 1989. 1985 U.S.G.S. Water-Use magnetic tape. U.S. Geological Survey—Georgia District, Doraville, Georgia.

Comment: Data were verified by comparison with published values in Solley et al. (1988).

MAPS AND DESCRIPTIONS

STUDY REGION

MAP 1

The four-state study region of Iowa, Kansas, Missouri, and Nebraska is located in the middle of the United States and is a reasonably homogeneous geographic region with respect to the rest of the nation. Respective Federal Information Processing Standards (FIPS) codes are 19, 20, 29, and 31. The region has low topography and rich soils and is dominated by agricultural land use. It is a major production area for staple crops such as wheat, corn, sorghum, and soybeans.

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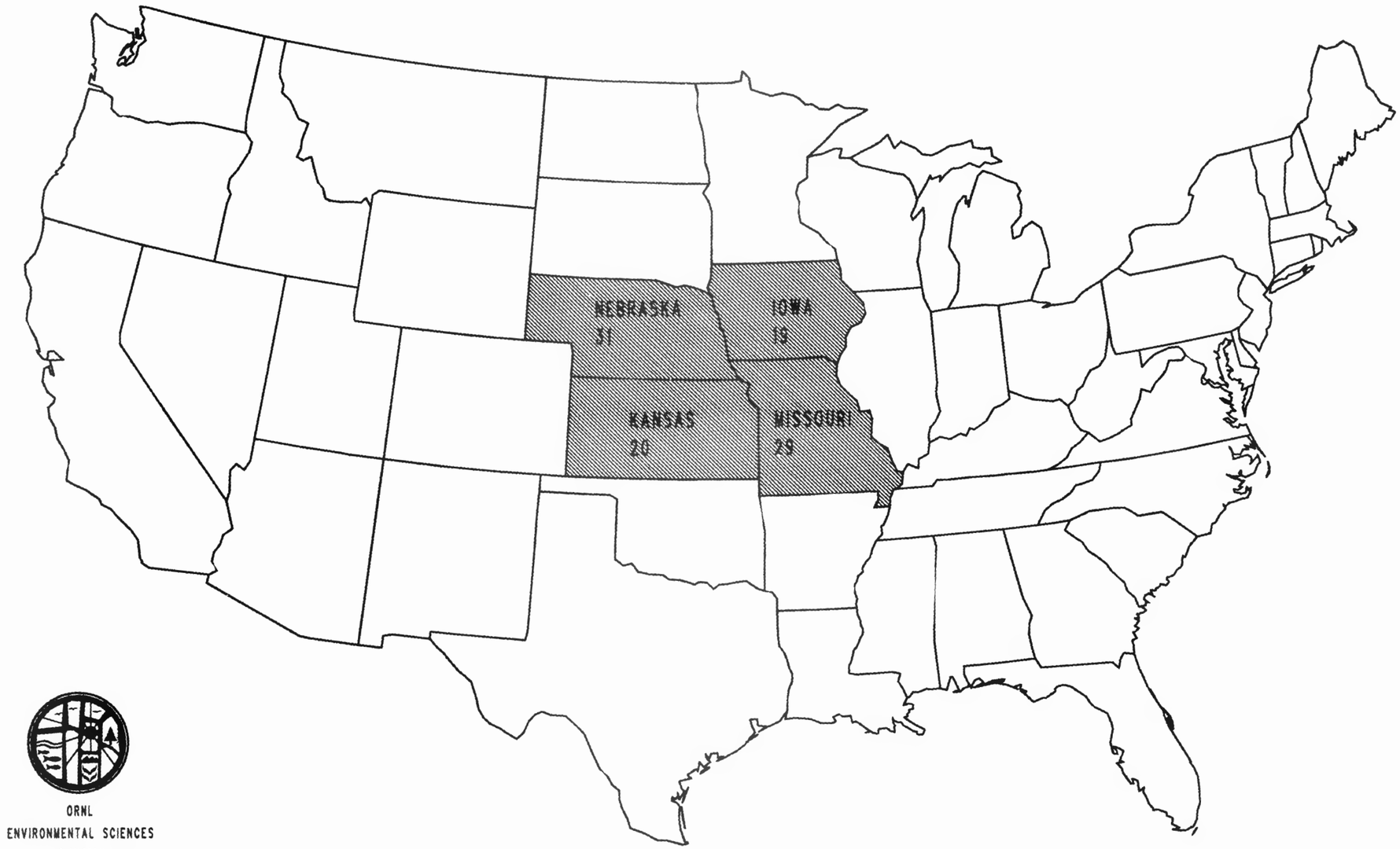

Map 1. The Iowa-Kansas-Missouri-Nebraska study region. The numbers represent the state Federal Information Processing Standards (FIPS) codes.

METROPOLITAN AREAS

MAP 2

The major metropolitan statistical areas (MSAs) occur in the eastern portion of the study region. No cities with populations greater than 100,000 are found west of Lincoln, Nebraska, and Wichita, Kansas. Population statistics were obtained from the 1980 Census or from the best available estimates (Rand McNally 1986).

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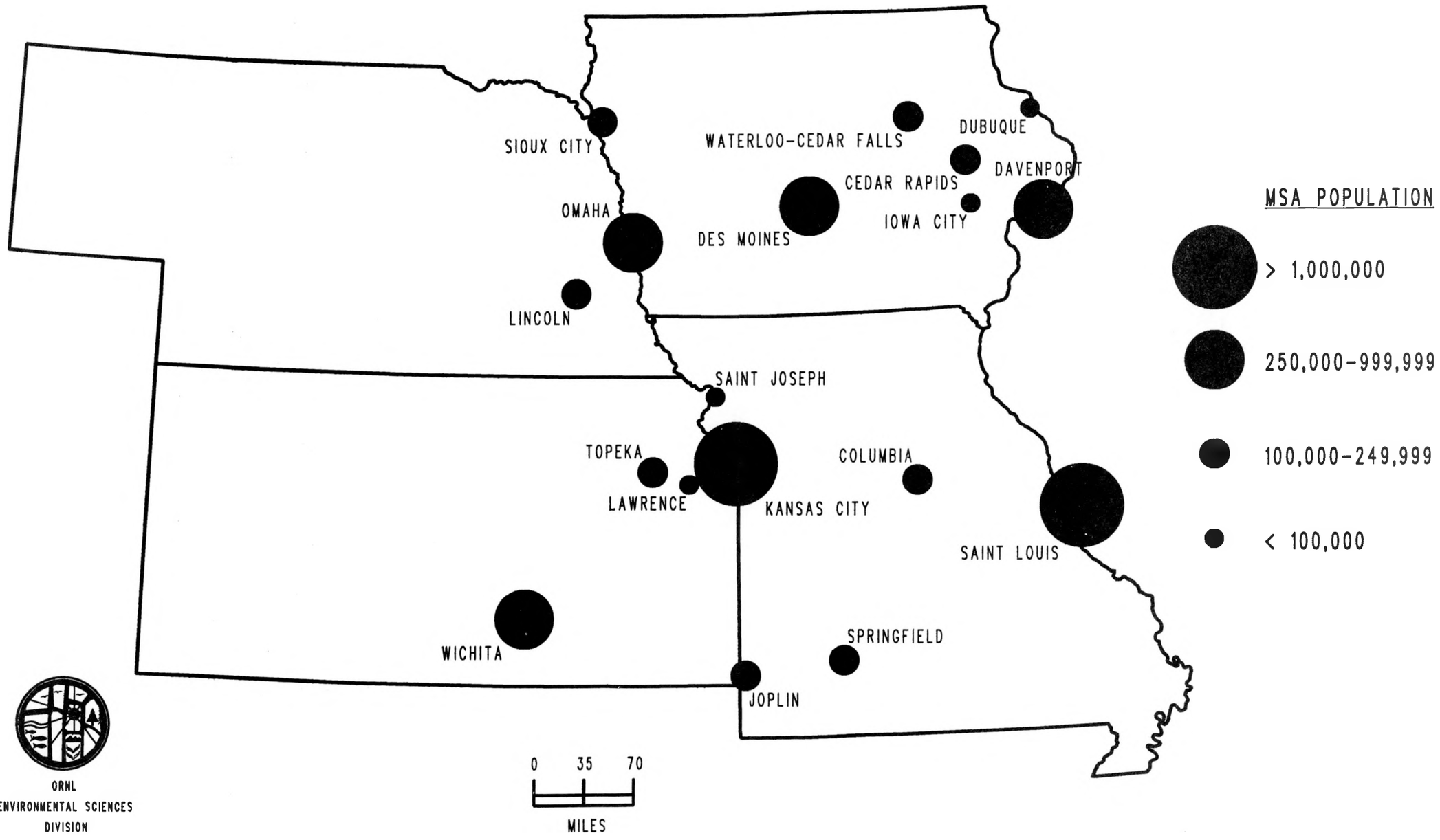

Map 2. Metropolitan statistical areas (MSAs).

FEDERAL INFORMATION PROCESSING STANDARDS (FIPS) COUNTY CODES

MAP 3

State and county Federal Information Processing Standards (FIPS) codes are mapped for Iowa, Kansas, Missouri, and Nebraska (U.S. Department of Commerce 1979, Olson et al. 1980). County FIPS codes and their associated names are listed in Table A-1. An overlay sheet of county boundaries and codes is contained in the pocket at the back of this report. It can be used to identify the counties for data mapped on the basis of that spatial unit. This overlay can also be used with the data mapped by river basins to compare data patterns for the different spatial units.

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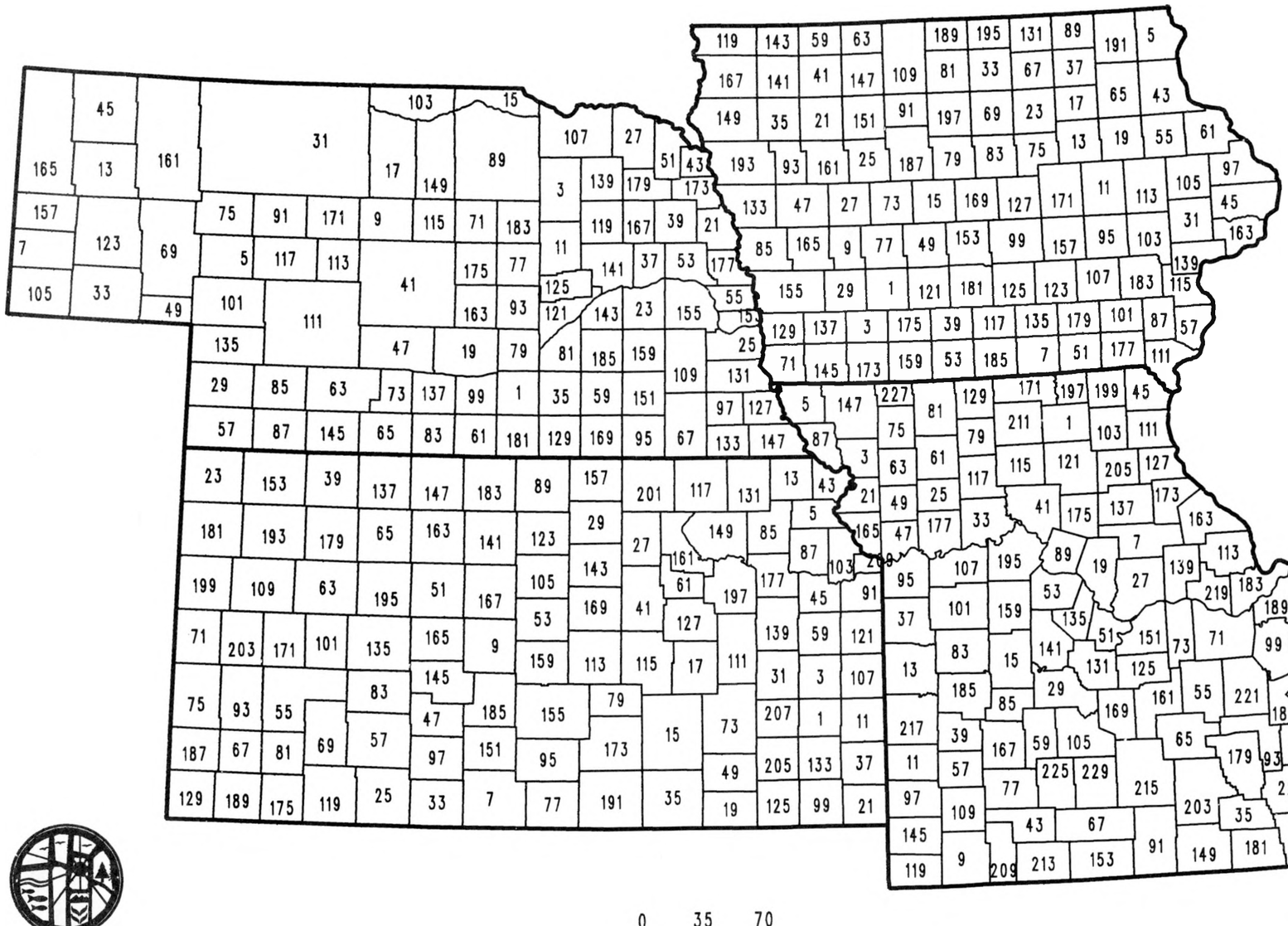

STATE FIPS CODES

19 IOWA
20 KANSAS
29 MISSOURI
31 NEBRASKA

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Map 3. Federal Information Processing Standards (FIPS) county codes.

MAJOR RIVER BASINS
(REGIONS AND SUBREGIONS)

MAP 4

The U.S. Geological Survey (USGS) has delineated the boundaries of major river basins as Hydrologic Units for the United States (Seaber et al. 1984). The hydrologic units are a four-level hierarchical system with Region being the largest category. Each of the 21 major regions of the United States is then subdivided into subregions, accounting units, and, finally, cataloging units. The Hydrologic Unit Code (HUC) is an eight-digit identifier for the river basins. The Regions (the first two digits of the code) and Subregions (first four digits of the code) are shown on this map (leading zeroes are not shown). Map 5 illustrates the accounting units and cataloging units of the river basin units in the study region. An overlay sheet of Map 4 is contained in the back pocket of this report for identification of basins whose data are mapped on the basis of that spatial unit. This overlay can also be used with the crop and livestock data that are mapped by counties to relate these data to the hydrologic spatial units.

The USGS Hydrologic Units provide the only uniform set of hydrologic spatial units for the United States at a regional and national scale. Regional studies of water resources should use these spatial units as a reference framework.

Region 07: Upper Mississippi

- Subregion 0702: Minnesota (not considered representative of the study region, data not mapped)
- Subregion 0706: Upper Mississippi–Maquoketa–Plum
- Subregion 0708: Upper Mississippi–Iowa–Skunk–Wapsipinicon
- Subregion 0710: Des Moines
- Subregion 0711: Upper Mississippi–Salt
- Subregion 0714: Upper Mississippi–Kaskaski–Meramec

Region 08: Lower Mississippi

- Subregion 0802: Lower Mississippi–St. Francis (not considered representative of the study region, data not mapped)

Region 10: Missouri

- Subregion 1012: Cheyenne
- Subregion 1014: Missouri–White
- Subregion 1015: Niobrara
- Subregion 1017: Missouri–Big Sioux
- Subregion 1018: North Platte
- Subregion 1019: South Platte
- Subregion 1020: Platte
- Subregion 1021: Loup
- Subregion 1022: Elkhorn
- Subregion 1023: Missouri–Little Sioux
- Subregion 1024: Missouri–Nishnabotna
- Subregion 1025: Republican
- Subregion 1026: Smoky Hill
- Subregion 1027: Kansas
- Subregion 1028: Chariton–Grand
- Subregion 1029: Gasconade–Osage
- Subregion 1030: Lower Missouri

Region 11: Arkansas-White-Red

- Subregion 1101: Upper White
- Subregion 1103: Middle Arkansas
- Subregion 1104: Upper Cimarron
- Subregion 1106: Arkansas–Keystone
- Subregion 1107: Neosho–Verdigris

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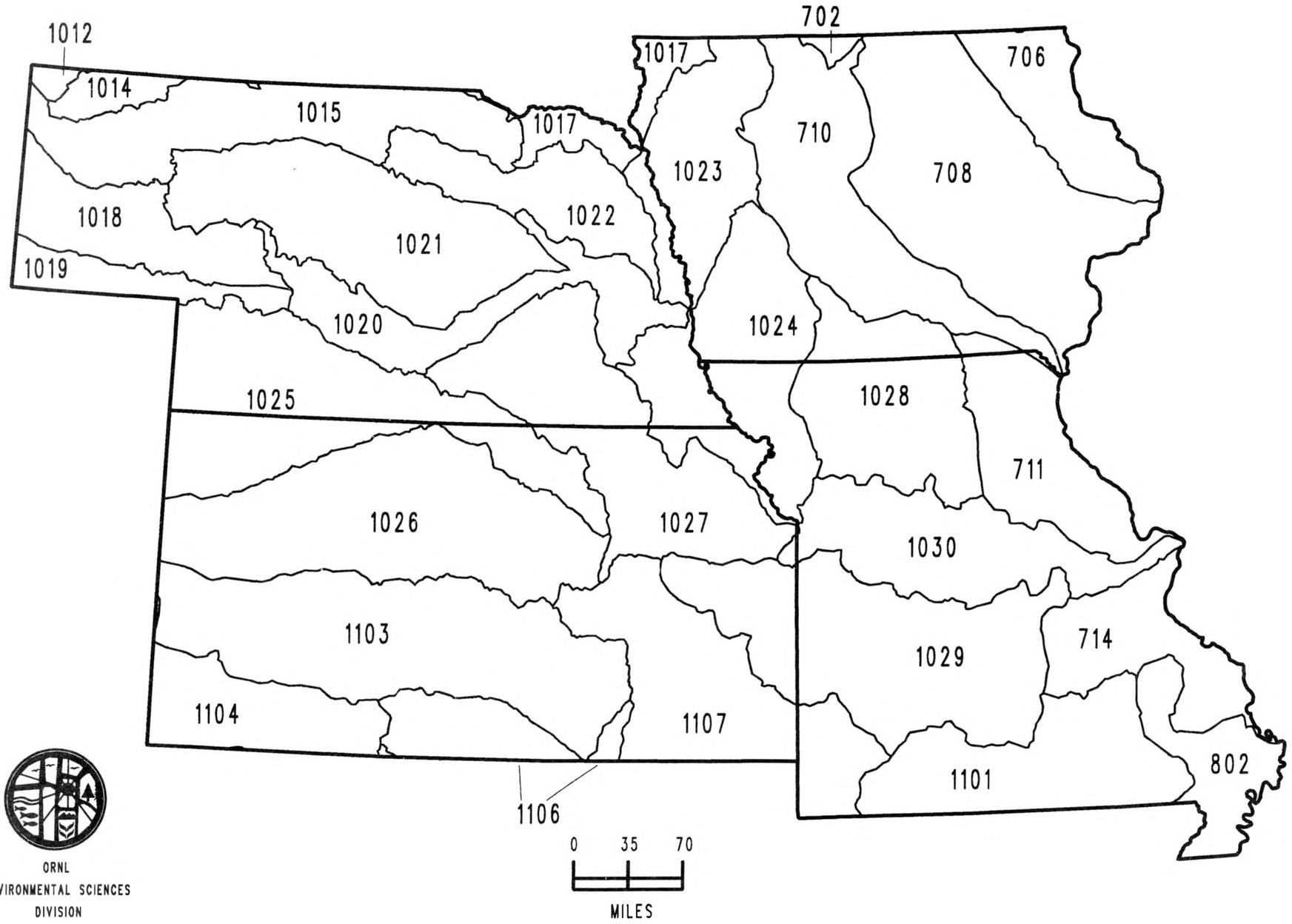

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Map 4. Major river basins (Region and Subregion Hydrologic Unit Codes).

INTERMEDIATE RIVER BASINS (ACCOUNTING AND CATALOGING UNITS)

MAP 5

This map illustrates intermediate river basins, based on the U.S. Geological Survey Hydrologic Units (Map 4), in the Iowa-Kansas-Missouri-Nebraska study region. The four-digit codes on the map identify Accounting (first two digits) and Cataloging (last two digits) Units. Codes for Region and Subregion (the first four digits of the eight-digit code) are shown in Map 4. An overlay sheet of Map 4 combined with this map shows how the Hydrologic Units nest inside one another. The Cataloging Units are similar in size to counties; thus, water resources data in this study are mapped by Cataloging Unit. Water data prior to 1985 are not necessarily available at the resolution of Cataloging Units and are most often reported at the Subregion level, which is suitable for a national study. The * indicates subregions 702 and 802, which were not considered representative of the study region; data from these two subregions were not mapped.

Source: Seaber et al. 1984.

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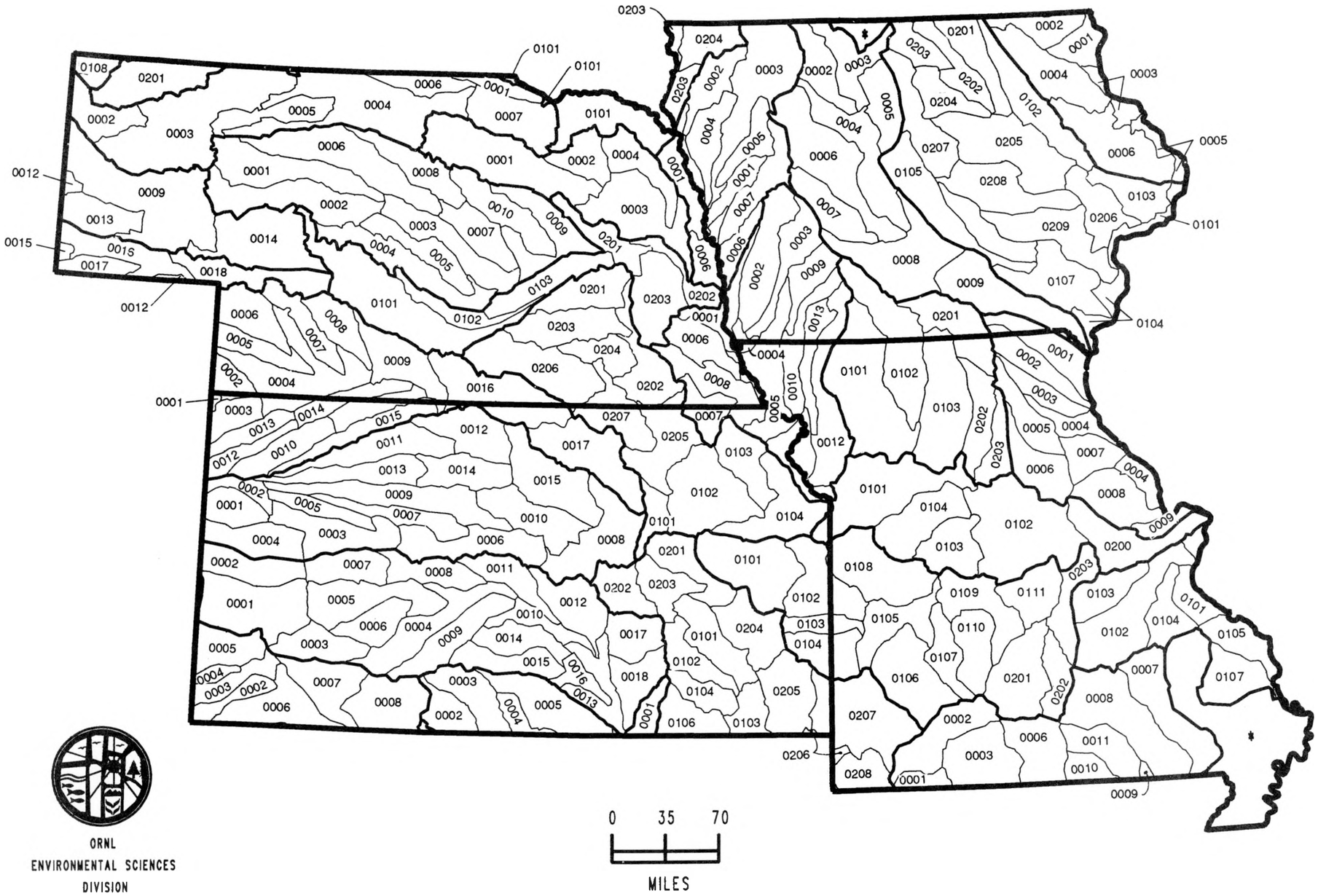

Map 5. Intermediate river basins (Accounting and Cataloging Hydrologic Unit Codes).

MAJOR LAND RESOURCE AREAS

MAP 6

All Major Land Resource Areas (MLRAs) that fall within the Iowa-Kansas-Missouri-Nebraska study region are shown on the map (U.S. Department of Agriculture/Soil Conservation Service 1981, Olson et al. 1980). MLRAs are characterized by a particular pattern of soils, climate, water resources, and land uses (U.S. Department of Agriculture/Soil Conservation Service 1981). An overlay sheet of this figure is contained in the pocket at the back of this report for identification of MLRAs for those data that are mapped on the basis of that spatial unit. This overlay can also be used with data mapped for counties or Hydrologic Units to relate these data to the different spatial map units.

The MLRA codes and names are listed below:

60 Pierre Shale Plains and Badlands
63 Southern Rolling Pierre Shale Plains
64 Mixed Sandy and Silty Tableland
65 Nebraska Sand Hills
66 Dakota-Nebraska Eroded Tableland
67 Central High Plains
71 Central Nebraska Loess Hills
72 Central High Tableland
73 Rolling Plains and Breaks
74 Central Kansas Sandstone Hills
75 Central Loess Plains
76 Bluestem Hills
77 Southern High Plains
78 Central Rolling Red Plains
79 Great Bend Sand Plains
80 Central Rolling Red Prairies
84 Cross Timbers
102 Loess Uplands and Till Plains
103 Central Iowa and Minnesota Till Prairies
104 Eastern Iowa and Minnesota Till Prairies
105 Northern Mississippi Valley Loess Hills
106 Nebraska and Kansas Loess-Drift Hills
107 Iowa and Missouri Deep Loess Hills
108 Illinois and Iowa Deep Loess and Drift
109 Iowa and Missouri Heavy Till Plain
112 Cherokee Prairies
113 Central Claypan Areas
115 Central Mississippi Valley Wooded Slopes
116 Ozark Highland and Border
131 Southern Mississippi Valley Alluvium
134 Southern Mississippi Valley Silty Uplands

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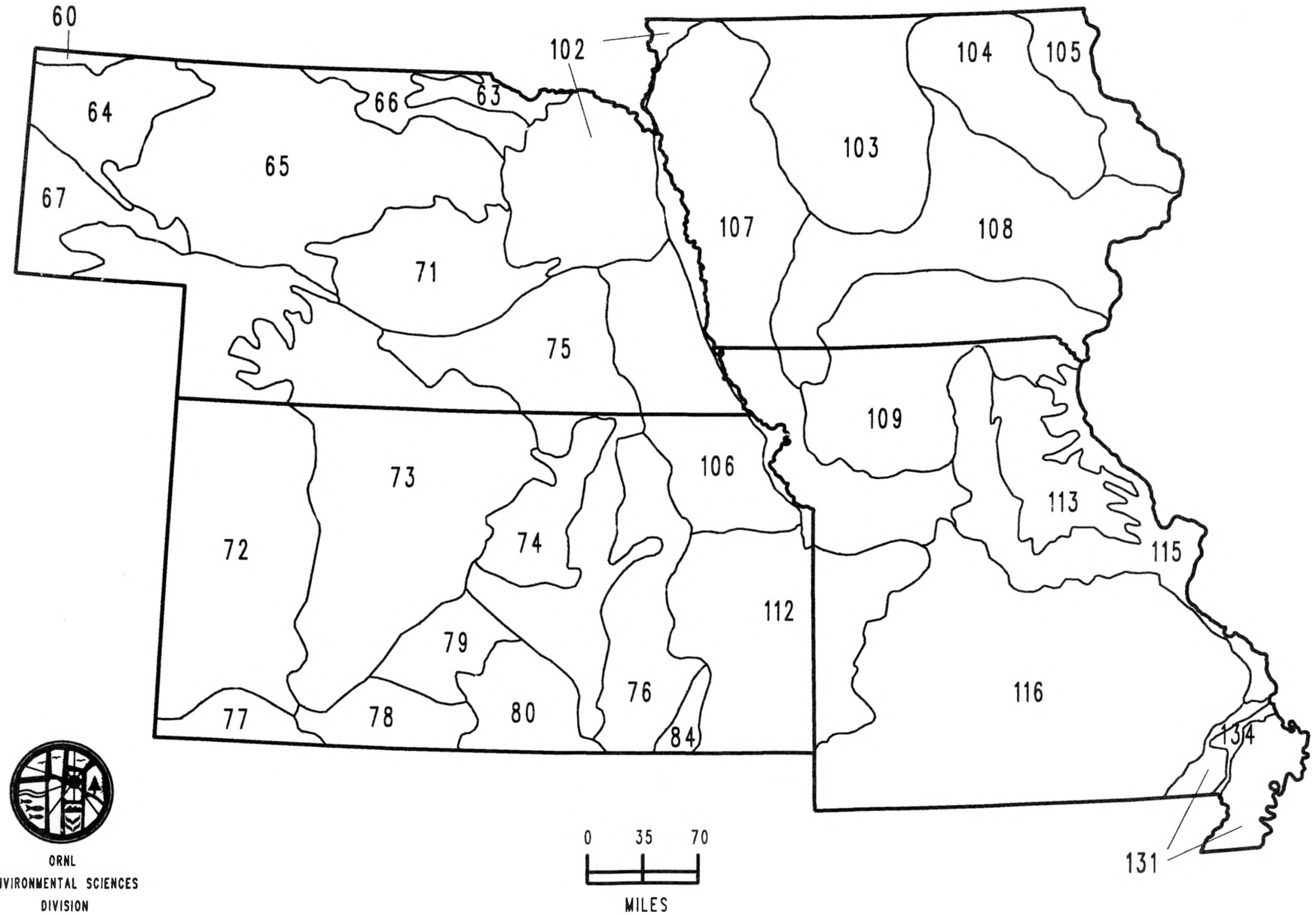

Map 6. Major Land Resource Areas.

COUNTY EQUIVALENTS OF MAJOR LAND RESOURCE AREAS

MAP 7

In order to aggregate county data into Major Land Resource Areas (MLRAs), the Soil Conservation Service partitioned counties into MLRAs (Olson et al. 1980; Dick Arnold, U.S. Department of Agriculture/Soil Conservation Service, personal communication to Linda Allison, May 1989). The MLRA codes are mapped within county boundaries on this map to show their approximate equivalents.

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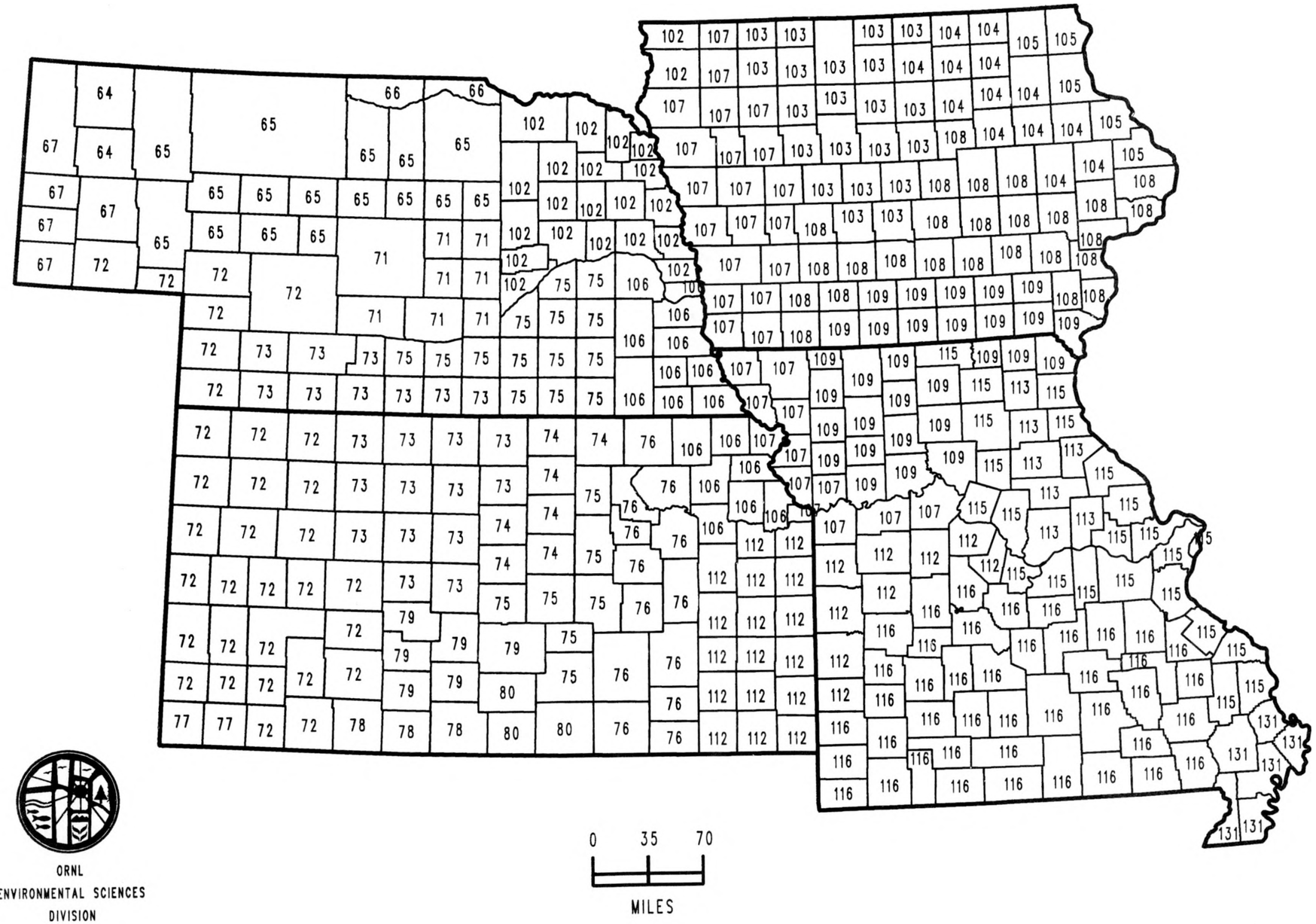

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Map 7. County representation of Major Land Resource Areas.

ANALYZED MLRAs

MAP 8

Eleven Major Land Resource Areas (MLRAs) determined to be representative of the Iowa-Kansas-Missouri-Nebraska region (U.S. Department of Agriculture/Soil Conservation Service 1981) were selected for analysis:

65 Nebraska Sand Hills
71 Central Nebraska Loess Hills
72 Central High Tableland
73 Rolling Plains and Breaks
75 Central Loess Plains
103 Central Iowa and Minnesota Till Prairies
106 Nebraska and Kansas Loess-Drift Hills
107 Iowa and Missouri Deep Loess Hills
108 Illinois and Iowa Deep Loess and Drift
109 Iowa and Missouri Heavy Till Plain
116 Ozark Highland and Border

The shaded MLRAs were not selected for analysis.

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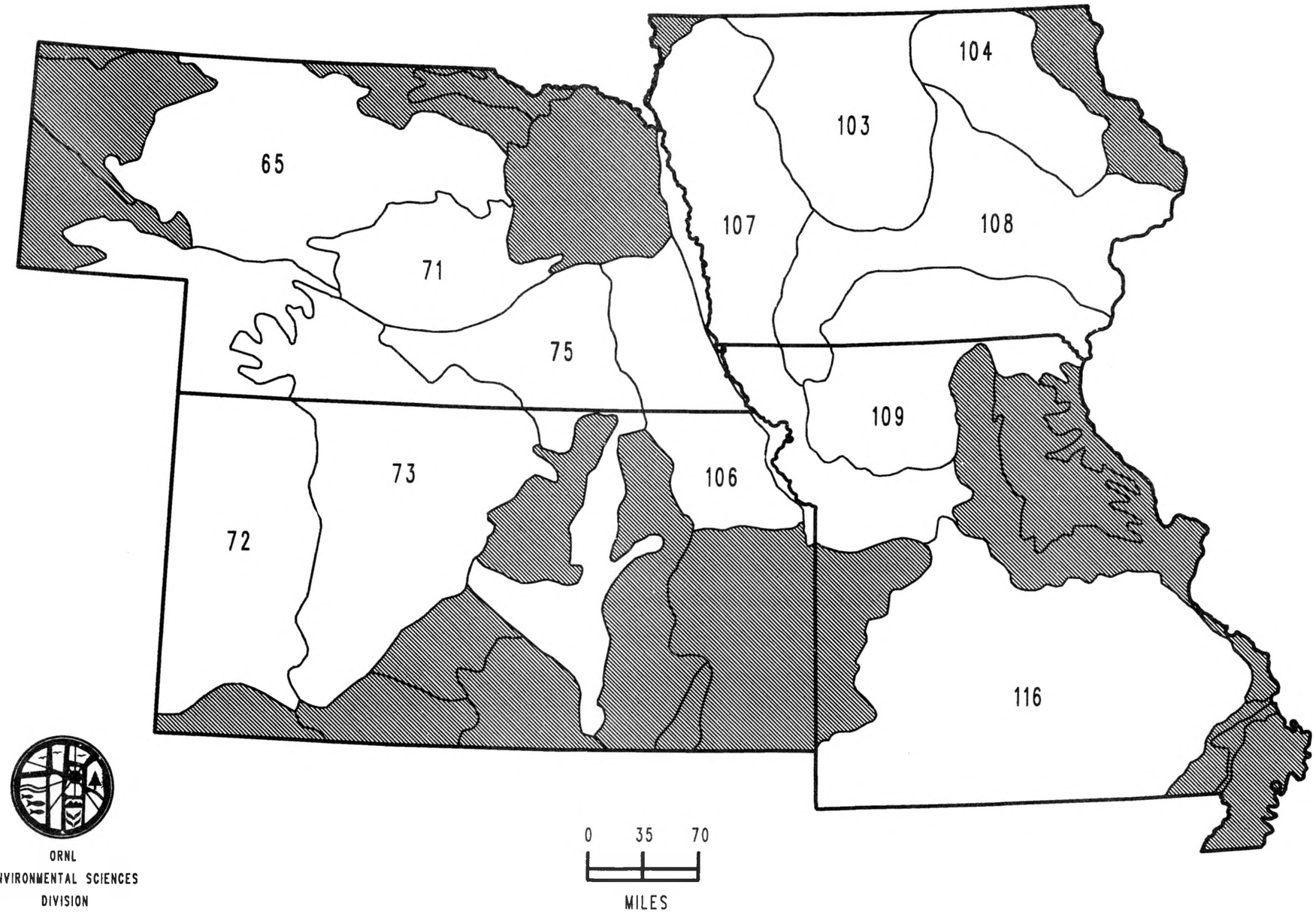

Map 8. Major Land Resource Areas selected for analysis.

ANALYZED MLRAs:
COUNTY EQUIVALENTS

MAP 9

Major Land Resource Area (MLRA) codes are mapped within the associated county boundaries for the MLRAs selected by Resources for the Future as representative of the Iowa-Kansas-Missouri-Nebraska region for the purposes of the climate-change analyses described in the introduction to this atlas. Most of the geographic area of these MLRAs is contained in the four-state study region; these MLRAs are major producers of the crops selected for analysis.

Shaded counties represent MLRAs not selected for analysis.

Source: Olson et al. 1980.

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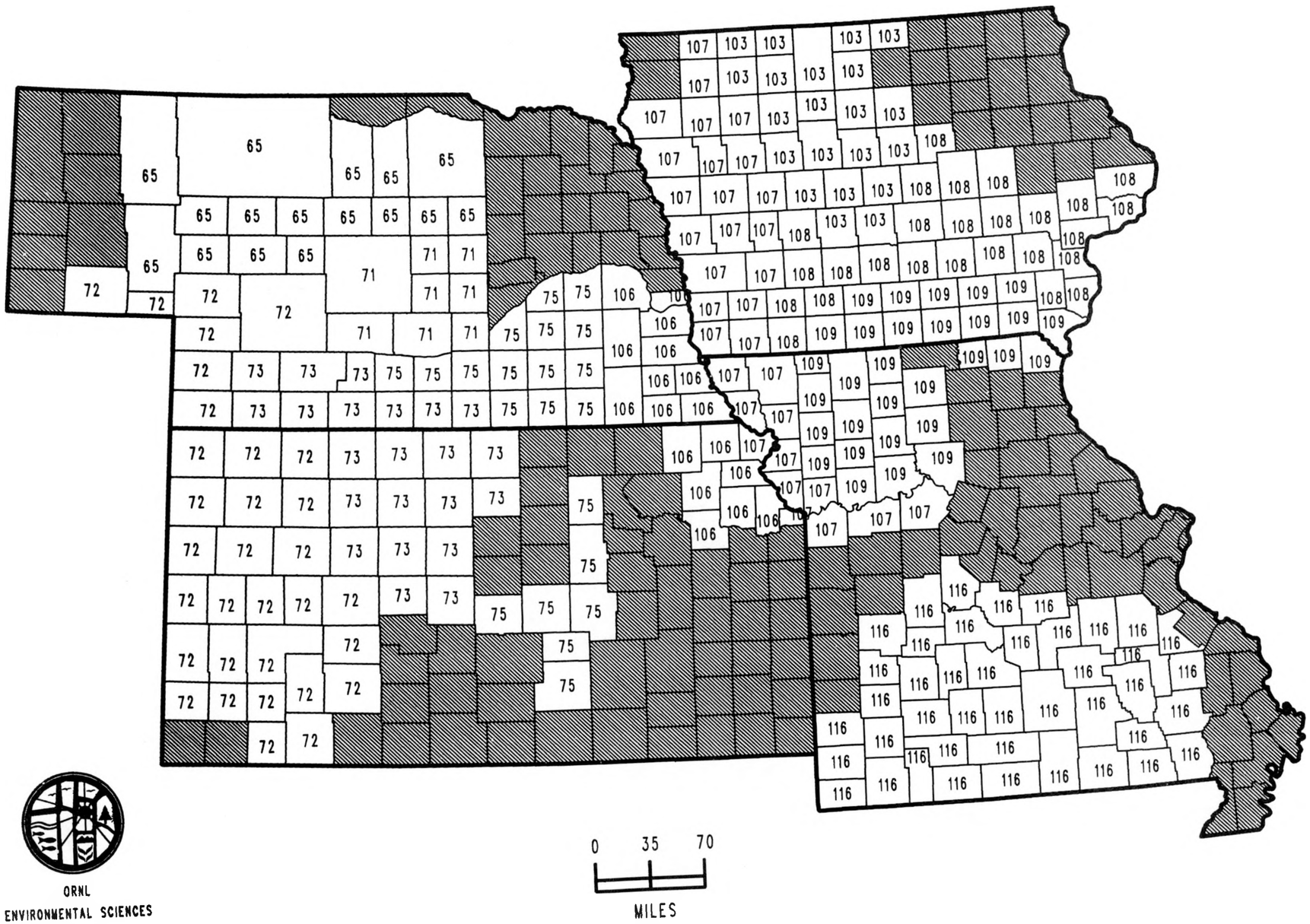

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Map 9. County representation of Major Land Resource Areas selected for analysis.

CORN PRODUCTION

MAP 10

Corn is grown throughout the Iowa-Kansas-Missouri-Nebraska region. Annual corn production is highest in Iowa and Nebraska, where many counties exceeded 16 million bushels during the baseline years (1984–1987). The individual 1984–1987 median values are listed by county in Table A-2. This production area is the westward extension of the corn belt in Illinois and Indiana. The highest corn production occurs in the following Major Land Resource Areas (MLRAs): the Central Iowa Till Prairie (103), the Central Loess Plains (075), and the loess and drift hills (106, 107, 108).

Iowa is in the center of the largest contiguous corn-producing area in the nation. Production in Iowa and in parts of Nebraska is among the highest in the nation. The combination of topography, soils, and climate makes this area one of the largest corn-growing regions in the world (White et al. 1985). From 1984 through 1987, Iowa, Kansas, Missouri, and Nebraska accounted for 32-36% of the national annual production of corn for grain (Agricultural Statistics Board 1987, 1989). The corresponding figures for 1988 and 1989 were 41% and 36%, respectively (Agricultural Statistics Board 1990).

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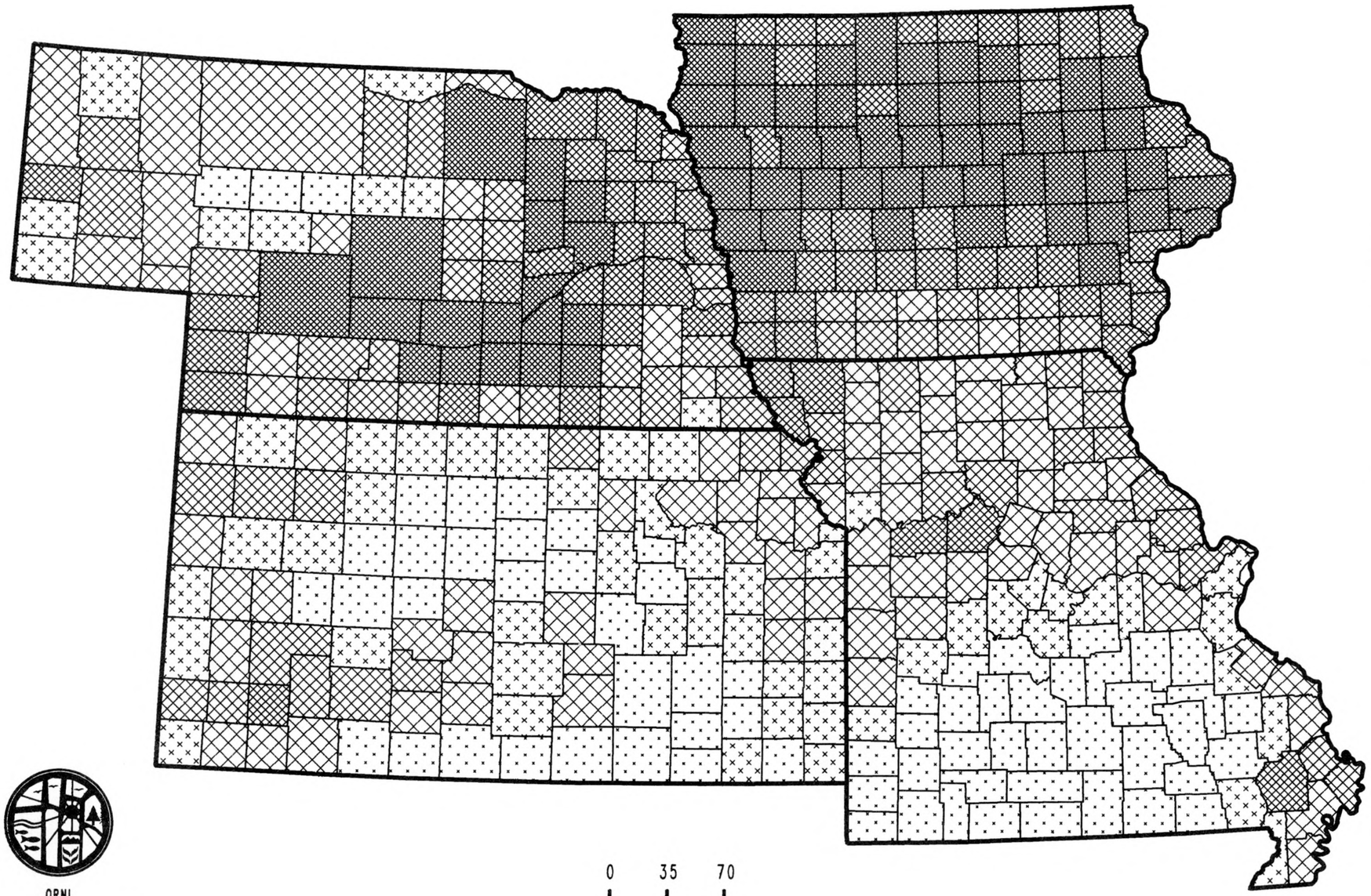

Map 10. Annual corn production (bushels), median values by county for 1984–1987.

CORN HARVESTED

MAP 11

Data on acres of corn harvested annually show basically the same pattern as for corn production (Map 10). The individual 1984–1987 median values are listed by county in Table A-2.

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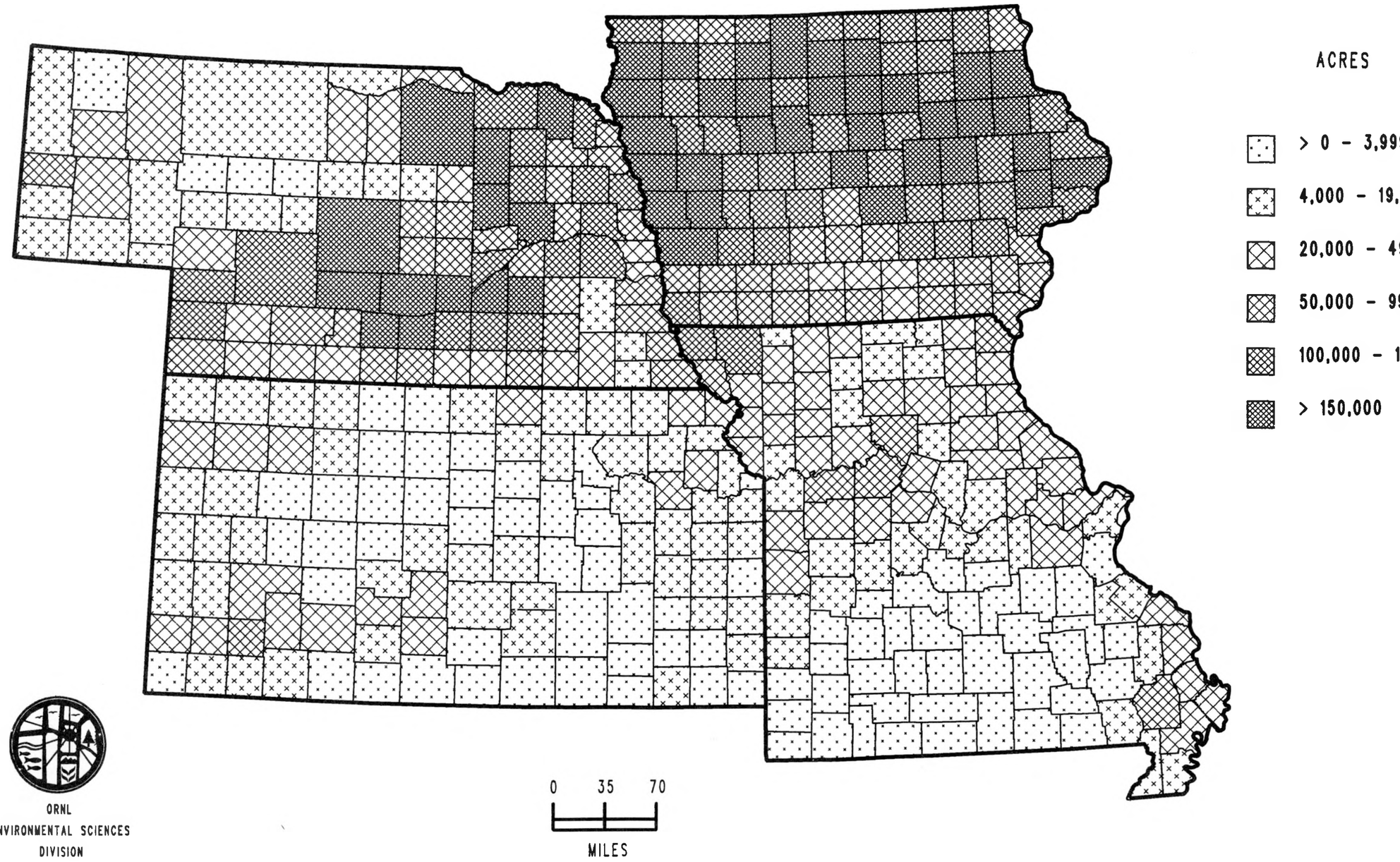


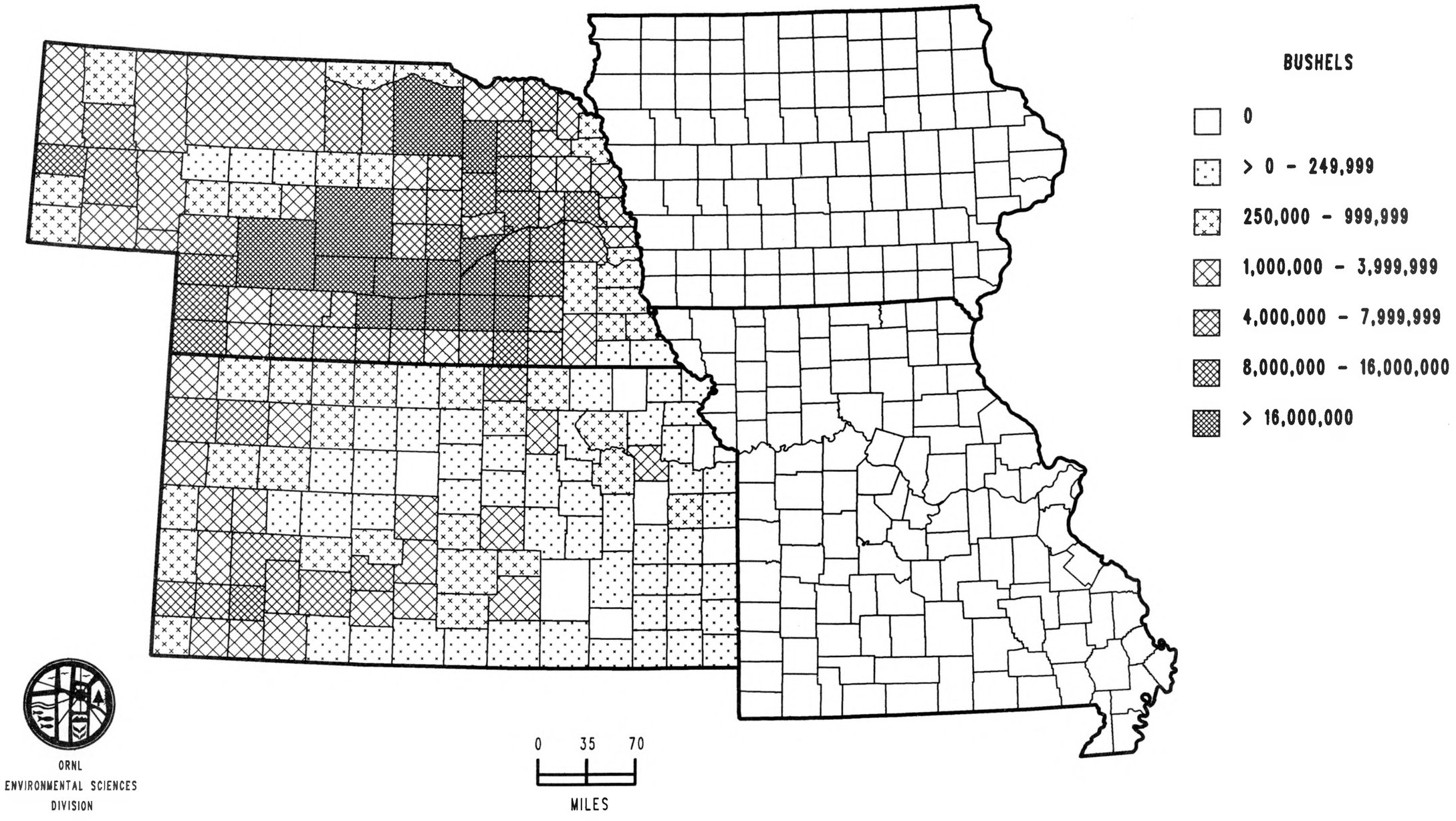
Map 11. Acres of corn harvested annually, median values by county for 1984–1987.

IRRIGATED CORN PRODUCTION

MAP 12

Almost all corn produced in Nebraska during the baseline years (1984–1987) was irrigated (Map 10). This is also true for most counties producing corn in Kansas except for those along the eastern border of the state. Very little corn is irrigated in Iowa or Missouri, where there is sufficient annual rainfall to meet water demand (White et al. 1985). The individual 1984–1987 median values are listed by county in Table A-3.

ORNL-DWG 90-1692



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Map 12. Annual irrigated corn production (bushels), median values by county for 1984–1987.

IRRIGATED CORN HARVESTED

MAP 13

The data illustrated in this map support the conclusions from Map 12: almost all corn grown in Nebraska and Kansas is irrigated, while very little corn grown in Iowa and Missouri is irrigated. The individual 1984–1987 median values are listed by county in Table A-3.

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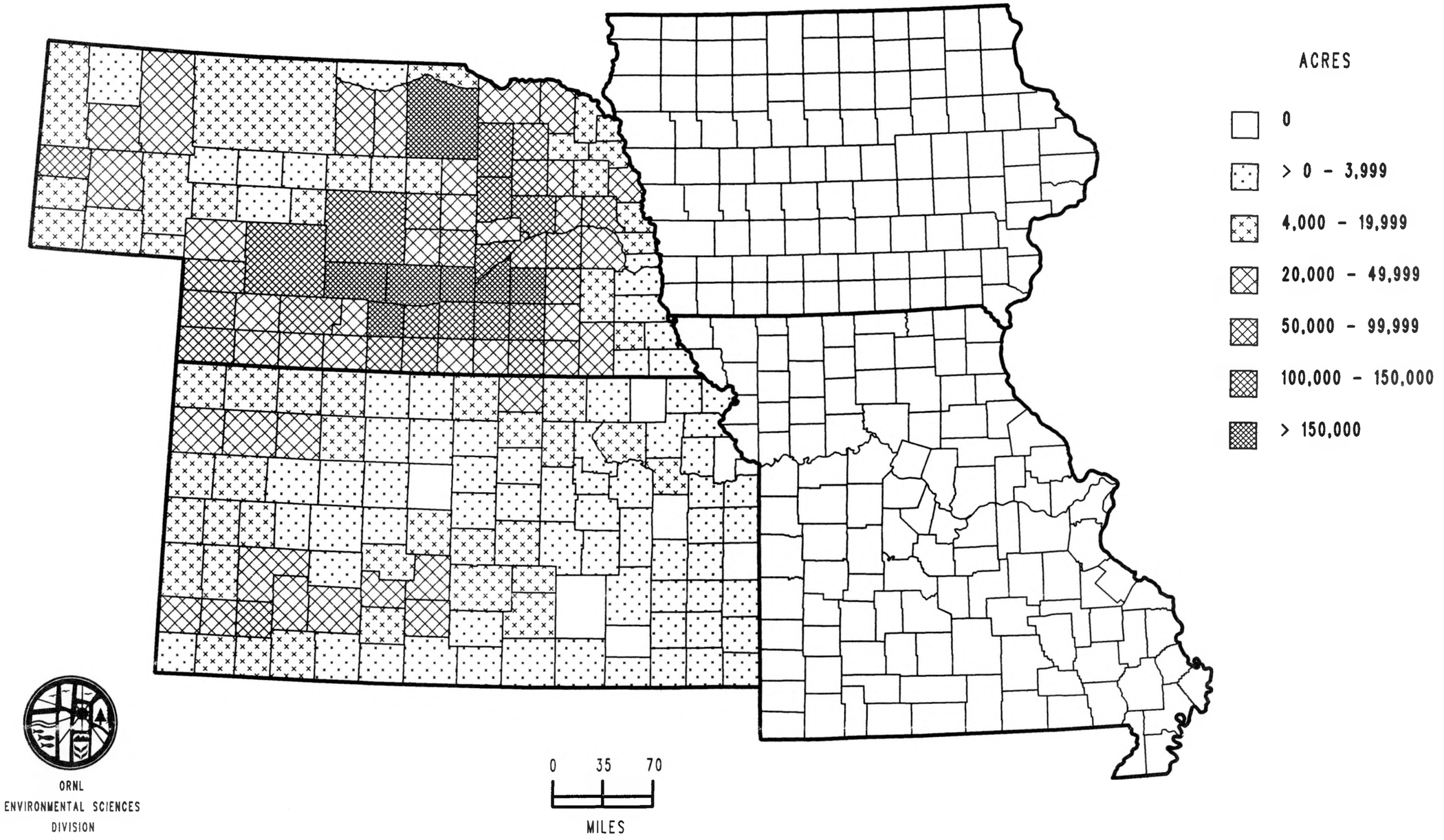

Map 13. Acres of irrigated corn harvested annually, median values by county for 1984–1987.

HAY PRODUCTION

MAP 14

Unlike the distribution of other crops evaluated in this study, counties with high production of hay (greater than 75,000 tons annually) are scattered throughout the Iowa-Kansas-Missouri-Nebraska region. The individual 1984–1987 median values are listed by county in Table A-2. Hay production is high in areas where cattle are extensive (Map 28), with most of the hay grown in Iowa and Missouri being used for dairy cattle (White et al. 1985). In Kansas most of the hay is grown in the counties where feedlot operations are nearby. Nebraska hay predominantly grows wild in the Sand Hills, a major cattle-raising area.

Areas of high production of hay are scattered throughout the nation. Several counties in the Iowa-Kansas-Missouri-Nebraska region have production that is among the highest in the United States. The largest groupings of these counties occur in central and northern Nebraska. From 1984 through 1987, Iowa, Kansas, Missouri, and Nebraska accounted for 17–18% of the national annual production of all hay (Agricultural Statistics Board 1987, 1989). The corresponding figures for 1988 and 1989 were 19% and 17%, respectively (Agricultural Statistics Board 1990).

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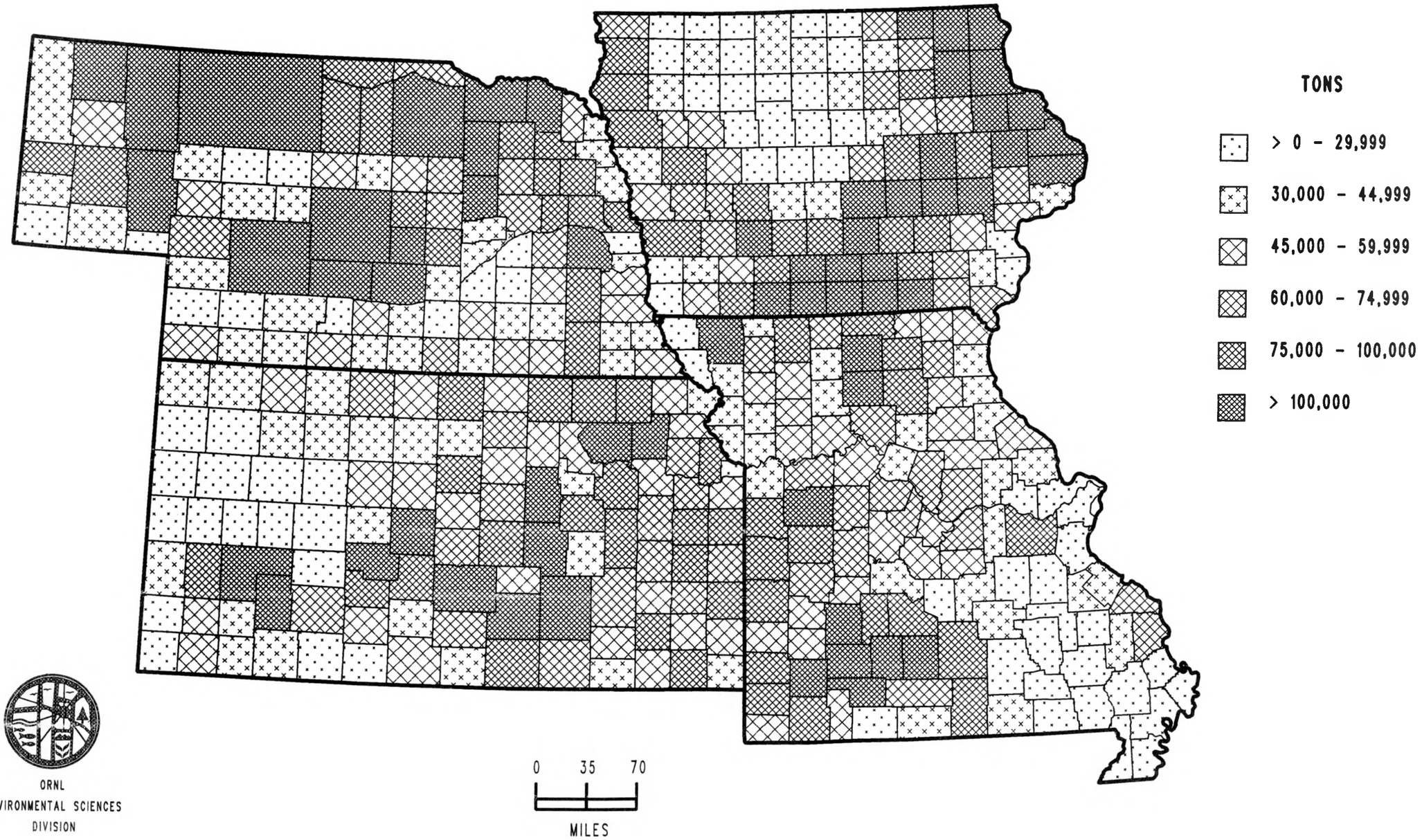


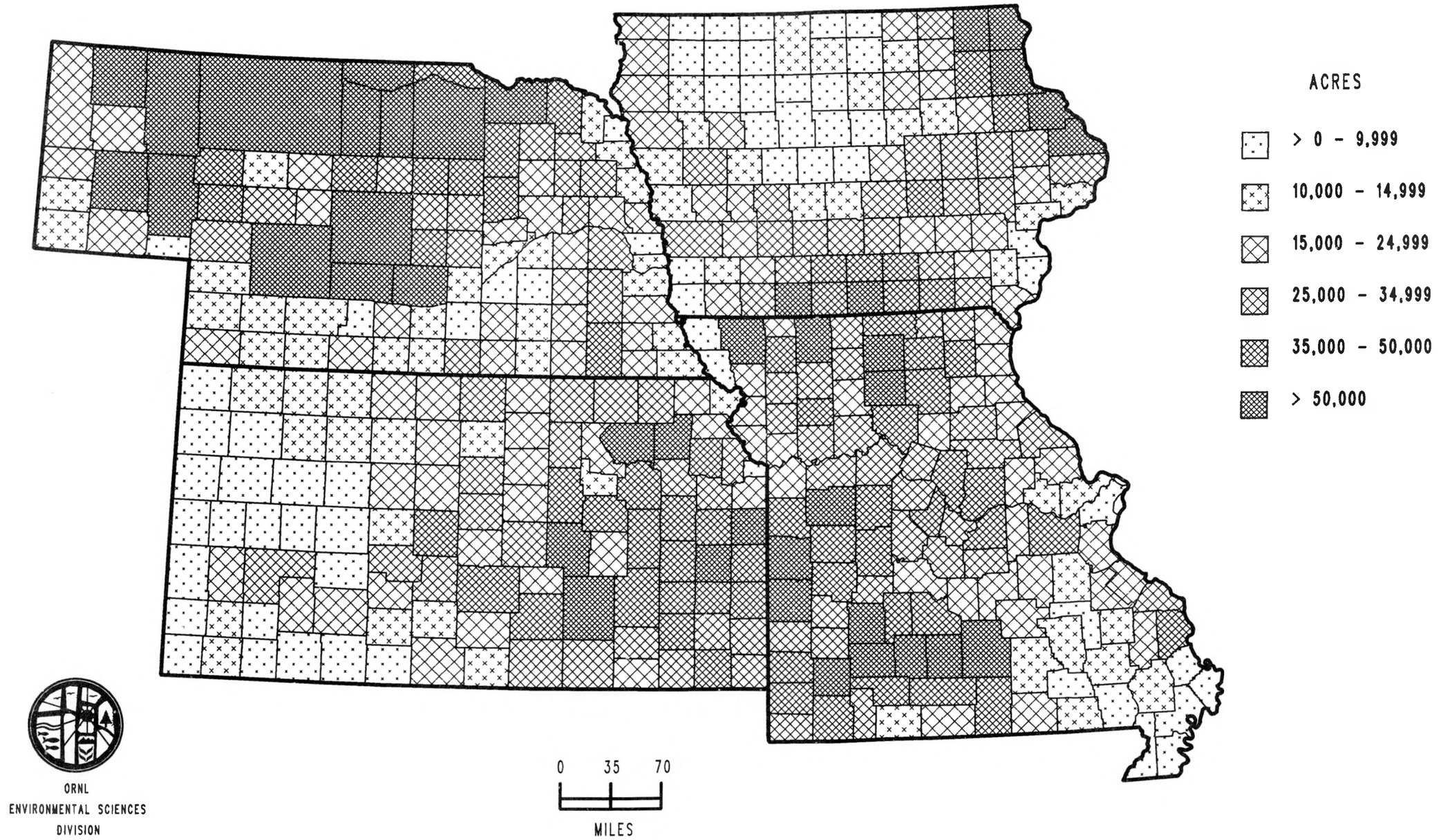
Map 14. Annual hay production (tons), median values by county for 1984–1987.

HAY HARVESTED

MAP 15

The data for the acres of hay harvested annually show a spatial pattern similar to that for the amounts of hay produced, with somewhat fewer acres havested in Iowa and southwestern Kansas (Map 14). Many counties had more than 35,000 acres of hay harvested annually during the baseline years (1984–1987). The individual 1984–1987 median values are listed by county in Table A-2.

ORNL-DWG 90-1695



Map 15. Acres of hay harvested annually, median values by county for 1984–1987.

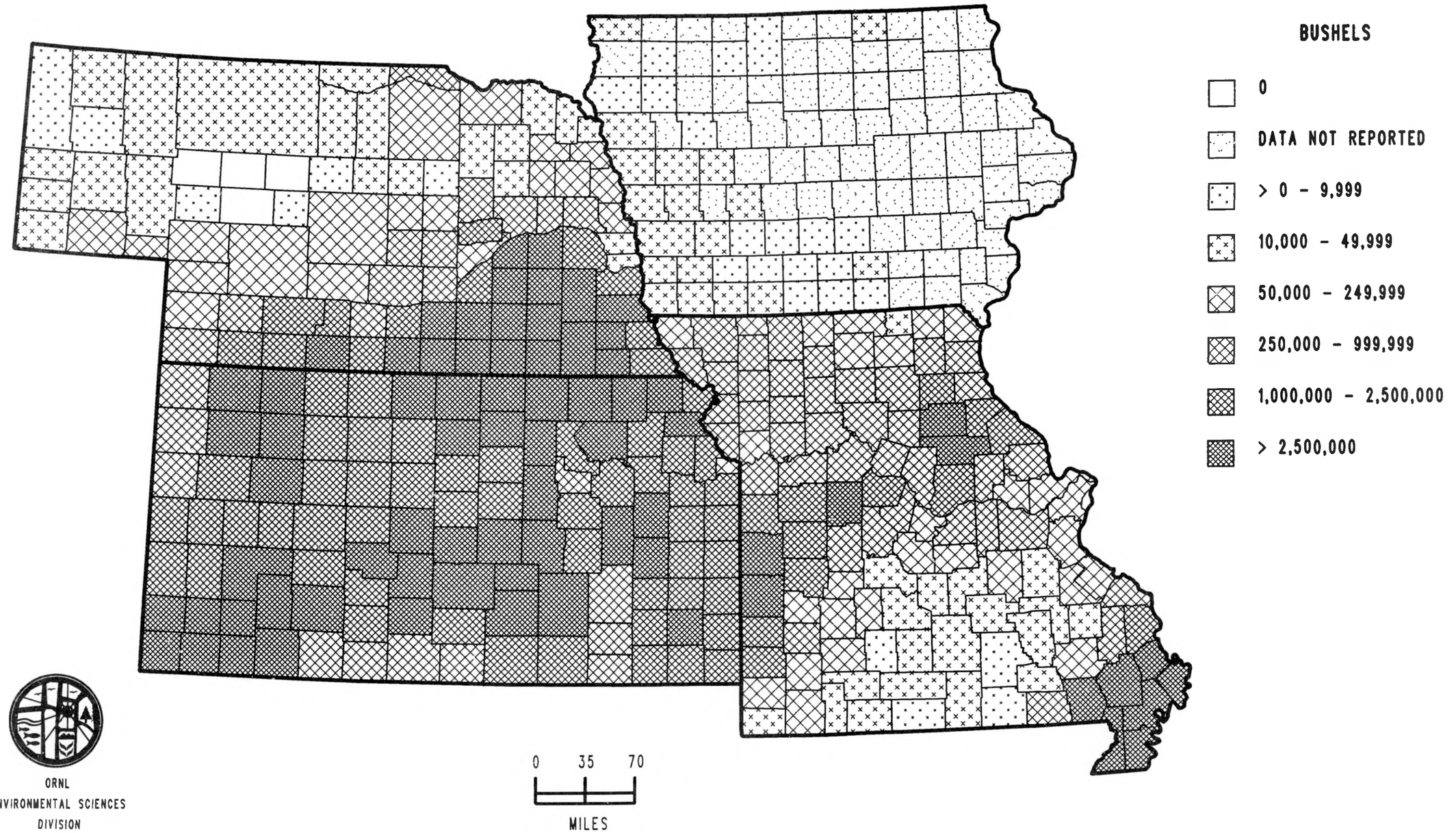
SORGHUM PRODUCTION

MAP 16

Annual sorghum production in the Iowa-Kansas-Missouri-Nebraska region is highest in Kansas and parts of Missouri and Nebraska, with most counties in Kansas exceeding one million bushels annually during the baseline years (1984–1987). In this region, sorghum is grown primarily for livestock feed. The individual 1984–1987 median values are listed by county in Table A-2. Although areas of sorghum production overlap to some extent with areas producing wheat, in general the area of high sorghum production is east of the wheat-growing area and west of the soybean- and corn-growing areas of the four-state region.

Sorghum is a grain adapted to growing in a semiarid environment and is planted in areas where the water supply is questionable (White et al. 1985). The highest sorghum production occurs in the central loess plains and hills of Nebraska and Kansas (Major Land Resource Areas 75 and 106).

Kansas is in the center of the largest contiguous sorghum-producing area in the nation. From 1984 through 1987, Iowa, Kansas, Missouri, and Nebraska accounted for 50-60% of the national annual production of sorghum for grain (Agricultural Statistics Board 1987, 1989). The corresponding figures for 1988 and 1989 were 60% and 56%, respectively (Agricultural Statistics Board 1990).



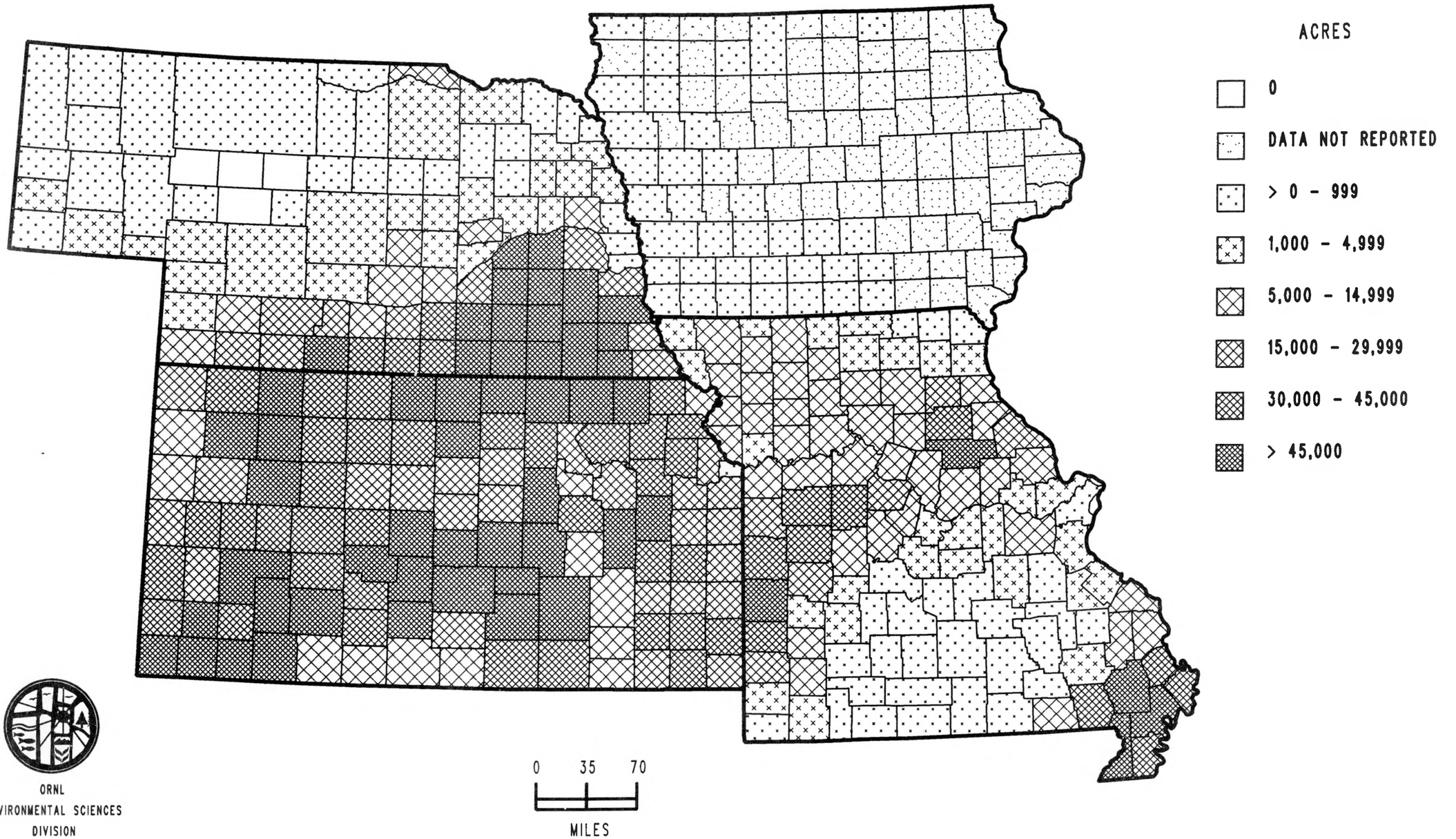
Map 16. Annual sorghum production (bushels), median values by county for 1984–1987.

SORGHUM HARVESTED

MAP 17

This map shows basically the same pattern as that for sorghum production (Map 16). The individual 1984–1987 median values are listed by county in Table A-2.

ORNL-DWG 90-1697



Map 17. Acres of sorghum harvested annually, median values by county for 1984–1987.

IRRIGATED SORGHUM PRODUCTION

MAP 18

Most sorghum is not heavily irrigated in the Iowa-Kansas-Missouri-Nebraska region. Irrigation occurs only in Nebraska and Kansas, and only a few clusters of counties in the high-production areas appear to irrigate intensively. The individual 1984–1987 median values are listed by county in Table A-3.

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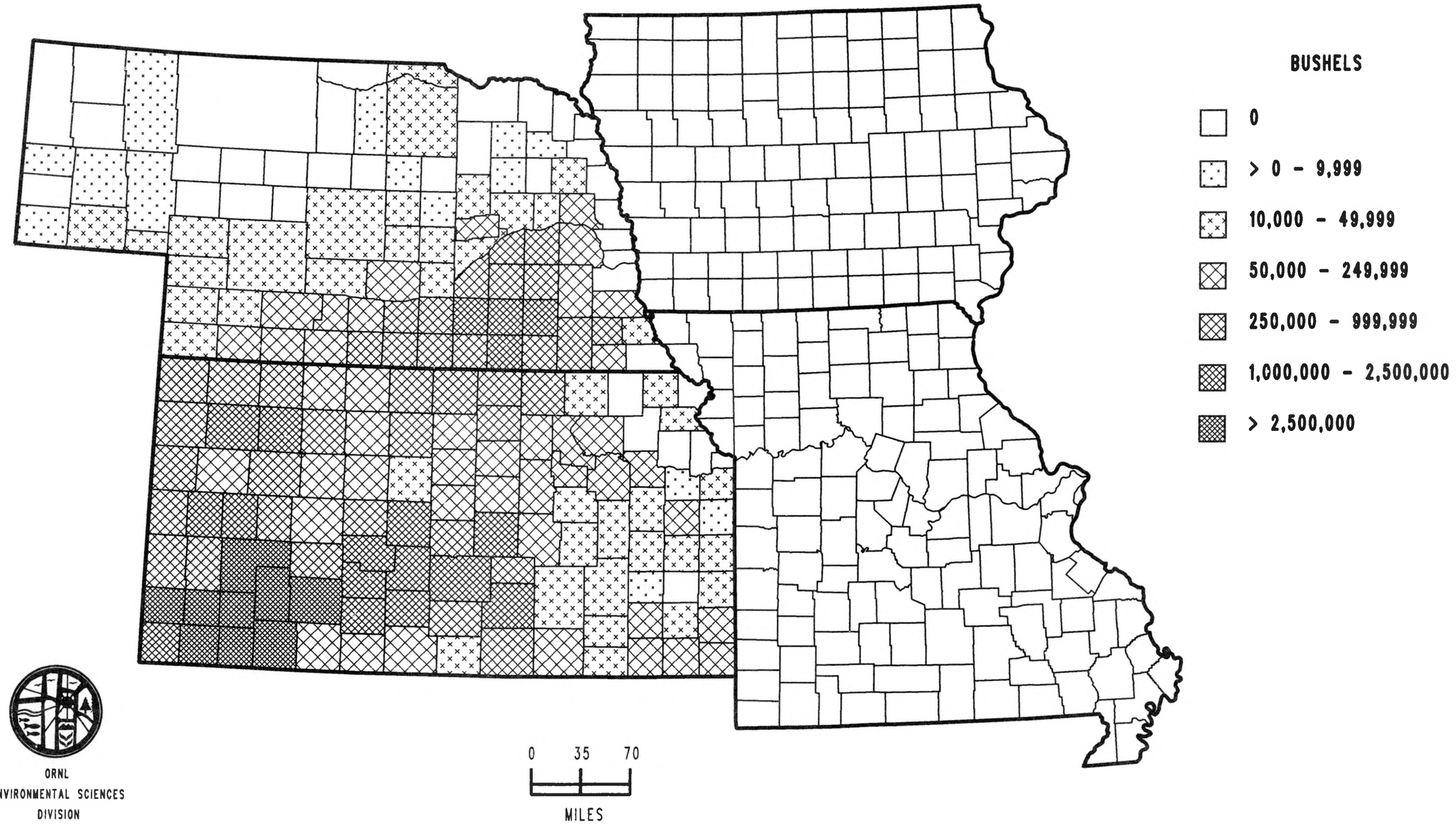
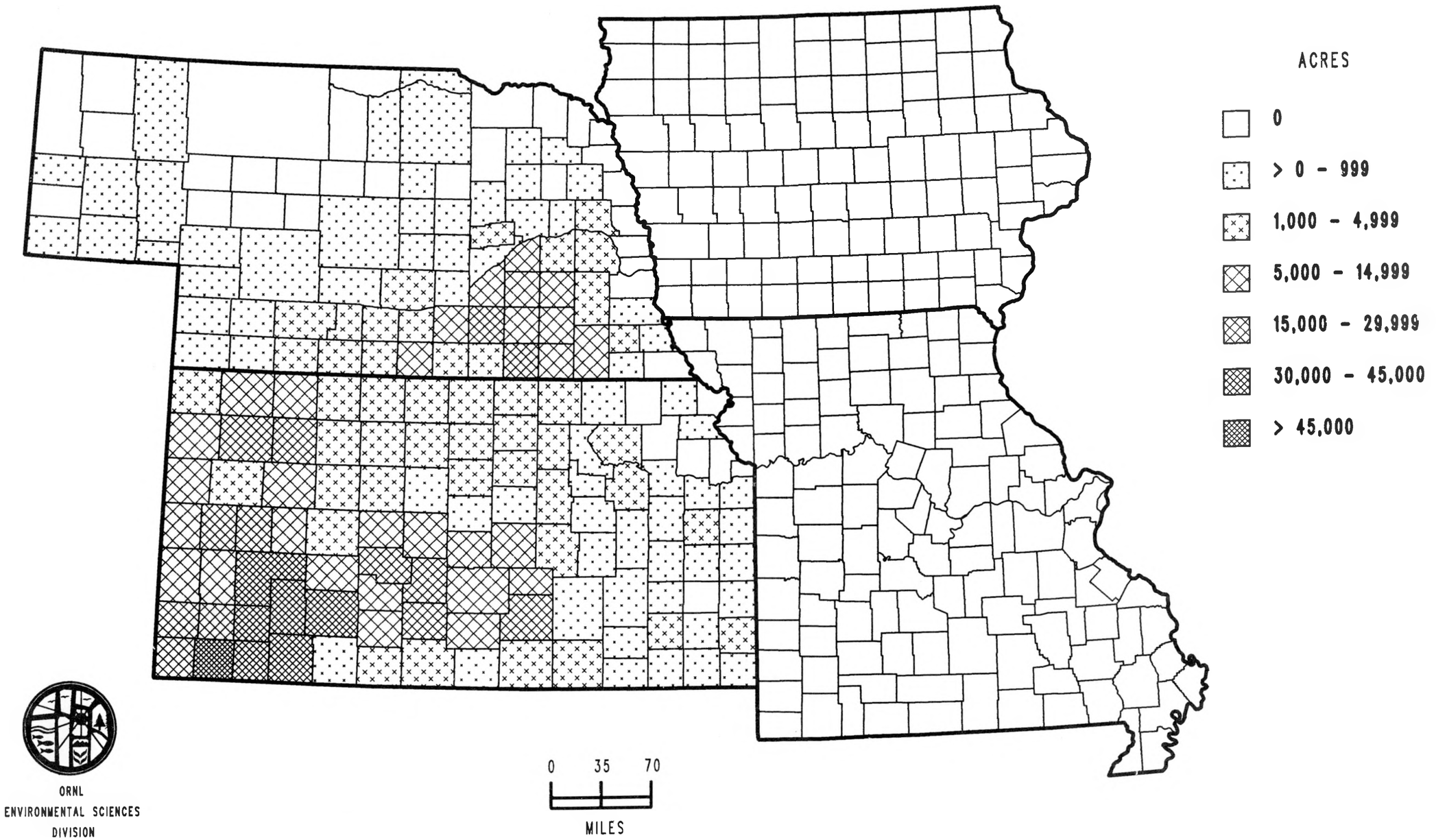


Map 18. Annual irrigated sorghum production (bushels), median values by county for 1984–1987.

IRRIGATED SORGHUM HARVESTED

MAP 19

Only a small amount of the total acreage of sorghum harvested in Iowa, Kansas, Missouri, and Nebraska is irrigated. Most counties in Kansas harvested more than 30,000 acres annually during the baseline years (1984–1987) (Map 17), but only a few counties in Kansas were irrigating more than 15,000 acres. The individual 1984–1987 median values are listed by county in Table A-3.



Map 19. Acres of irrigated sorghum harvested annually, median values by county for 1984–1987.

SOYBEAN PRODUCTION

MAP 20

Annual soybean production is very high for Iowa and, to a lesser extent, for eastern Nebraska and northern and southeastern Missouri, with most counties in Iowa exceeding two million bushels annually during the baseline years (1984–1987). The individual median values are listed by county in Table A-2. Originally soybeans were grown in the lower Mississippi River Valley, but they are now one of the leading crops in Iowa. The highest soybean production occurs in the Central Iowa Till Prairies and in the Iowa and Missouri Deep Loess Hills (Major Land Resource Areas 103 and 107). The climatic requirements for soybeans are the same as those for corn, which is the reason both crops are grown in the same area (White et al. 1985) (see Map 10). Very little soybean production occurs in the western part of Nebraska and Kansas, where wheat production predominates.

Iowa and northern Missouri are at the western edge of the major soybean production area in the nation. From 1984 through 1987, Iowa, Kansas, Missouri, and Nebraska accounted for 24–35% of the national annual production of soybeans (Agricultural Statistics Board 1987, 1989). The corresponding figures for 1988 and 1989 were 31% and 30%, respectively (Agricultural Statistics Board 1990).

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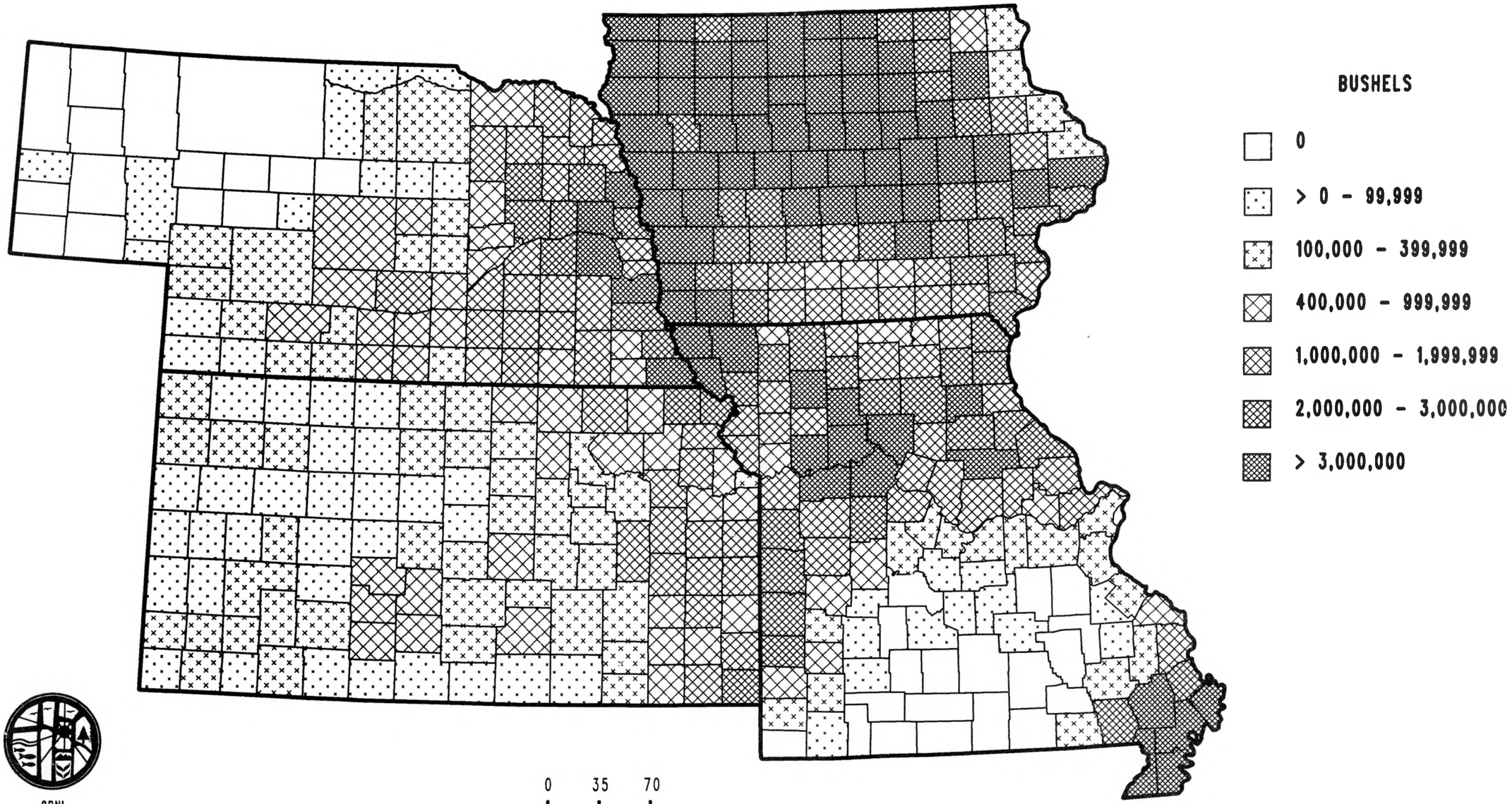


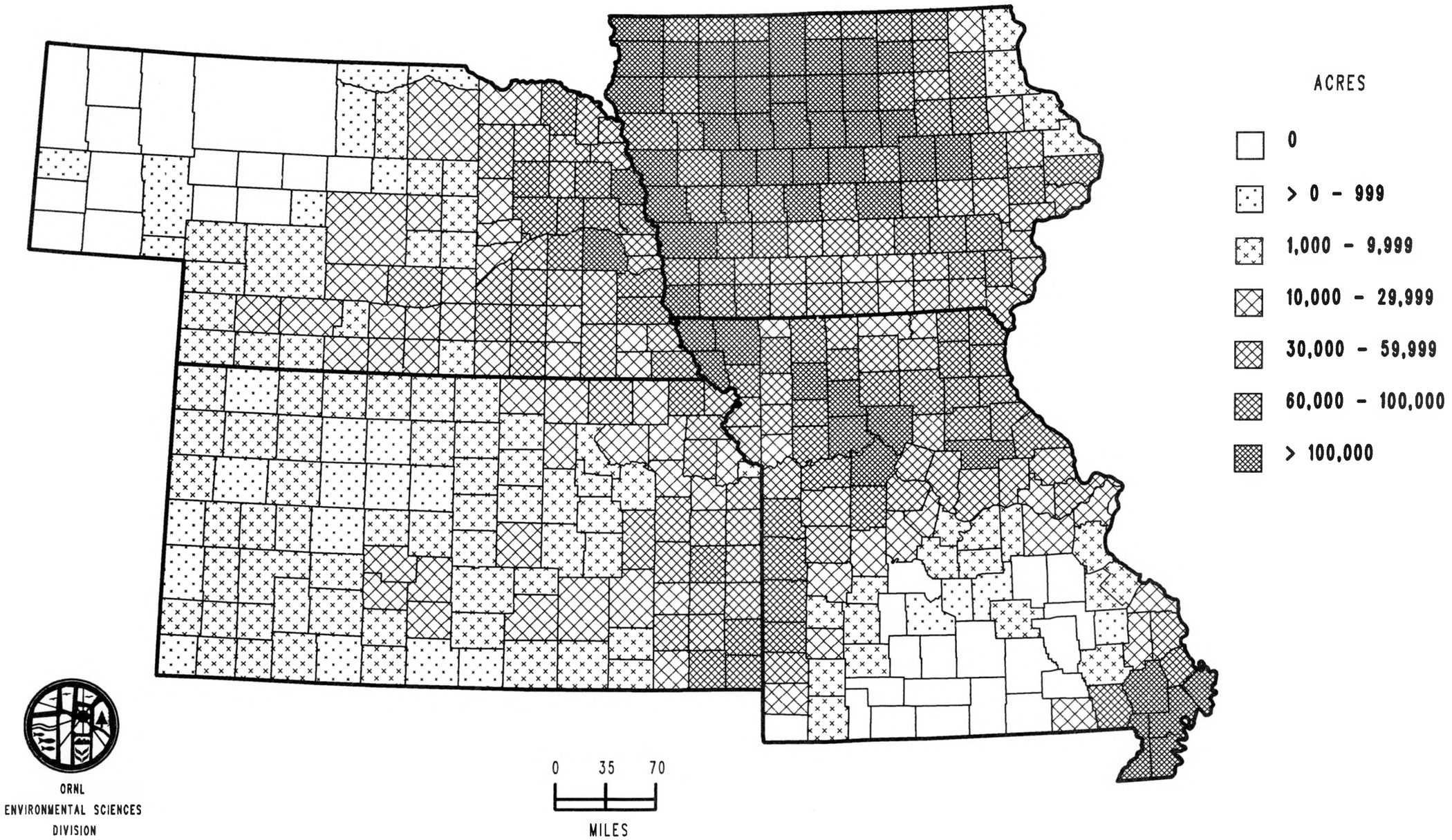
Map 20. Annual soybean production (bushels), median values by county for 1984–1987.

SOYBEANS HARVESTED

MAP 21

This map shows basically the same pattern as that for soybean production (Map 20). The individual 1984–1987 median values are listed by county in Table A-2.

ORNL-DWG 90-1701



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Map 21. Acres of soybeans harvested annually, median values by county for 1984–1987.

IRRIGATED SOYBEAN PRODUCTION

MAP 22

The most heavily irrigated areas of soybean production occur in Nebraska and Kansas, and production does not exceed two million bushels annually for any counties. The actual 1984–1987 median values are listed by county in Table A-3.

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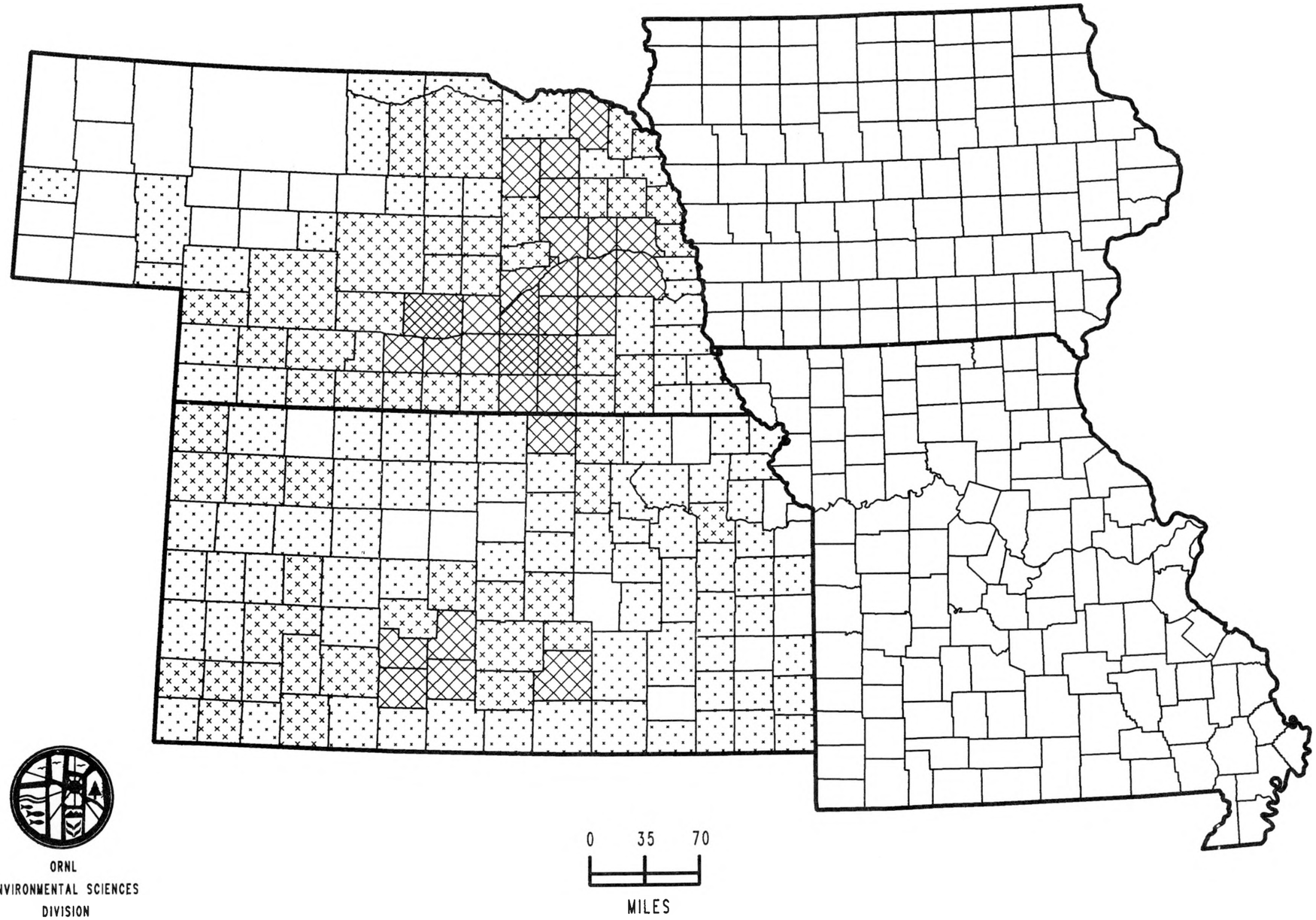

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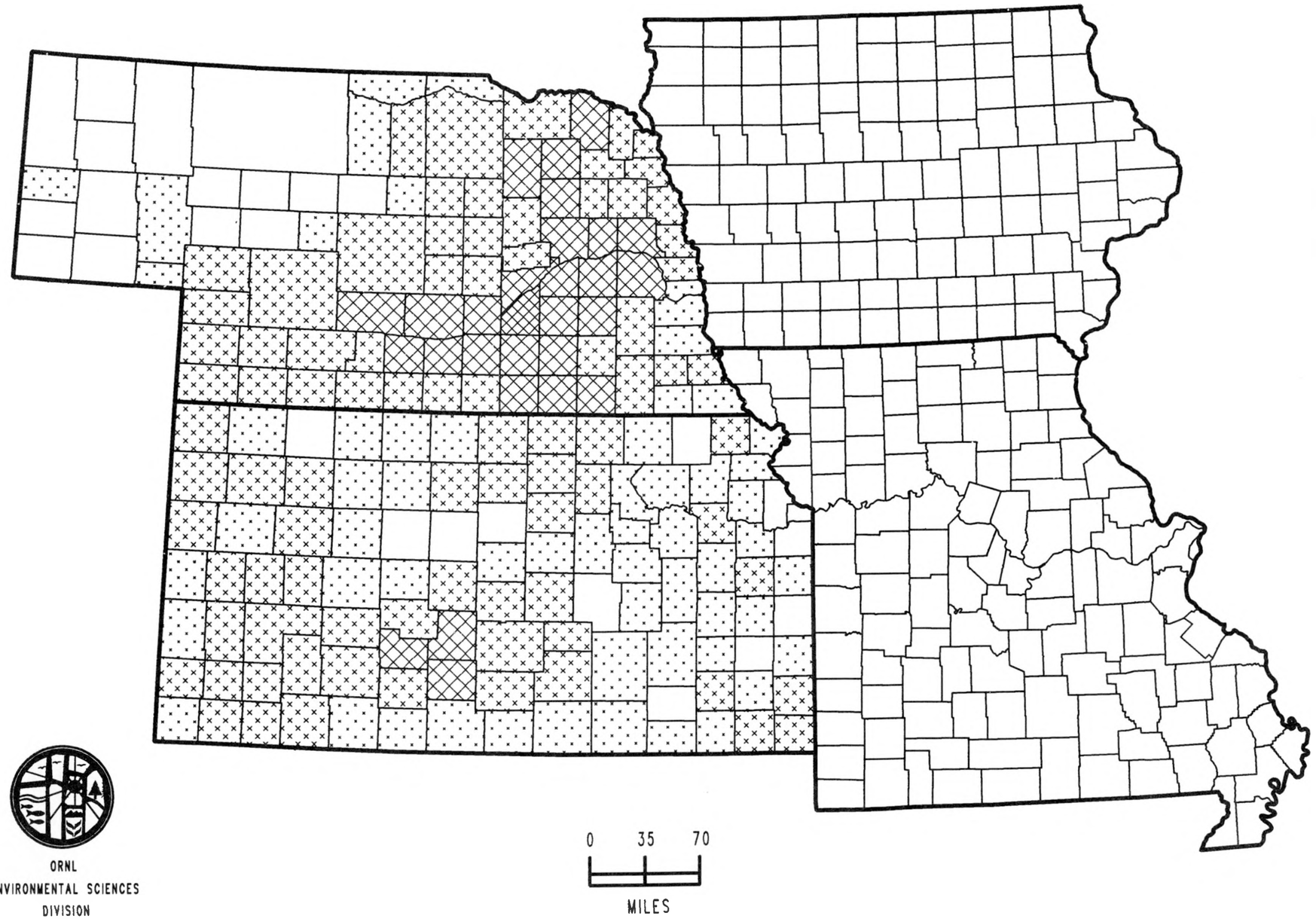
Map 22. Annual irrigated soybean production (bushels), median values by county for 1984–1987.

IRRIGATED SOYBEANS HARVESTED

MAP 23

This map shows basically the same pattern as that for irrigated soybean production: the majority of the land growing soybeans in Nebraska and Kansas is irrigated (see Map 21). Generally, soybeans are not irrigated as intensively as corn since the economic return for soybeans is lower (White et al. 1985). The individual 1984–1987 median values are listed by county in Table A-3.

ORNL-DWG 90-1703



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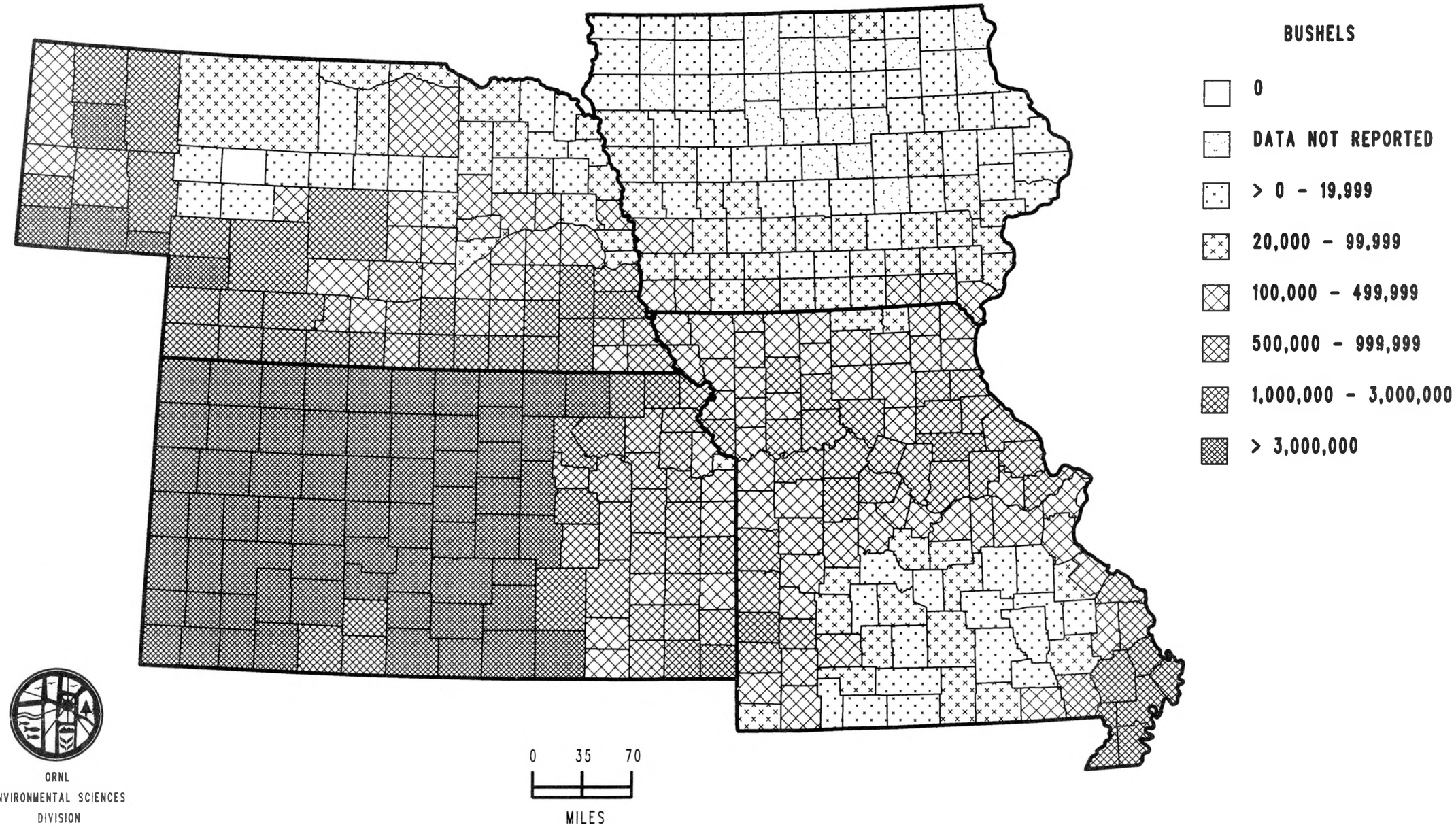
Map 23. Acres of irrigated soybeans harvested annually, median values by county for 1984–1987.

WHEAT PRODUCTION

MAP 24

Annual wheat production is very high for Kansas, with most counties exceeding three million bushels annually during the baseline years (1984–1987). The flat topography of Kansas makes this region well-adapted to growing wheat (White et al. 1985). The individual median values (based on up to 4 years of data from 1984–1987) are listed by county in Table A-2. The highest wheat production occurs in the Central High Tableland and the Rolling Plains and Breaks [Major Land Resource Areas (MLRAs) 72 and 73]; the Central Loess Plains also has high wheat production (MLRA 75). Intermediate production occurs in the deep loess and drift areas and Heavy Till Plain of Iowa and Missouri (MLRAs 106, 107, and 109). Winter wheat is the dominant variety grown. It tends to be grown in the drier portions of the study region where it has a higher economic return than corn.

Central and western Kansas is one of the primary wheat-producing areas of the United States. From 1984 through 1987, Iowa, Kansas, Missouri, and Nebraska accounted for 21–24% of the national annual production of all wheat (Agricultural Statistics Board 1987, 1989). The corresponding figures for 1988 and 1989 were 26% and 18%, respectively (Agricultural Statistics Board 1990).

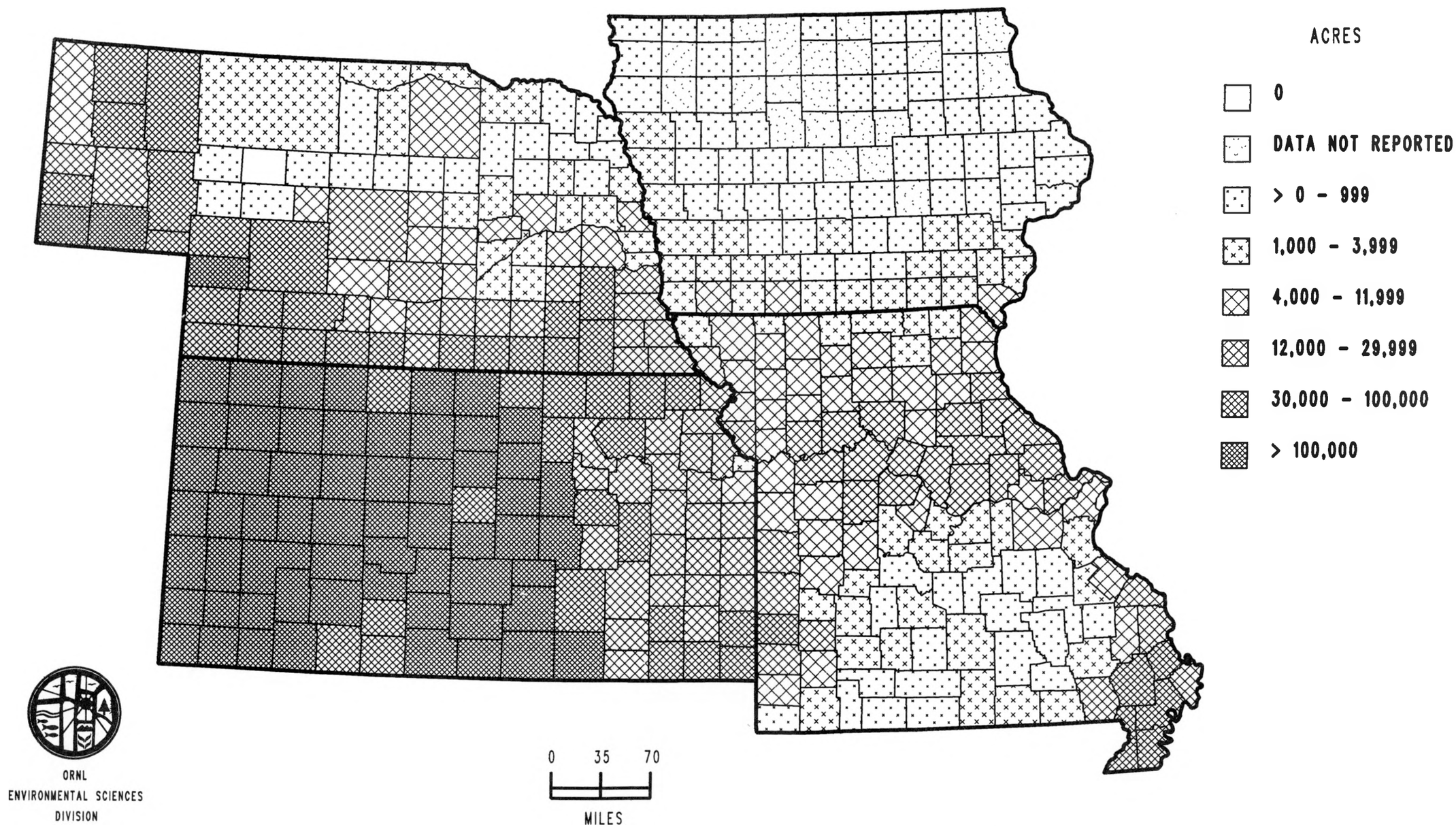


Map 24. Annual wheat production (bushels), median values by county for 1984–1987.

WHEAT HARVESTED

MAP 25

This map shows basically the same pattern as that shown for wheat production in Map 24. The individual median values for 1984–1987 are listed by county in Table A-2.



Map 25. Acres of wheat harvested annually, median values by county for 1984–1987.

IRRIGATED WHEAT PRODUCTION

MAP 26

Irrigation of wheat is limited to the central and western part of Nebraska and Kansas. The highest production of irrigated wheat occurs in southwestern Kansas, with one to three million bushels produced annually during the baseline years (1984–1987). The individual median values are listed by county in Table A-3.

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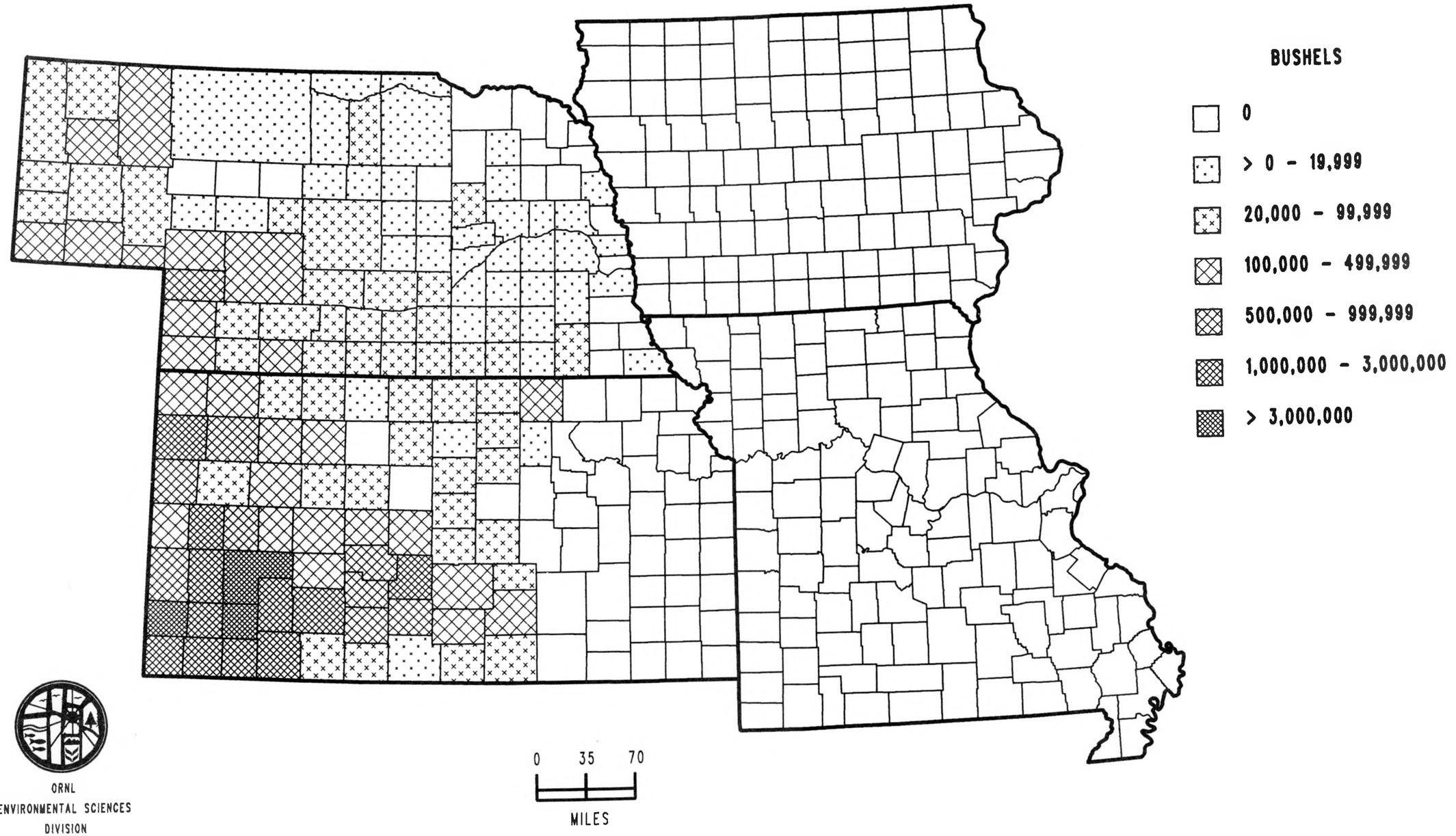

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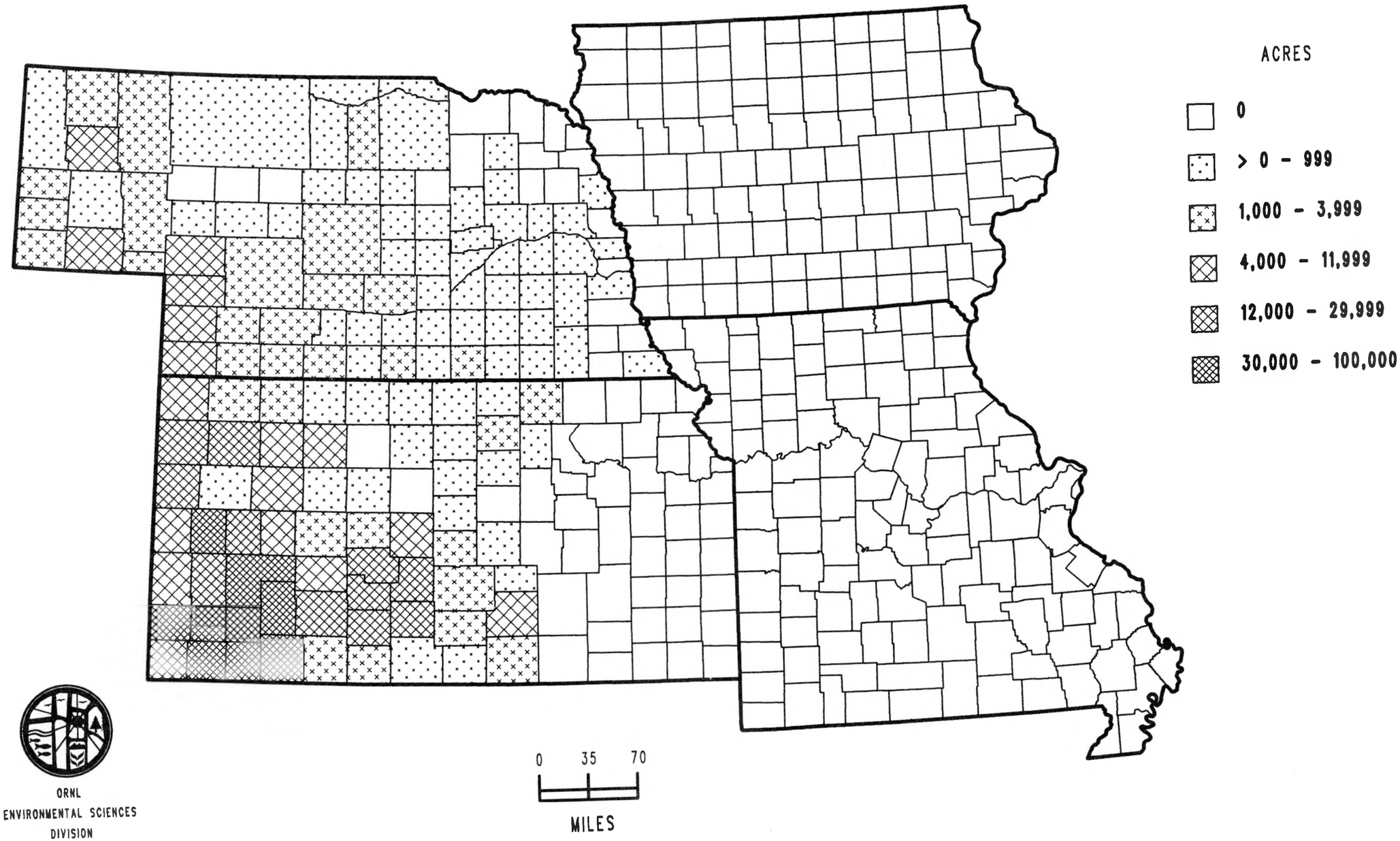
Map 26. Annual irrigated wheat production (bushels), median values by county for 1984–1987.

IRRIGATED WHEAT HARVESTED

MAP 27

This map shows basically the same pattern as that for irrigated wheat production (Map 26). The counties with the highest acreage in irrigated wheat are in southwestern Kansas. The individual 1984–1987 median values are listed by county in Table A-3.

ORNL-DWG 90-1707



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Map 27. Acres of irrigated wheat harvested annually, median values by county for 1984–1987.

CATTLE PRODUCTION

MAP 28

Cattle are produced throughout the Iowa-Kansas-Missouri-Nebraska region. Counties with high cattle production (greater than 75,000 head annually) are found in each state; however, Nebraska has the highest production. Cattle in Nebraska are range cattle, and ranchers take advantage of the fields of naturally occurring hay. Many ranches have thousands of acres, and cattle can outnumber people by 75 to 1 (White et al. 1985). High numbers of cattle in Kansas indicate the counties with major cattle feedlots, parking centers, and slaughterhouses. Kansas is one of the leading cattle-parking centers in the United States. Iowa has dairy cattle in the east and range cattle in the west, while the cattle in southwestern Missouri are predominantly dairy cattle (White et al. 1985).

The individual median values are listed by county in Table A-4. County-level data in Nebraska were available only for 1984 and 1985.

From 1984 through 1987, the four-state region accounted for 20–21% of the national total of cattle, in terms of number on farms, and 24–25% of the national total, in terms of quantity (weight) produced (U.S. Bureau of the Census 1985, 1986, 1987, 1988, and 1989).

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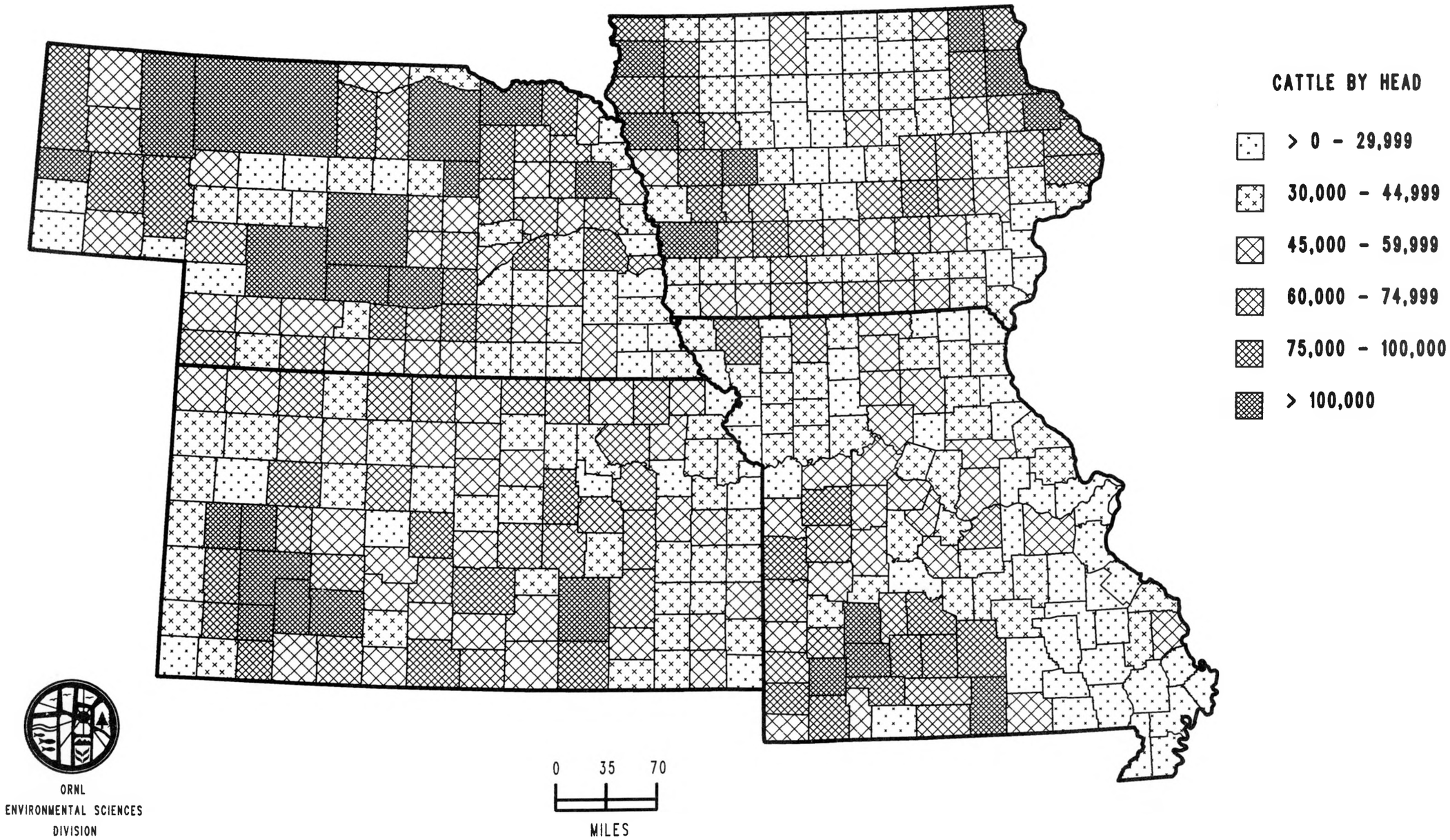

Map 28. Annual total of cattle by head, median values by county for 1984–1987.

HOG PRODUCTION

MAP 29

Hogs are raised throughout the Iowa-Kansas-Missouri-Nebraska region, with the highest number of hogs produced in Iowa, eastern Nebraska, and north-central Missouri. Most counties in Iowa had more than 100,000 head of hogs annually during the baseline years (1984–1987).
County-level data in Nebraska were available only for 1984 and 1985. Individual median values are listed by county in Table A-4.

From 1984 through 1987, the four-state region accounted for 41–43% of the national total of hogs and pigs, in terms of both number on farms and quantity (weight) produced (U.S. Bureau of the Census 1986, 1987, 1988, 1989).

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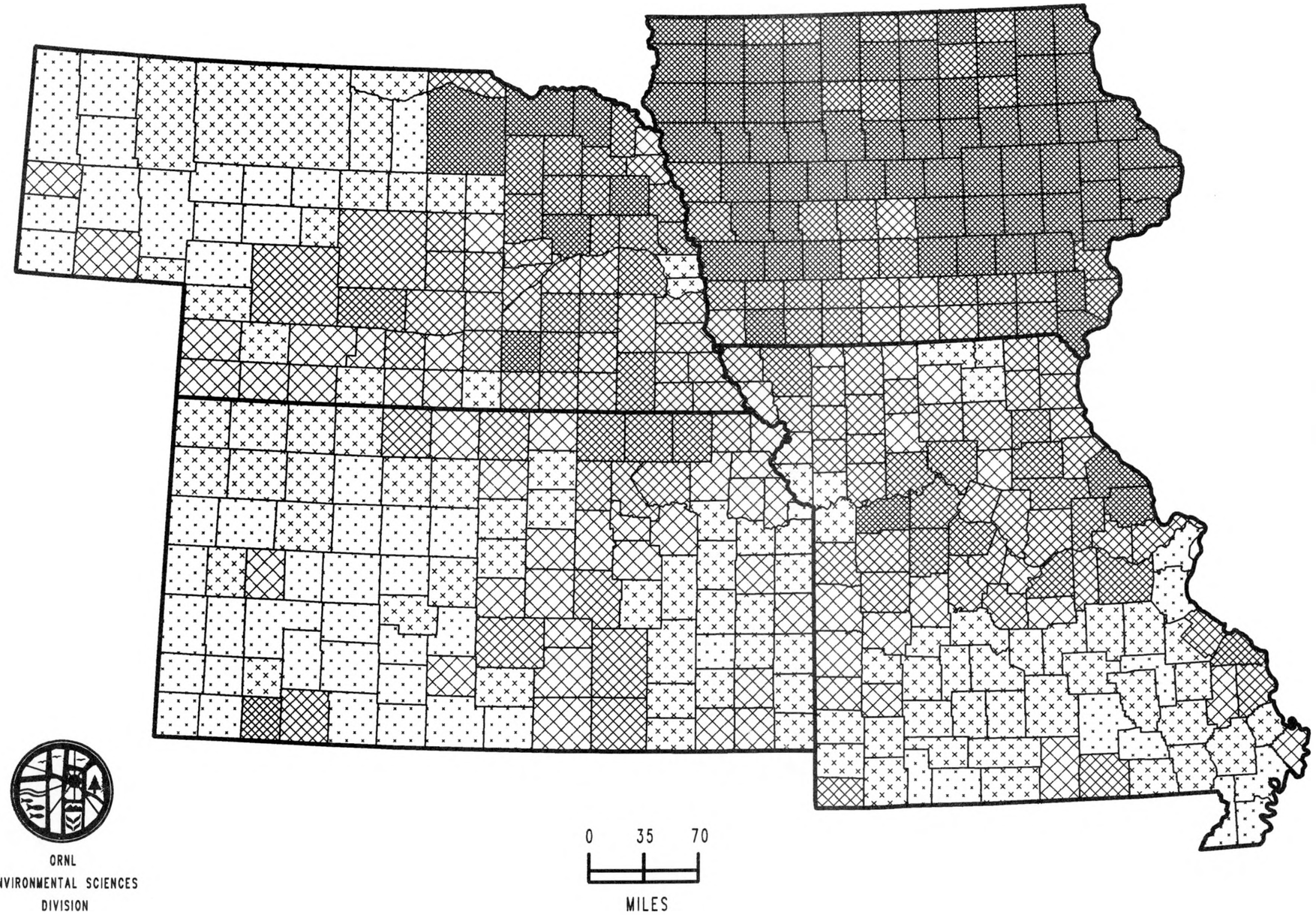

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Map 29. Annual total of hogs by head, median values by county for 1984–1987.

IRRIGATED ACRES BY COUNTY

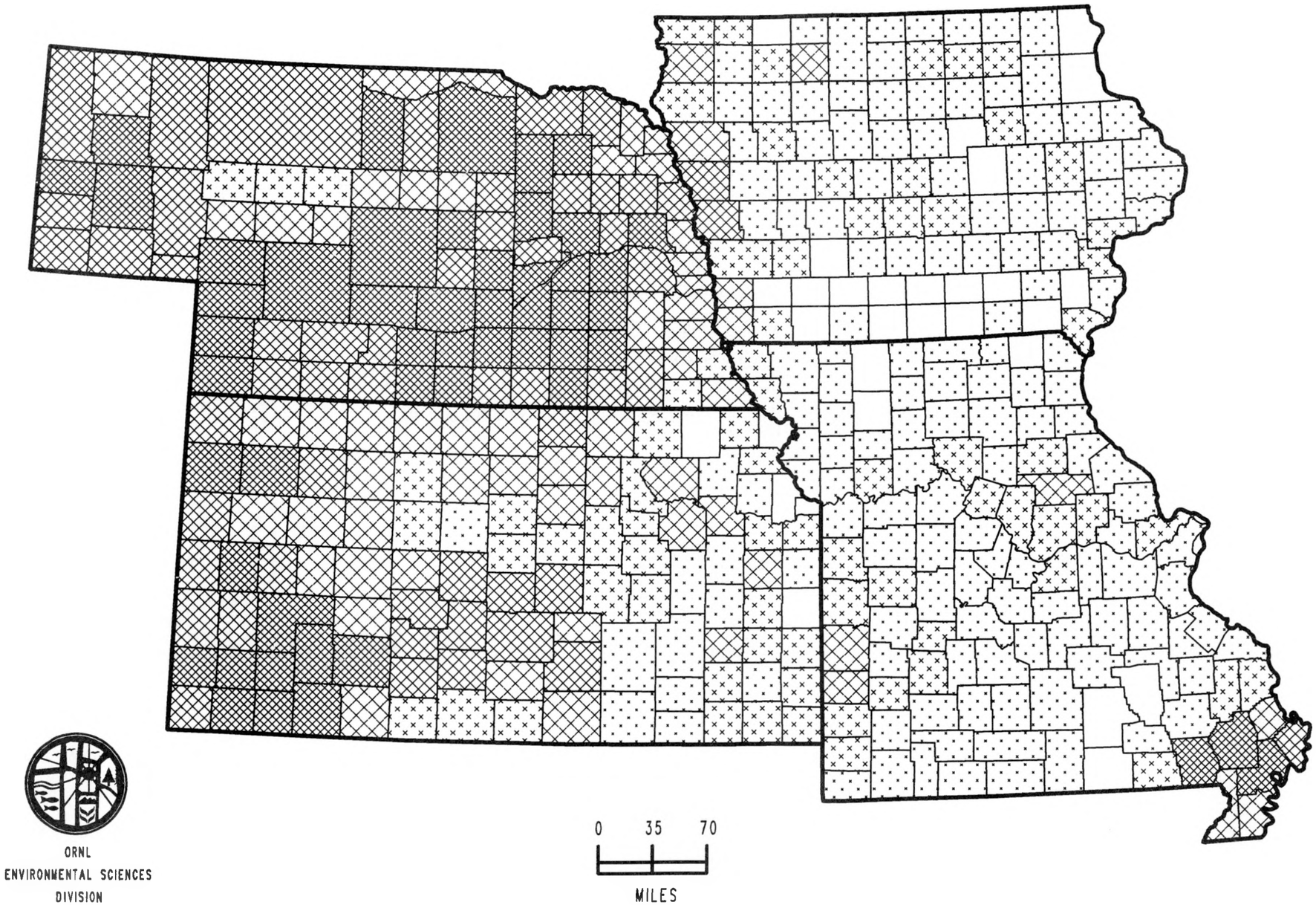
MAP 30

This map shows the dramatic split between heavy irrigation in Nebraska and Kansas and very little irrigation in Iowa and Missouri. Most counties in Iowa and Missouri irrigated less than 5,000 acres in 1985, whereas most counties in the other two states irrigated more than 5,000 acres. Most counties in Nebraska irrigated more than 25,000 acres.

These data can be related to Major Land Resource Areas (MLRAs) and watersheds (Hydrologic Units) by using the overlays contained in the pocket at the back of this report.

Source: Solley et al. 1985; Perlman 1989.

ORNL-DWG 90-1710



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Map 30. Irrigated acres by county for 1985.

IRRIGATED ACRES BY CATALOGING UNIT

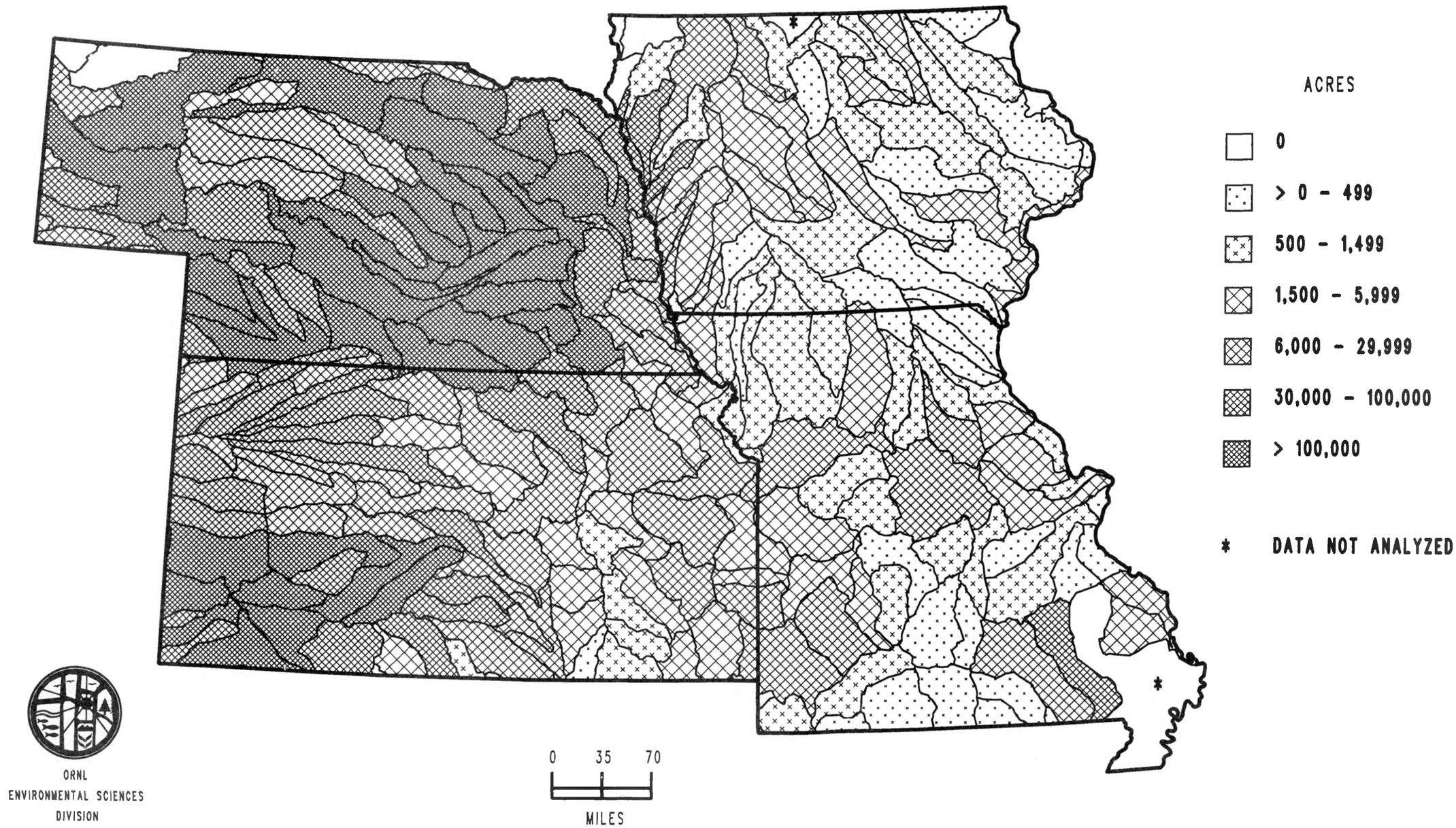
MAP 31

This map shows the contrast between heavy irrigation in Nebraska and Kansas river basins during 1985 and very little irrigation in Iowa and Missouri (Map 30). The upper and middle portions of the Missouri River, which include the Platte, Loup, and Elkhorn Subregions and the Middle Arkansas and Upper Cimarron Subregions, have the highest amount of irrigated acreage; often more than 100,000 acres per Cataloging Unit were irrigated in 1985.

These data can be related to counties and Major Land Resource Areas (MLRAs) by using the overlays contained in the pocket at the back of this report.

The * indicates subregions 702 and 802, which were not considered representative of the study region; data for these two subregions were not mapped (see Map 4).

Source: Seaber et al. 1984; Perlman 1989.



Map 31. Irrigated acres by Cataloging Unit for 1985.

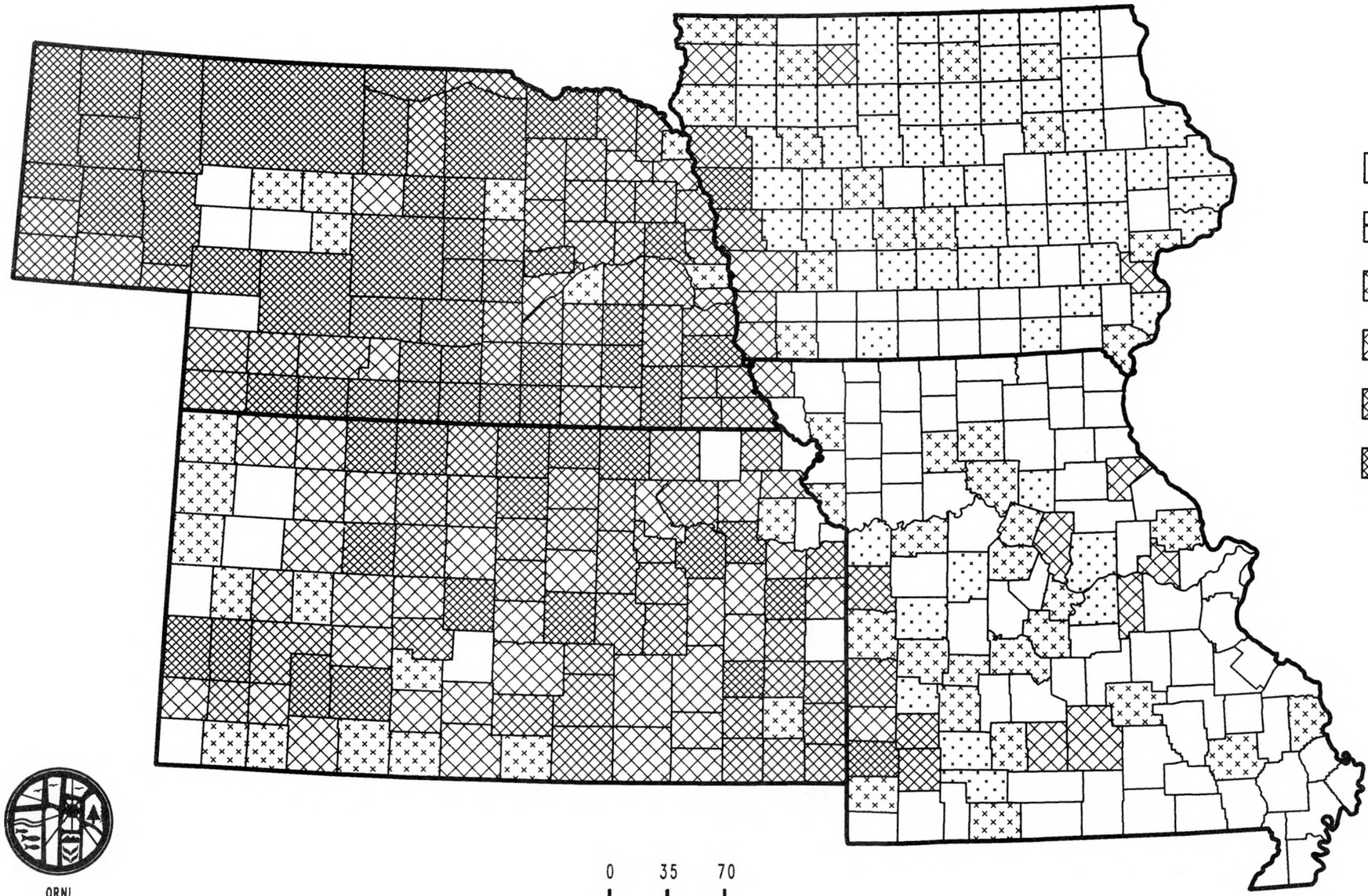
SURFACE-WATER WITHDRAWAL BY COUNTY

MAP 32

Surface-water withdrawal for irrigation is much greater in Nebraska and Kansas than in Iowa and Missouri. The counties in Nebraska with more than four million gallons per day of water used for irrigation in 1985 tend to be the counties with more than 75,000 acres under irrigation (Map 30). In Kansas, counties with high surface-water withdrawal for irrigation are more scattered throughout the state, whereas those counties with a large number of acres under irrigation are clustered in the southwestern portion of the state.

Source: Solley et al. 1985; Perlman 1989.

ORNL-DWG 90-1712



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Map 32. Surface-water withdrawal for irrigation (gallons per day) by county for 1985.

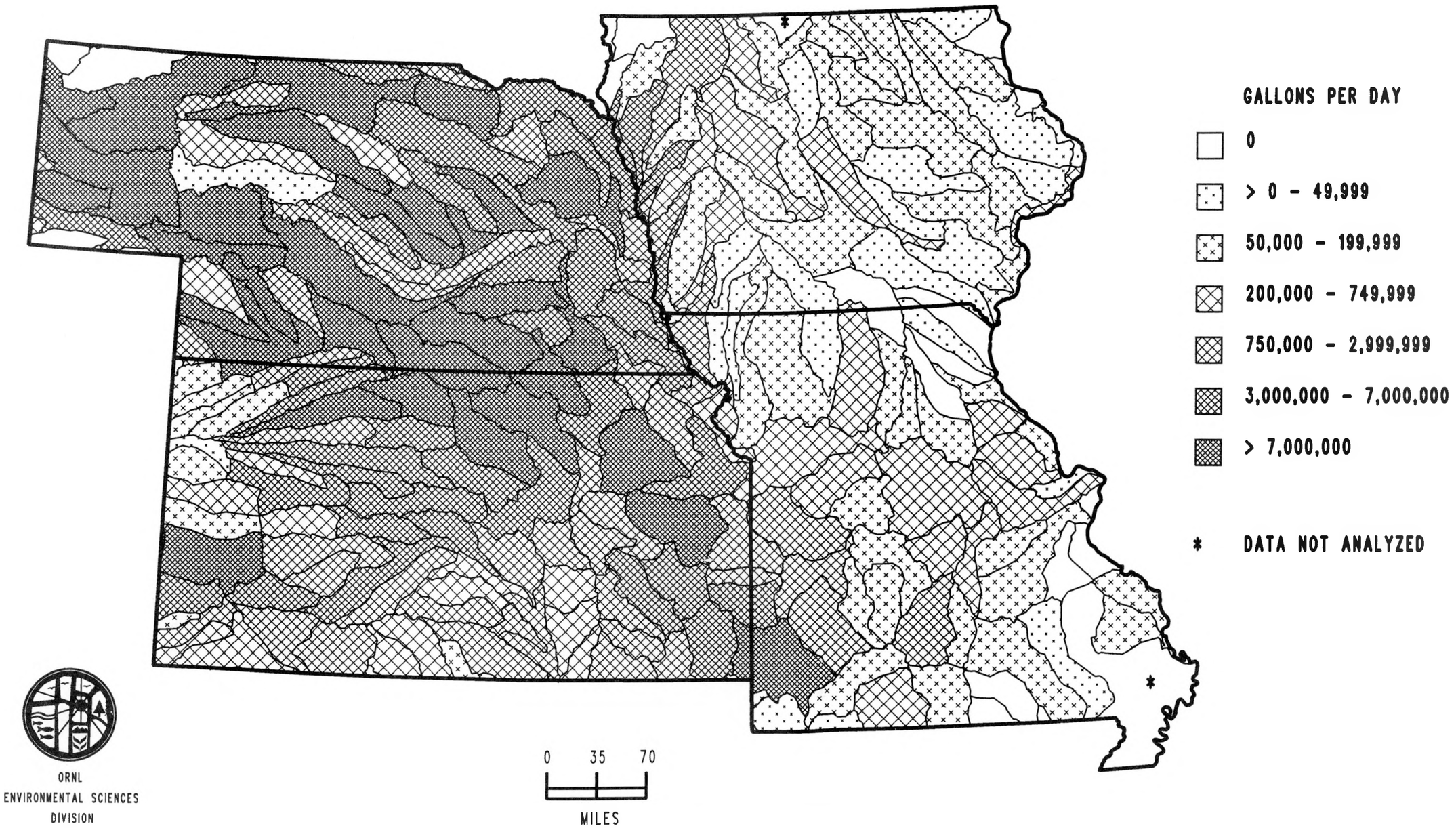
SURFACE-WATER WITHDRAWAL BY CATALOGING UNIT

MAP 33

The pattern of river basins with high surface-water withdrawal extends from northwestern Nebraska to southeastern Kansas. Many Cataloging Units exceeded seven million gallons per day of water used for irrigation in 1985 and have a different spatial pattern than the Cataloging Units with a large amount of acreage under irrigation (Map 31). High withdrawal rates occur in the North Platte, Republican, and Smoky Hill Subregions of the Missouri River.

Source: Seaber et al. 1984; Perlman 1989.

ORNL-DWG 90-1713



Map 33. Surface-water withdrawal for irrigation (gallons per day) by Cataloging Unit for 1985.

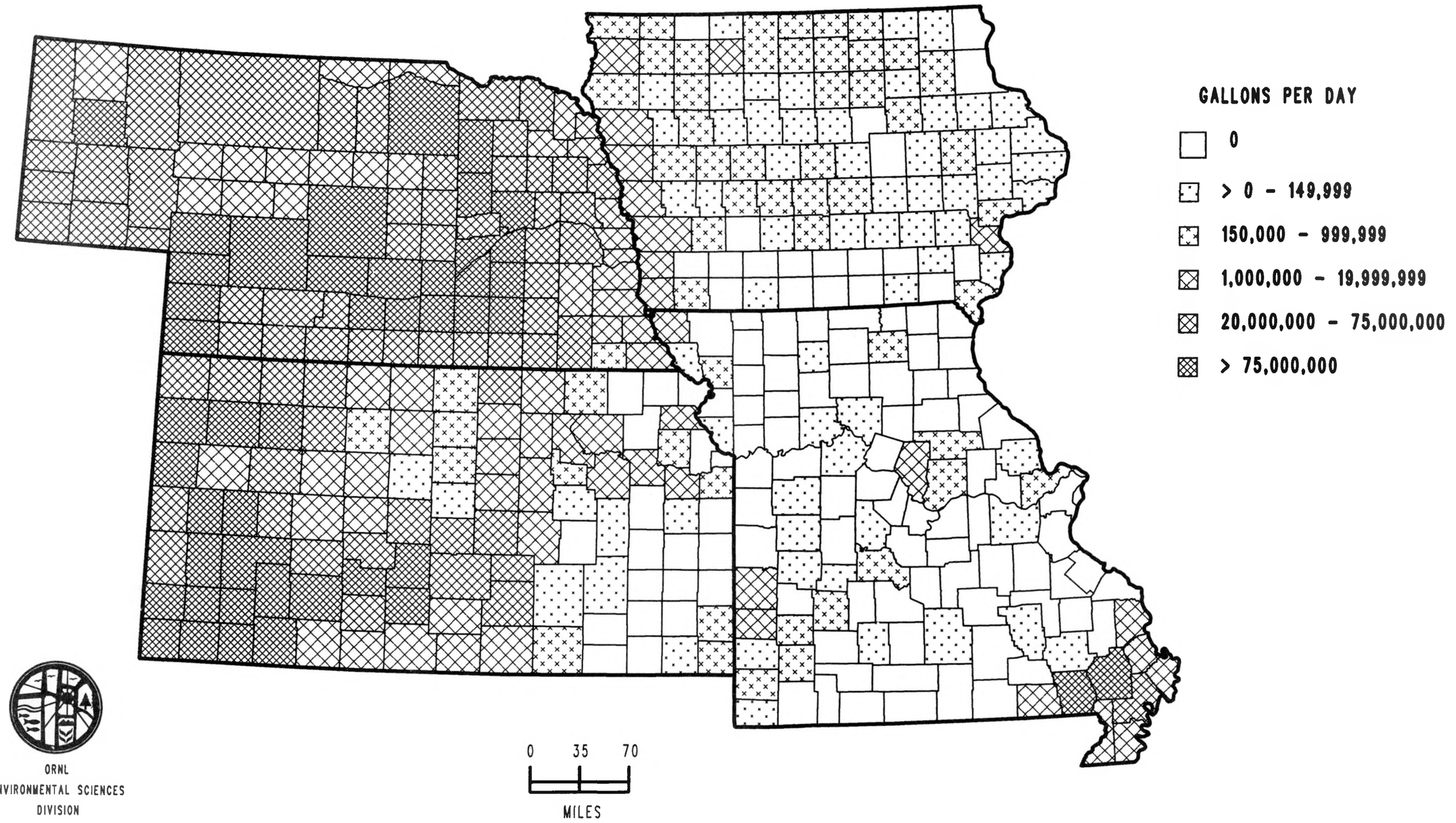
GROUNDWATER WITHDRAWAL BY COUNTY

MAP 34

In Nebraska and Kansas, groundwater withdrawal for irrigation is much higher than withdrawal from surface water (Map 32). Counties with high groundwater withdrawal (greater than 20 million gallons per day in 1985) are more often contiguous in the central and western portions of these states than are counties with high surface-water withdrawal. Groundwater withdrawal for irrigation is much higher than surface-water withdrawal, almost 20 times greater for the highest classes shown on this map as compared to the corresponding classes on Map 32.

Source: Solley et al. 1985; Perlman 1989.

ORNL-DWG 90-1714



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Map 34. Groundwater withdrawal for irrigation (gallons per day) by county for 1985.

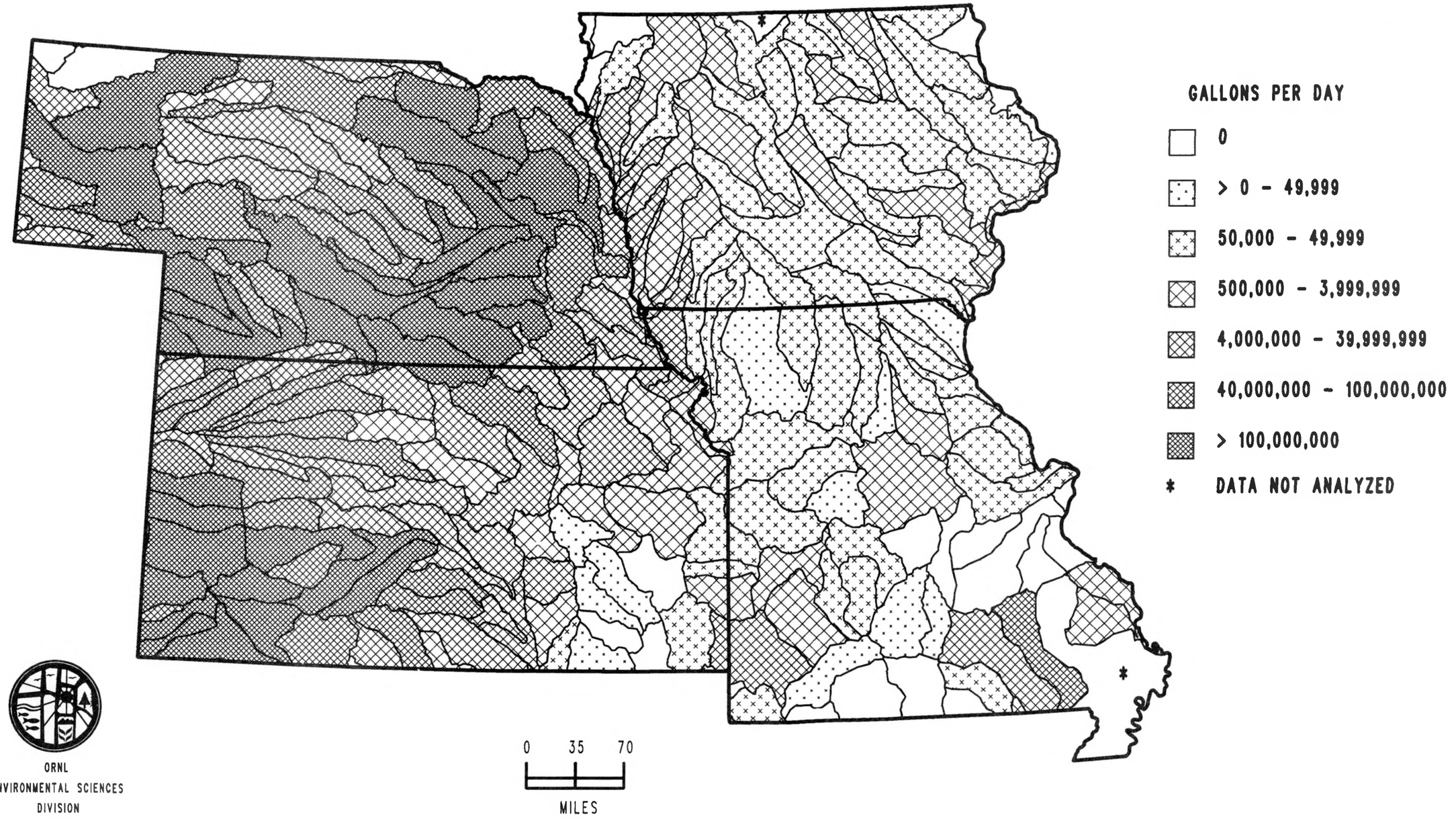
GROUNDWATER WITHDRAWAL BY CATALOGING UNIT

MAP 35

The spatial pattern for groundwater withdrawal is more similar to that for total irrigated acreage (Map 31) than to that for surface-water withdrawal (Map 33). The heavily irrigated river basins are most dependent on groundwater in the central and western portions of Nebraska and Kansas, while some Cataloging Units in the western portion of Kansas and in Iowa and Missouri use approximately equal amounts of groundwater and surface water for irrigation. Irrigation in many river basins withdrew more than 40 million gallons per day of groundwater in 1985 (almost 20 times the amount of surface water withdrawn).

Source: Seaber et al. 1984; Perlman 1989.

ORNL-DWG 90-1715



Map 35. Groundwater withdrawal for irrigation (gallons per day) by Cataloging Unit for 1985.

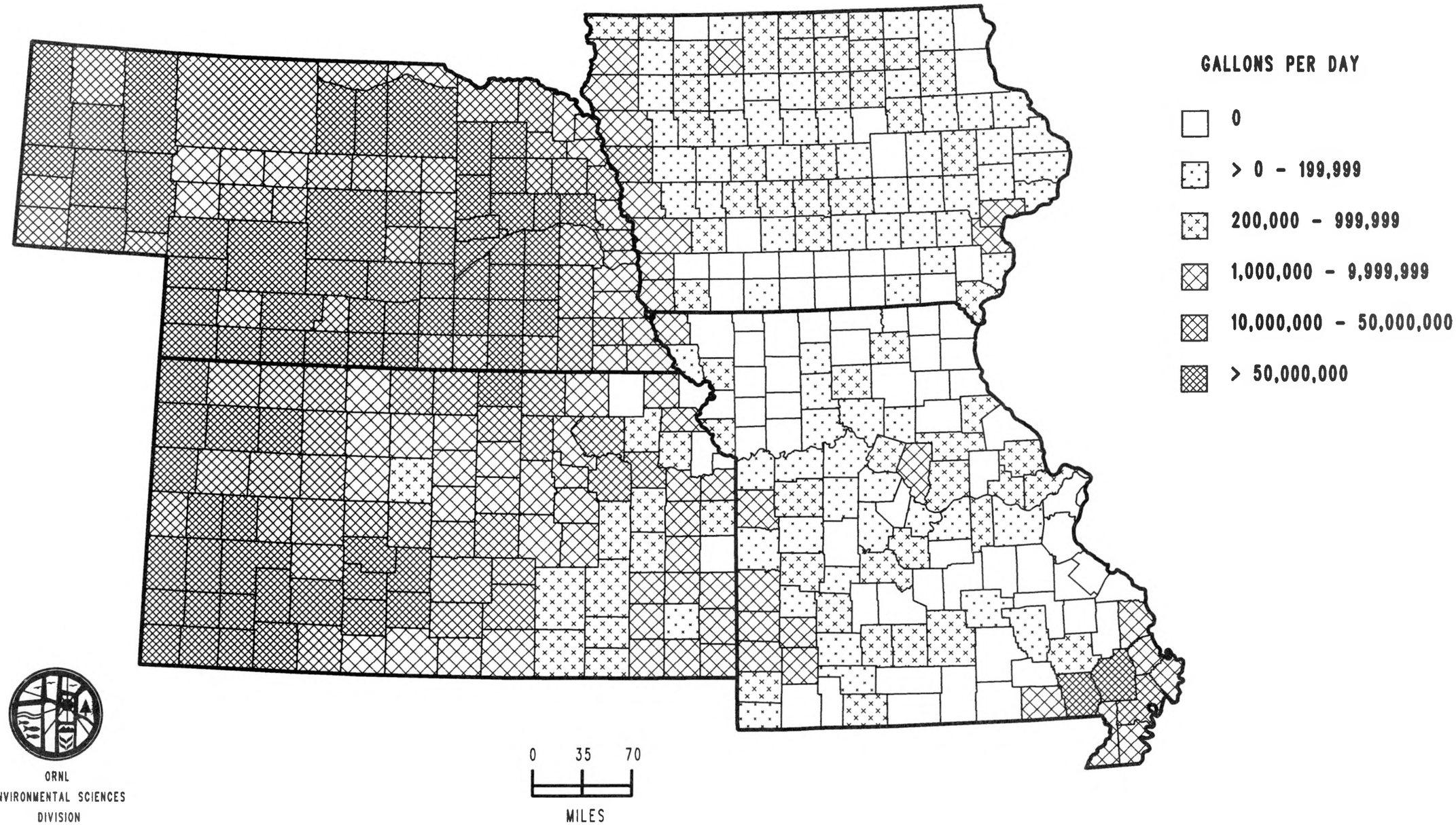
TOTAL WATER WITHDRAWAL BY COUNTY

MAP 36

Nebraska and Kansas counties with heavy irrigation are using mostly groundwater, as shown by comparing the map for total withdrawal (surface water and groundwater) with the values provided on Map 34. Again one sees the distinction between the heavily irrigated states (Nebraska and Kansas), where most counties withdrew more than one million gallons per day in 1985, and Iowa and Missouri, where several counties have no irrigation and most use less than 200,000 gallons per day.

Source: Solley et al. 1985; Perlman 1989.

ORNL-DWG 90-1716



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Map 36. Total water withdrawal for irrigation (gallons per day) by county for 1985.

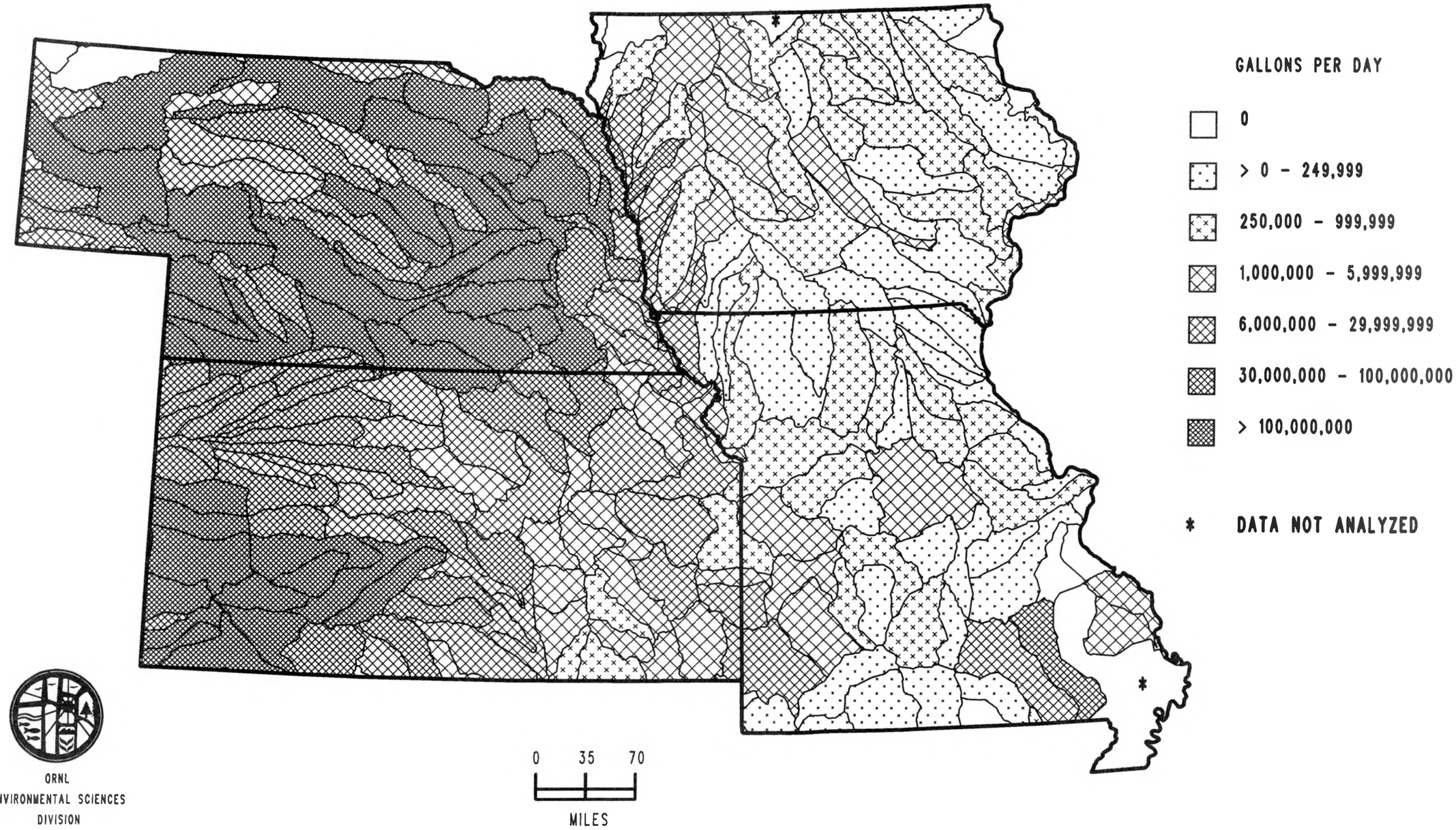
TOTAL WATER WITHDRAWAL BY CATALOGING UNIT

MAP 37

As is true for assessments mapped by county, total water-withdrawal data for irrigation mapped by Cataloging Unit show a spatial pattern of use very similar to that for groundwater (Map 35). This pattern is also similar to that for acres irrigated (Map 31). Most Cataloging Units in Nebraska and Kansas had a withdrawal rate of more than six million gallons per day for irrigation in 1985, while most Cataloging Units in Iowa and Missouri had a withdrawal rate of less than one million gallons per day.

Source: Seaber et al. 1984; Perlman 1989.

ORNL-DWG 90-1717



Map 37. Total water withdrawal for irrigation (gallons per day) by Cataloging Unit for 1985.

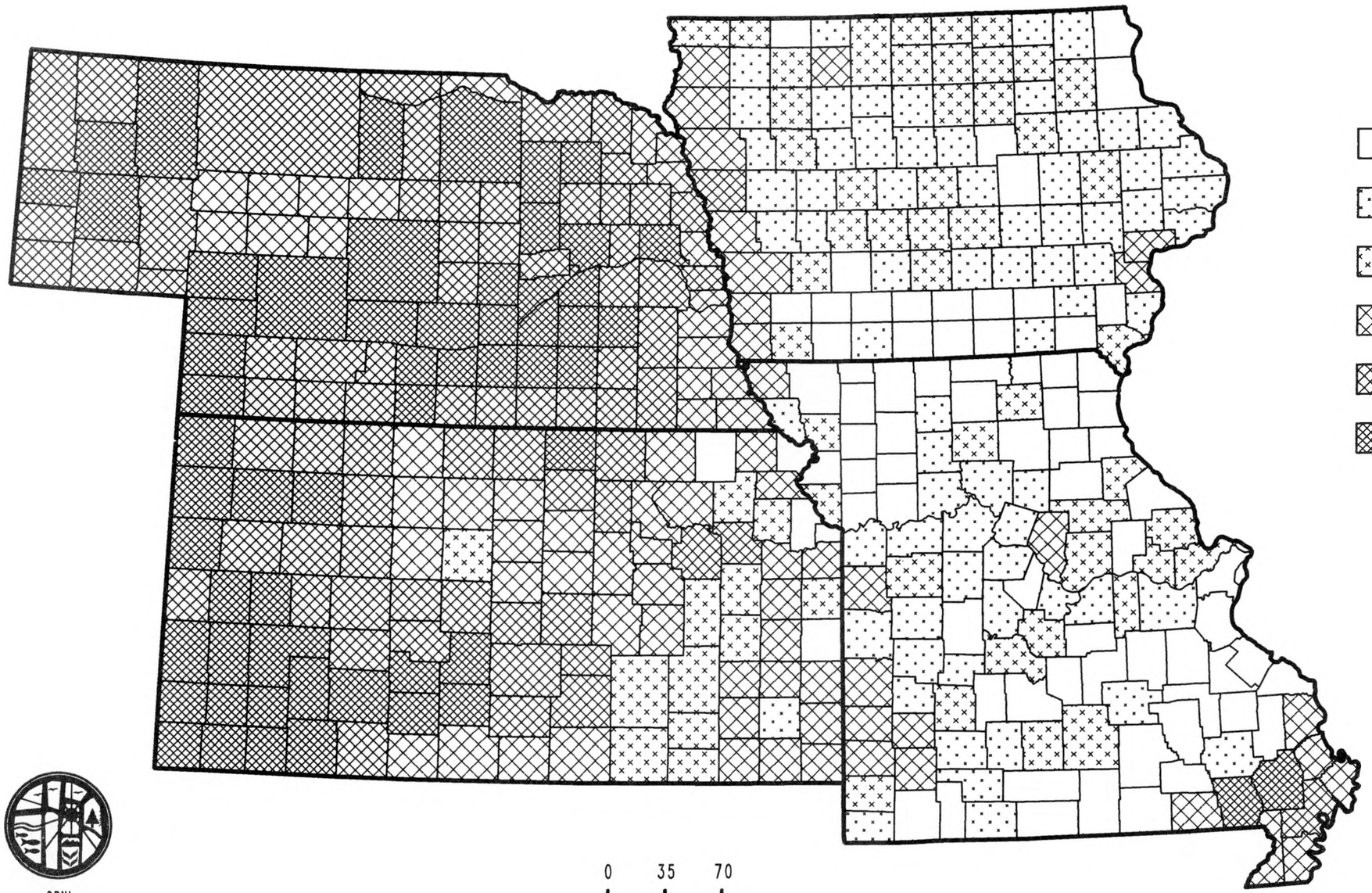
TOTAL WATER CONSUMPTION BY COUNTY

MAP 38

The spatial pattern for total water consumption from irrigation is very similar to that for total withdrawal by county in 1985 (Map 36). Therefore, most water withdrawn for irrigation in the Iowa-Kansas-Missouri-Nebraska region is consumed and thus not directly returned to surface-water and groundwater systems.

Source: Solley et al. 1985; Perlman 1989.

ORNL-DWG 90-1718



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Map 38. Total water consumption from irrigation (gallons per day) by county for 1985.

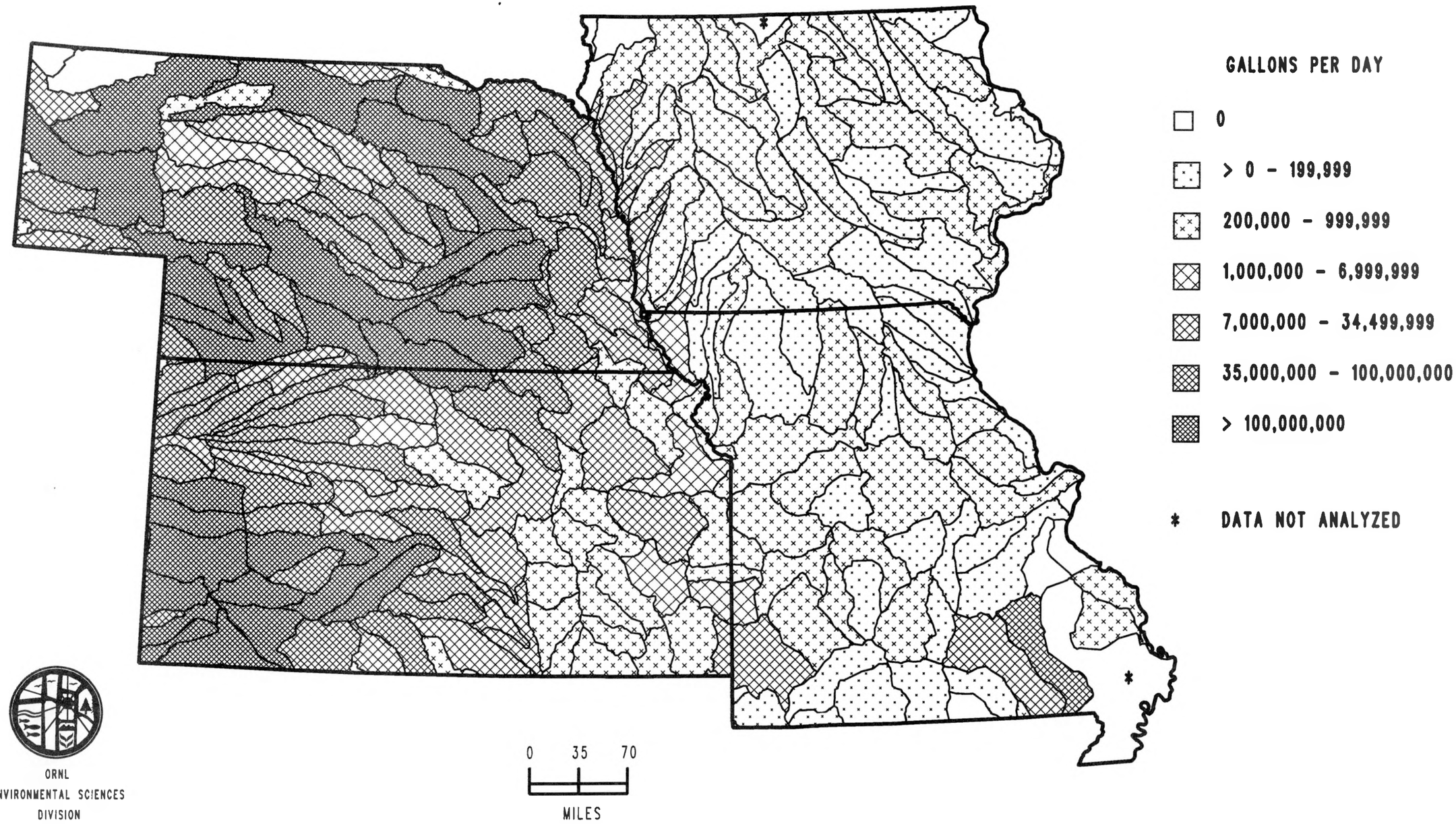
TOTAL WATER CONSUMPTION BY CATALOGING UNIT

MAP 39

When total water consumption data from irrigation during 1985 are mapped by Cataloging Unit, one again concludes that most water withdrawn for irrigation in the Iowa-Kansas-Missouri-Nebraska region is consumed and thus not directly returned to surface-water and groundwater systems.

Source: Seaber et al. 1984; Perlman 1989.

ORNL-DWG 90-1719



Map 39. Total water consumption from irrigation (gallons per day) by Cataloging Unit for 1985.

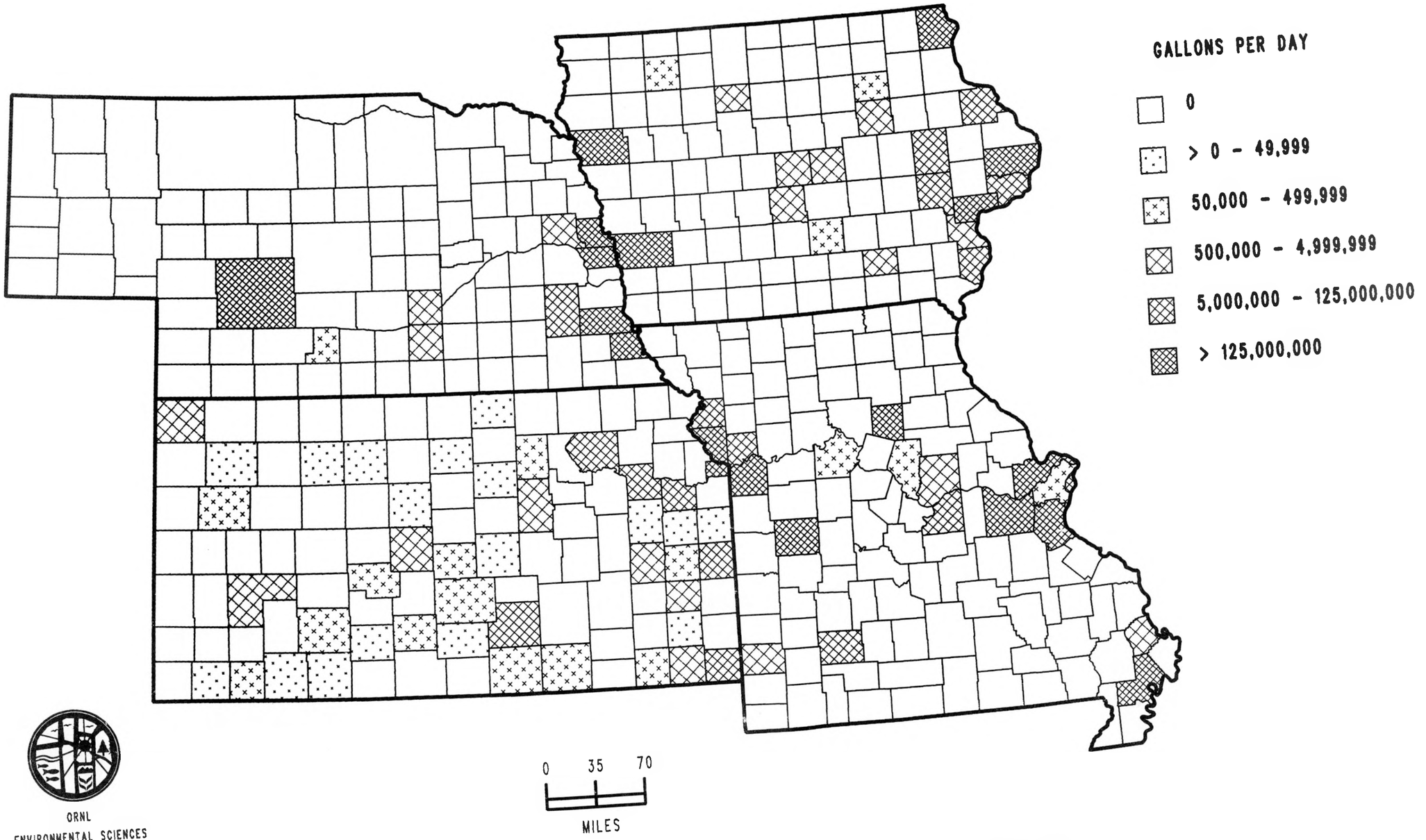
TOTAL WATER WITHDRAWALS FOR THERMOELECTRIC GENERATION BY COUNTY

MAP 40

The withdrawal of large amounts of water for thermoelectric generation is localized in a few counties scattered throughout the Iowa-Kansas-Missouri-Nebraska region. Highest withdrawals in 1985 exceeded 125 million gallons per day. Where Kansas had the smallest number of counties with large amounts of water withdrawal for thermoelectric generation, it had the most counties with some withdrawal for this use (i.e., many small facilities). Thermoelectric withdrawals by county can exceed withdrawals for irrigation (Map 36) by almost 3 times (125 million gallons per day).

Source: Solley et al. 1985; Perlman 1989.

ORNL-DWG 90-1720



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Map 40. Total water withdrawals for thermoelectric generation (gallons per day) by county for 1985.

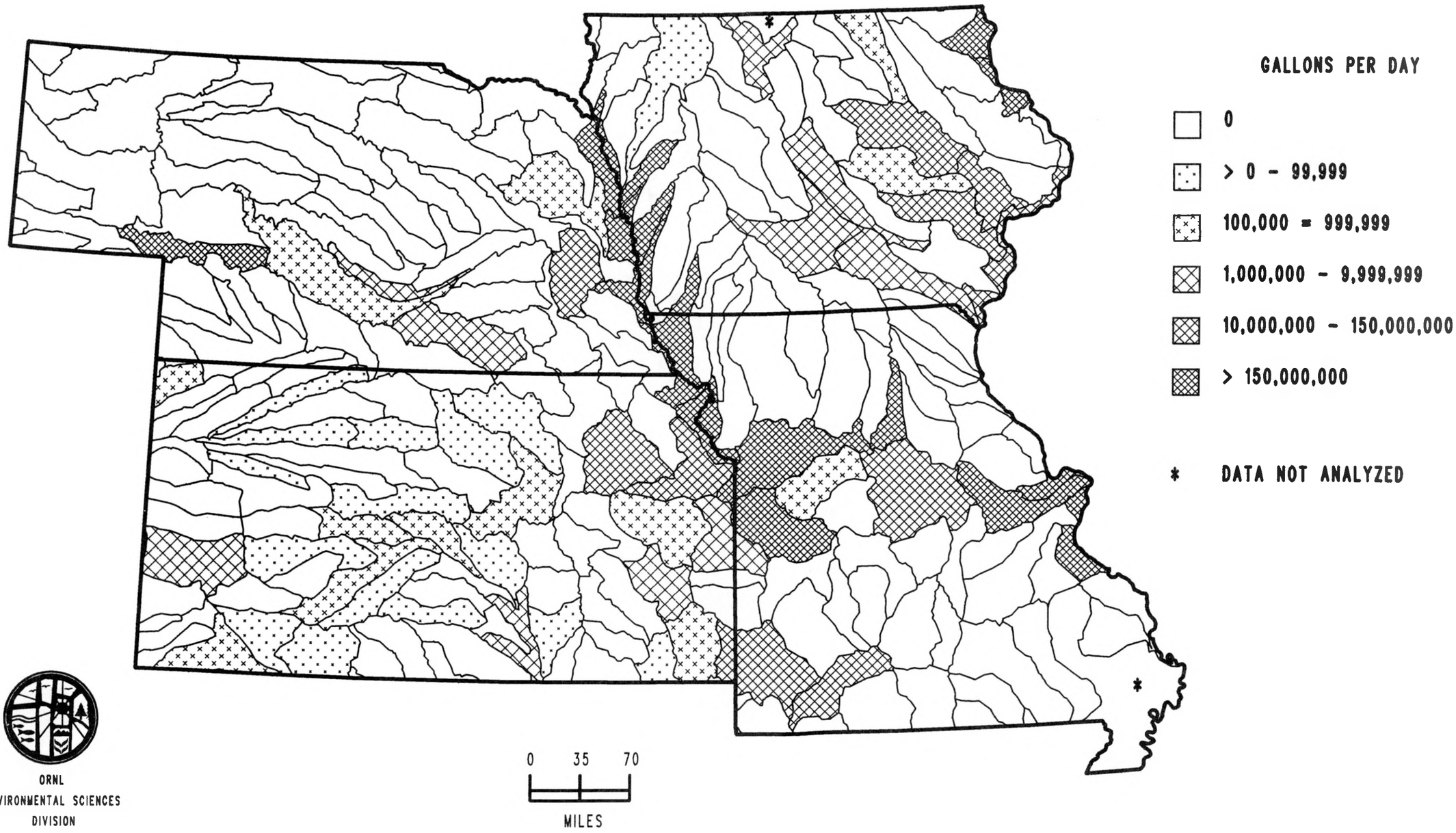
TOTAL WATER WITHDRAWALS FOR THERMOELECTRIC GENERATION BY CATALOGING UNIT

MAP 41

The Cataloging Units with the largest amounts of water withdrawal for thermoelectric generation are localized along major rivers such as the Platte and the Missouri. Withdrawals in 1985 exceeded 150 million gallons per day for several Cataloging Units in the Iowa-Kansas-Missouri-Nebraska region.

Source: Seaber et al. 1984; Perlman 1989.

ORNL-DWG 90-1721



Map 41. Total water withdrawals for thermoelectric generation (gallons per day) by Cataloging Unit for 1985.

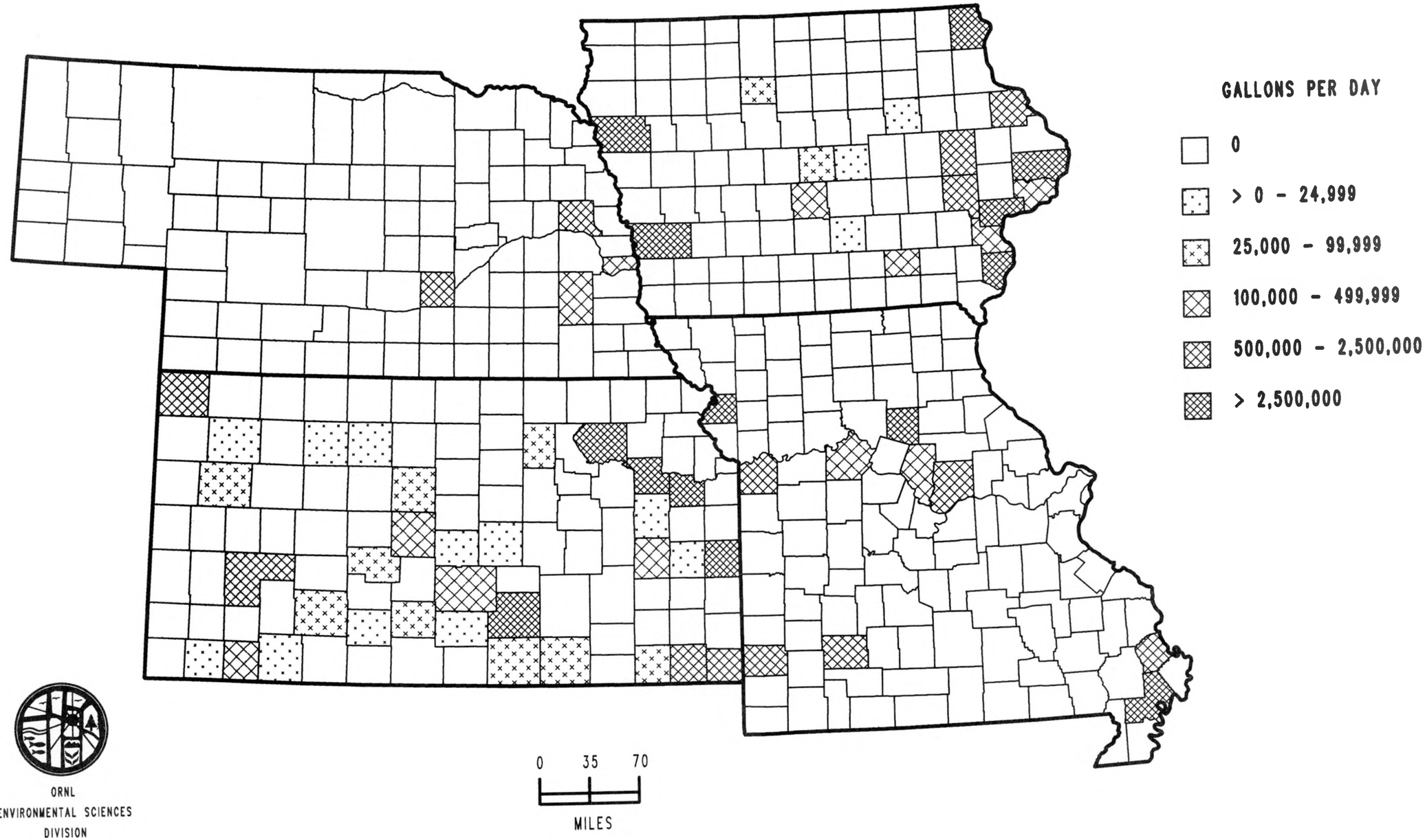
TOTAL WATER CONSUMPTION FROM THERMOELECTRIC GENERATION BY COUNTY

MAP 42

Water consumption from thermoelectric generation exceeded 2.5 million gallons per day in 1985 for only a few localized counties in the Iowa-Kansas-Missouri-Nebraska region. Counties with water withdrawal rates (Map 40) that are much larger than rates of water consumption from thermoelectric generation probably have power plants with once-through rather than evaporative cooling.

Source: Solley et al. 1985; Perlman 1989.

ORNL-DWG 90-1722



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Map 42. Total water consumption from thermoelectric generation (gallons per day) by county for 1985.

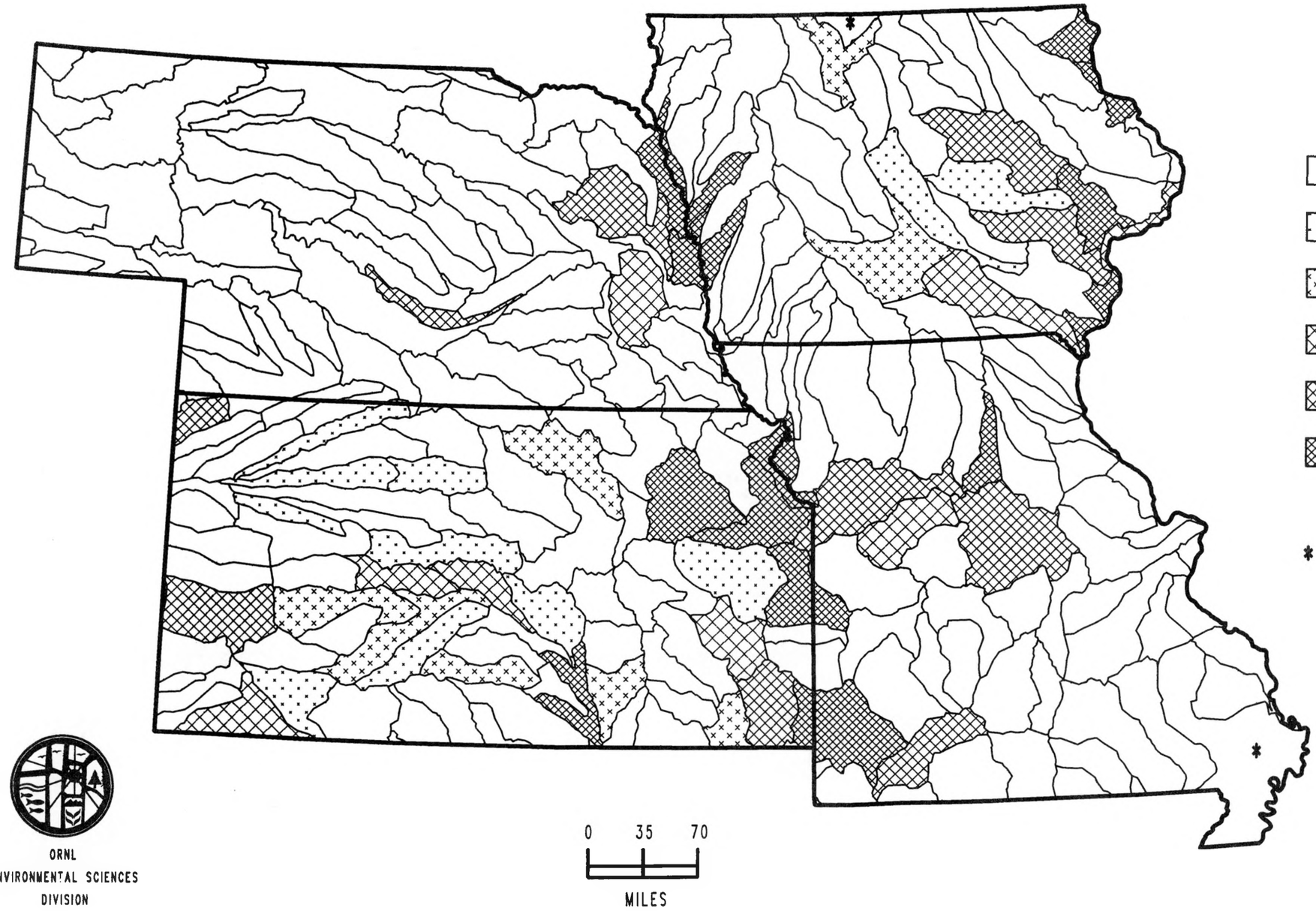
TOTAL WATER CONSUMPTION FROM THERMOELECTRIC GENERATION BY CATALOGING UNIT

MAP 43

Although Cataloging Units with the largest amounts of water withdrawal for thermoelectric generation are localized along major rivers (as stated in the description of Map 41), the spatial pattern is different for consumption. This is probably the result of power plants with once-through, rather than evaporative, cooling (i.e., cooling towers), a process which consumes more water. Only a few Cataloging Units consumed more than 2.5 million gallons per day in 1985.

Source: Seaber et al. 1984; Perlman 1989.

ORNL-DWG 90-1723



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Map 43. Total water consumption from thermoelectric generation (gallons per day) by Cataloging Unit for 1985.

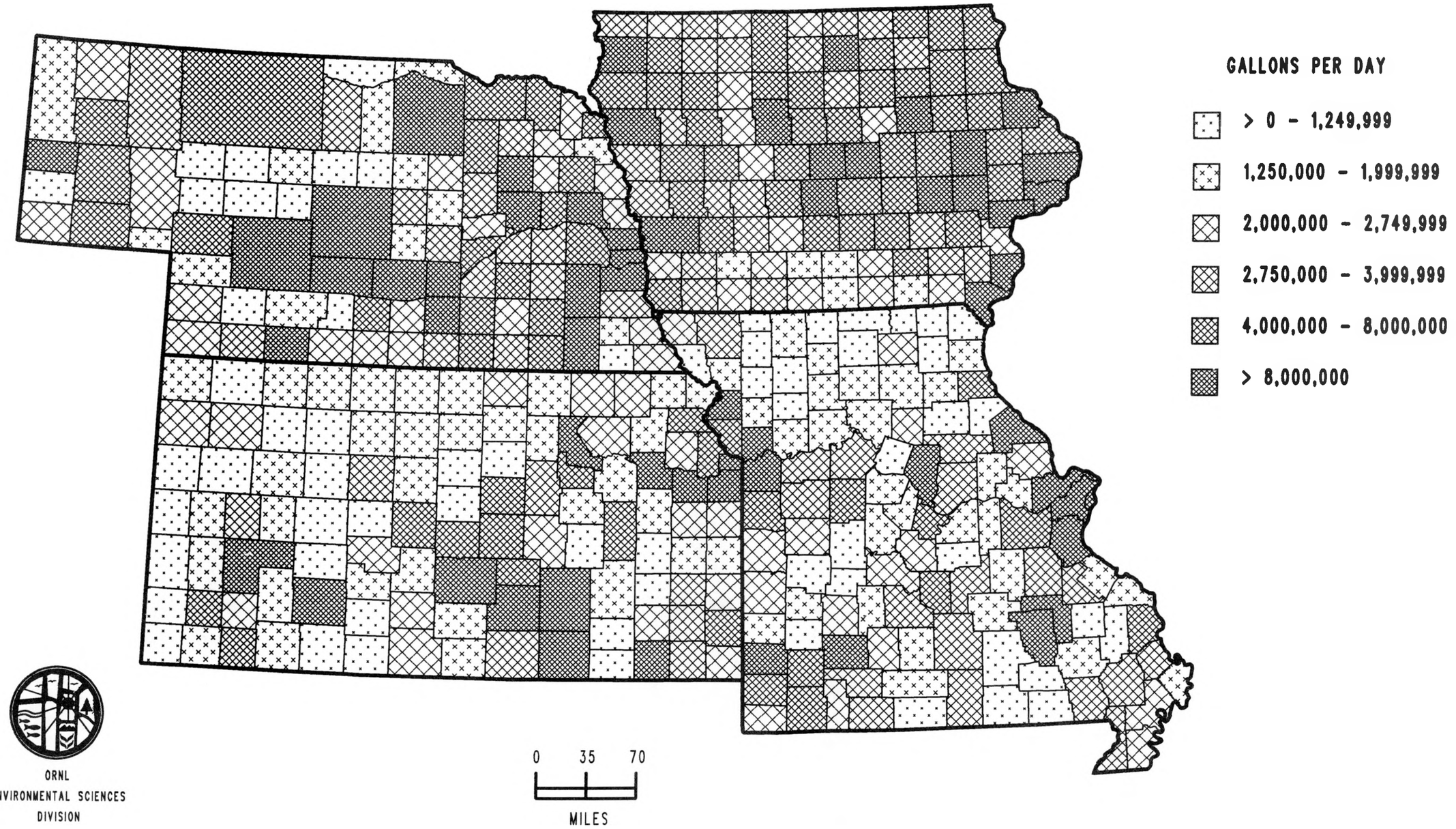
TOTAL WATER USE FROM OTHER SECTORS BY COUNTY

MAP 44

Total water use by county from sectors other than irrigation and thermoelectric tends to be highest near major metropolitan areas (Map 2), except in Nebraska. Highest-use counties exceeded eight million gallons per day in 1985.

Source: Solley et al. 1985; Perlman 1989.

ORNL-DWG 90-1724



Map 44. Total water use from sectors other than irrigation and thermoelectric generation (gallons per day) by county for 1985.

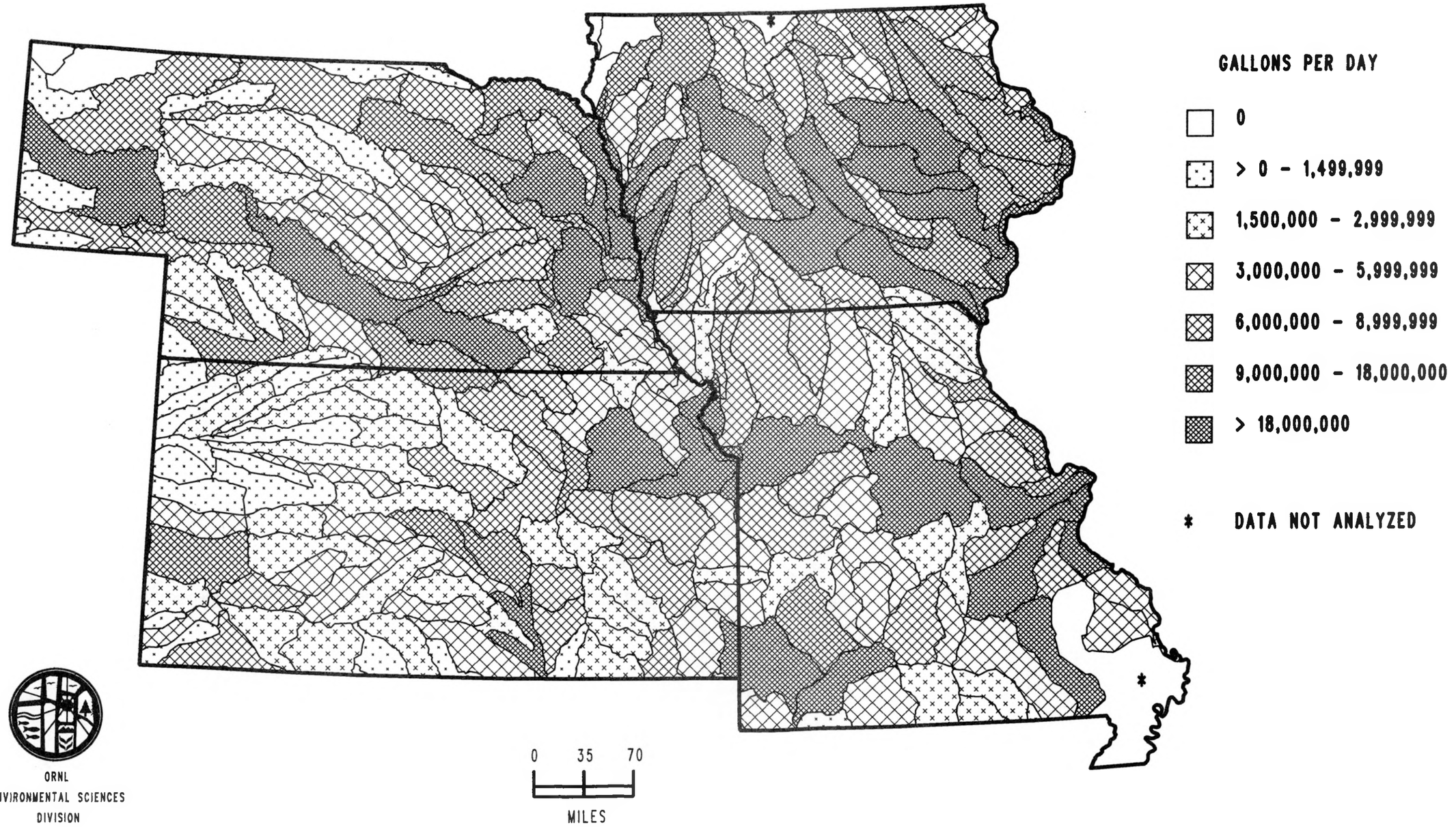
TOTAL WATER USE FROM OTHER SECTORS BY CATALOGING UNIT

MAP 45

Total water use by Cataloging Unit from sectors other than irrigation and thermoelectric tends to be highest near major metropolitan areas (Maps 2 and 44), except along the Platte River in Nebraska. Highest-use Cataloging Units exceeded 18 million gallons per day in 1985.

Source: Seaber et al. 1984; Perlman 1989.

ORNL-DWG 90-1725



Map 45. Total water use from sectors other than irrigation and thermoelectric generation (gallons per day) by Cataloging Unit for 1985.

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APPENDIXES

APPENDIX A

Table A-1. County Federal Information Processing Standards (FIPS) codes and names for Iowa, Kansas, Missouri, and Nebraska (Olson et al. 1980).

Table A-2. Median acreage and production values for irrigated and nonirrigated crops for 1984–1987 by crop, state, and county (Patton 1989a).

Table A-3. Median acreage and production values for irrigated crops for 1984–1987 by crop, state, and county (Patton 1989a).

Table A-4. Median values for livestock for 1984–1987 by state and county (Patton 1989b).

TABLE A-1. COUNTY FEDERAL INFORMATION PROCESSING STANDARDS (FIPS) CODES AND NAMES FOR IOWA, KANSAS, MISSOURI, AND NEBRASKA (OLSON et al. 1980)

Iowa

County code	County name	County code	County name	County code	County name	County code	County name	County code	County name	County code	County name	County code	County name
1	Adair	31	Cedar	59	Dickinson	87	Henry	115	Louisa	143	Osceola	171	Tama
3	Adams	33	Cerro Gordo	61	Dubuque	89	Howard	117	Lucas	145	Page	173	Taylor
5	Allamakee	35	Cherokee	63	Emmet	91	Humboldt	119	Lyon	147	Palo Alto	175	Union
7	Appanoose	37	Chickasaw	65	Fayette	93	Ida	121	Madison	149	Plymouth	177	Van Buren
9	Audubon	39	Clarke	67	Floyd	95	Iowa	123	Mahaska	151	Pocahontas	179	Wapello
11	Benton	41	Clay	69	Franklin	97	Jackson	125	Marion	153	Polk	181	Warren
13	Black Hawk	43	Clayton	71	Fremont	99	Jasper	127	Marshall	155	Pottawattamie	183	Washington
15	Boone	45	Clinton	73	Greene	101	Jefferson	129	Mills	157	Poweshiek	185	Wayne
17	Bremer	47	Crawford	75	Grundy	103	Johnson	131	Mitchell	159	Ringgold	187	Webster
19	Buchanan	49	Dallas	77	Guthrie	105	Jones	133	Monona	161	Sac	189	Winnebago
21	Buena Vista	51	Davis	79	Hamilton	107	Keokuk	135	Monroe	163	Scott	191	Winneshiek
23	Butler	53	Decatur	81	Hancock	109	Kossuth	137	Montgomery	165	Shelby	193	Woodbury
25	Calhoun	55	Delaware	83	Hardin	111	Lee	139	Muscatine	167	Sioux	195	Worth
27	Carroll	57	Des Moines	85	Harrison	113	Linn	141	O'Brien	169	Story	197	Wright
29	Cass												

Kansas

1	Allen	31	Coffey	61	Geary	91	Johnson	121	Miami	151	Pratt	181	Sherman
3	Anderson	33	Comanche	63	Gove	93	Kearny	123	Mitchell	153	Rawlins	183	Smith
5	Atchison	35	Cowley	65	Graham	95	Kingman	125	Montgomery	155	Reno	185	Stafford
7	Barber	37	Crawford	67	Grant	97	Kiowa	127	Morris	157	Republic	187	Stanton
9	Barton	39	Decatur	69	Gray	99	Labette	129	Morton	159	Rice	189	Stevens
11	Bourbon	41	Dickinson	71	Greeley	101	Lane	131	Nemaha	161	Riley	191	Sumner
13	Brown	43	Doniphan	73	Greenwood	103	Leavenworth	133	Neosho	163	Rooks	193	Thomas
15	Butler	45	Douglas	75	Hamilton	105	Lincoln	135	Ness	165	Rush	195	Trego
17	Chase	47	Edwards	77	Harper	107	Linn	137	Norton	167	Russell	197	Wabaunsee
19	Chautauqua	49	Elk	79	Harvey	109	Logan	139	Osage	169	Saline	199	Wallace
21	Cherokee	51	Ellis	81	Haskell	111	Lyon	141	Osborne	171	Scott	201	Washington
23	Cheyenne	53	Ellsworth	83	Hodgeman	113	McPherson	143	Ottawa	173	Sedgwick	203	Wichita
25	Clark	55	Finney	85	Jackson	115	Marion	145	Pawnee	175	Seward	205	Wilson
27	Clay	57	Ford	87	Jefferson	117	Marshall	147	Phillips	177	Shawnee	207	Woodson
29	Cloud	59	Franklin	89	Jewell	119	Meade	149	Pottawatomie	179	Sheridan	209	Wyandotte

TABLE A-1. (CONTINUED)

County code	County name	County code	County name	County code	County name	County code	County name	County code	County name	County code	County name
Missouri											
1	Adair	35	Carter	69	Dunklin	103	Knox	135	Moniteau	167	Polk	201	Scott
3	Andrew	37	Cass	71	Franklin	105	Laclede	137	Monroe	169	Pulaski	203	Shannon
5	Atchison	39	Cedar	73	Gasconade	107	Lafayette	139	Montgomery	171	Putnam	205	Shelby
7	Audrain	41	Chariton	75	Gentry	109	Lawrence	141	Morgan	173	Ralls	207	Stoddard
9	Barry	43	Christian	77	Greene	111	Lewis	143	New Madrid	175	Randolph	209	Stone
11	Barton	45	Clark	79	Grundy	113	Lincoln	145	Newton	177	Ray	211	Sullivan
13	Bates	47	Clay	81	Harrison	115	Linn	147	Nodaway	179	Reynolds	213	Taney
15	Benton	49	Clinton	83	Henry	117	Livingston	149	Oregon	181	Ripley	215	Texas
17	Bollinger	51	Cole	85	Hickory	119	McDonald	151	Osage	183	St Charles	217	Vernon
19	Boone	53	Cooper	87	Holt	121	Macon	153	Ozark	185	St Clair	219	Warren
21	Buchanan	55	Crawford	89	Howard	123	Madison	155	Pemiscot	186	Ste Genevieve	221	Washington
23	Butler	57	Dade	91	Howell	125	Maries	157	Perry	187	St Francois	223	Wayne
25	Caldwell	59	Dallas	93	Iron	127	Marion	159	Pettis	189	St Louis	225	Webster
27	Callaway	61	Daviess	95	Jackson	129	Mercer	161	Phelps	195	Saline	227	Worth
29	Camden	63	De Kalb	97	Jasper	131	Miller	163	Pike	197	Schuyler	229	Wright
31	Cape Girardeau	65	Dent	99	Jefferson	133	Mississippi	165	Platte	199	Scotland		
33	Carroll	67	Douglas	101	Johnson								
Nebraska											
1	Adams	29	Chase	57	Dundy	83	Harlan	109	Lancaster	135	Perkins	161	Sheridan
3	Antelope	31	Cherry	59	Fillmore	85	Hayes	111	Lincoln	137	Phelps	163	Sherman
5	Arthur	33	Cheyenne	61	Franklin	87	Hitchcock	113	Logan	139	Pierce	165	Sioux
7	Banner	35	Clay	63	Frontier	89	Holt	115	Loup	141	Platte	167	Stanton
9	Blaine	37	Colfax	65	Furnas	91	Hooker	117	McPherson	143	Polk	169	Thayer
11	Boone	39	Cuming	67	Gage	93	Howard	119	Madison	145	Red Willow	171	Thomas
13	Box Butte	41	Custer	69	Garden	95	Jefferson	121	Merrick	147	Richardson	173	Thurston
15	Boyd	43	Dakota	71	Garfield	97	Johnson	123	Morrill	149	Rock	175	Valley
17	Brown	45	Dawes	73	Gosper	99	Kearney	125	Nance	151	Saline	177	Washington
19	Buffalo	47	Dawson	75	Grant	101	Keith	127	Nemaha	153	Sarpy	179	Wayne
21	Burt	49	Deuel	77	Greeley	103	Keya Paha	129	Nuckolls	155	Saunders	181	Webster
23	Butler	51	Dixon	79	Hall	105	Kimball	131	Otoe	157	Scotts Bluff	183	Wheeler
25	Cass	53	Dodge	81	Hamilton	107	Knox	133	Pawnee	159	Seward	185	York
27	Cedar	55	Douglas										

TABLE A-2. MEDIAN ACREAGE AND PRODUCTION VALUES FOR IRRIGATED AND NONIRRIGATED CROPS FOR 1984–1987 BY CROP, STATE, AND COUNTY (PATTON 1989a).

Corn for Grain

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Iowa																			
1	4	106850	12185000	41	4	125400	15375000	81	4	158650	20329000	121	4	93200	10477000	161	4	142750	17080000
3	4	59350	6273000	43	4	162550	20033000	83	4	163850	21736496	123	4	115700	14157500	163	4	125050	17029000
5	4	76300	9085500	45	4	207150	25771496	85	4	152350	18374496	125	4	80200	10394000	165	4	175100	21507496
7	4	33700	3627500	47	4	154950	18431496	87	4	90650	11098000	127	4	143650	18405496	167	4	212700	26091496
9	4	114100	13423500	49	4	135850	16592500	89	4	109150	12675500	129	4	95800	11013500	169	4	154150	19609496
11	4	183500	22721496	51	4	51950	5456500	91	4	115250	14503500	131	4	114700	14410500	171	4	174750	22064496
13	4	152900	19060496	53	4	55100	5598000	93	4	124900	15315500	133	4	156700	17363000	173	4	75300	7699000
15	4	123900	16093500	55	4	168000	20794992	95	4	142150	18035000	135	4	39150	4031500	175	4	58300	6110000
17	4	112100	14392000	57	4	96750	13587500	97	4	104350	11759000	137	4	81150	9193500	177	4	57500	6237000
19	4	172300	21713992	59	4	85600	10792500	99	4	164400	20922000	139	4	119150	15104500	179	4	50450	6066000
21	4	150850	17434500	61	4	117550	14804500	101	4	84450	10627500	141	4	151100	19436992	181	4	94550	11520000
23	4	162450	20064496	63	4	114150	14283000	103	4	134450	16343000	143	4	98750	12488500	183	4	144550	19018496
25	4	163500	20153496	65	4	175850	21994496	105	4	150300	20376496	145	4	93150	10228000	185	4	72000	7411500
27	4	146900	18298000	67	4	132250	16877496	107	4	120850	15446500	147	4	160050	20048000	187	4	153850	20080000
29	4	116250	14315500	69	4	157000	20699496	109	4	248900	33462000	149	4	220600	25764496	189	4	114450	14699500
31	4	152300	21193496	71	4	103550	12470000	111	4	94750	12056000	151	4	151600	18340996	191	4	132450	15517000
33	4	155300	19788496	73	4	129050	16761996	113	4	142600	17835000	153	4	90600	11173500	193	4	199100	22128496
35	4	129800	16239500	75	4	148250	17284500	115	4	93550	12177000	155	4	237800	30083496	195	4	108050	13910500
37	4	131600	15215000	77	4	119350	14004000	117	4	40600	4157000	157	4	117750	13978500	197	4	150850	20032992
39	4	42950	3938000	79	4	136450	18264496	119	4	147800	17342996	159	4	62750	6393500				
Kansas																			
1	4	4450	417250	43	4	49800	5895450	85	4	13750	1120050	127	4	2450	177950	169	4	1300	100050
3	4	12950	1160400	45	4	11900	1324450	87	4	23950	2265750	129	4	3650	435250	171	4	13300	1582750
5	4	15500	1709400	47	4	40400	5418200	89	4	7400	952300	131	4	11950	1048200	173	4	18400	2562150
7	4	950	130600	49	4	700	55450	91	4	7150	641750	133	4	3700	328950	175	4	8100	1255050
9	4	11100	1558150	51	4	500	20000	93	4	19250	2591650	135	4	250	29200	177	4	29850	3825800
11	4	6000	548850	53	4	300	26950	95	4	3550	376950	137	4	6300	749700	179	4	27350	4048250
13	4	42050	4236500	55	4	38750	5461800	97	4	9850	1401750	139	4	4900	454550	181	4	33950	4649550
15	4	2150	208350	57	4	38700	6215150	99	4	2900	235350	141	4	1350	161750	183	4	2250	250450
17	4	2950	261650	59	4	13000	1205600	101	4	1200	137550	143	4	1300	155500	185	4	26400	3918900
19	4	1300	84250	61	4	1300	137450	103	4	16600	1593550	145	4	7600	1086150	187	4	36900	5157700
21	4	3800	312900	63	4	2950	371300	105	4	200	20000	147	4	3900	494450	189	4	16300	2581000
23	4	12900	1627950	65	4	4500	570200	107	4	3650	318050	149	4	13950	1582350	191	4	1300	88300
25	4	100	15450	67	4	27200	4681200	109	4	4400	578150	151	4	24150	2960450	193	4	45550	6230550
27	4	8350	1162000	69	4	49950	7242450	111	4	5350	516300	153	4	5200	636300	195	4	1050	126950
29	4	6400	870950	71	4	7550	939800	113	4	10150	1468650	155	4	4900	593450	197	4	5850	612850
31	4	6900	651100	73	4	850	71050	115	4	3000	218600	157	4	39850	5364700	199	4	19850	2536800
33	4	500	74200	75	4	5550	829400	117	4	6400	607750	159	4	6750	889900	201	4	7200	852000
35	4	400	33500	77	4	250	29300	119	4	19400	2830550	161	4	3250	359650	203	4	14950	2102400
37	4	6800	535800	79	4	9150	1041300	121	4	12950	1243150	163	4	1850	199250	205	4	1700	133400
39	4	14300	1523700	81	4	69500	11192250	123	4	1600	210100	165	4	1150	138150	207	4	1650	132000
41	4	3550	338950	83	4	2850	336100	125	4	5500	481450	167	4	350	12300	209	4	2600	264200

TABLE A-2. (CONTINUED)

Corn for Grain (continued)

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Missouri																			
1	4	19350	2102000	47	4	8800	982500	93	4	150	10500	139	4	32150	3643500	185	4	5100	430500
3	4	40900	4427500	49	4	27300	3102500	95	4	12900	1330000	141	4	4950	435000	186	4	13850	1405500
5	4	104900	12305000	51	4	5700	506500	97	4	2250	212000	143	4	29000	3863500	187	4	4100	356500
7	4	40900	4877000	53	4	33750	3611500	99	4	2950	255500	145	4	425	29750	189	4	4500	528500
9	4	875	67050	55	4	1000	64000	101	4	26500	2642500	147	4	111250	12717500	195	4	97450	12579500
11	4	6650	734750	57	4	1300	101500	103	4	31950	3430500	149	4	75	5600	197	4	14800	1448000
13	4	27600	2407500	59	4	200	13300	105	4	1500	114500	151	4	7850	716500	199	4	43500	4111000
15	4	5600	516000	61	4	29750	3057000	107	4	71950	8253000	153	4	100	6550	201	4	42850	4963500
17	4	8500	768000	63	4	28600	3057500	109	4	1450	101000	155	4	10800	1189000	203	4	200	13000
19	4	13750	1379000	65	4	775	61250	111	4	43000	4951000	157	4	27650	2756000	205	4	32750	4213500
21	4	35650	4216500	67	4	175	11450	113	4	48350	5609000	159	4	27900	2901000	207	4	68250	8472500
23	4	6750	670500	69	4	4600	495500	115	4	20950	2498000	161	4	2300	176000	209	4	100	6500
25	4	21000	2265500	71	4	22250	1982000	117	4	13200	1609000	163	4	46600	5029000	211	4	19200	2047000
27	4	16200	1794000	73	4	9450	742000	119	4	200	13050	165	4	20750	2238500	213	4	50	3250
29	4	600	46800	75	4	33550	3405500	121	4	27150	2920500	167	4	1100	81150	215	4	575	37250
31	4	38750	3641500	77	4	1250	87550	123	4	800	66100	169	4	900	67300	217	4	17400	1565000
33	4	49750	6131000	79	4	18850	2034000	125	4	2550	195500	171	4	18500	1962500	219	4	21450	2484500
35	4	150	9750	81	4	48550	5134000	127	4	33600	4122500	173	4	22500	2312500	221	4	450	29500
37	4	23250	2204000	83	4	16850	1619000	129	4	24950	2757500	175	4	14900	1630500	223	4	1650	131000
39	4	850	62000	85	4	1000	75100	131	4	3100	269000	177	4	28000	3138500	225	4	700	48500
41	4	55000	7055500	87	4	75900	8563000	133	4	39750	5088500	179	4	450	32150	227	4	18300	1870000
43	4	650	48050	89	4	26700	2939500	135	4	8800	853500	181	4	225	17050	229	4	425	26900
45	4	51000	5376500	91	4	300	24750	137	4	22700	2399500	183	4	41450	5251000				
Nebraska																			
1	4	126800	18695744	39	4	135700	14477750	77	4	68250	7591550	115	4	6100	654950	151	4	53550	7295350
3	4	208450	25545096	41	4	184650	22725144	79	4	165000	23619696	117	4	4050	445150	153	4	42800	5198900
5	4	4300	534800	43	4	55850	5622800	81	4	191800	28911648	119	4	145800	16366098	155	4	131250	14912400
7	4	4600	547500	45	4	3100	328400	83	4	53500	7395000	121	4	141350	18997000	157	4	61050	8093250
9	4	4350	516700	47	4	179900	24788392	85	4	42050	3687250	123	4	44950	5618900	159	4	78700	11027350
11	4	175650	19774248	49	4	9850	1399350	87	4	33450	3676800	125	4	78550	8590100	161	4	22650	2616200
13	4	36400	4875300	51	4	102000	9000300	89	4	210950	29507992	127	4	50250	5458450	163	4	57650	6590000
15	4	32950	2278550	53	4	127800	15722900	91	4	250	28950	129	4	35850	5315000	165	4	11550	1538600
17	4	43000	5462200	55	4	47250	5426900	93	4	96200	11995700	131	4	63750	7291900	167	4	94500	9131750
19	4	184700	24169696	57	4	84100	10638000	95	4	35500	4867800	133	4	10300	807250	169	4	71450	10505650
21	4	111950	12885200	59	4	124000	18386592	97	4	11850	1366850	135	4	100400	14355300	171	4	950	111750
23	4	109900	13855100	61	4	58000	8080400	99	4	150400	21861192	137	4	178850	26477944	173	4	87050	8284650
25	4	76050	8639450	63	4	59850	7782000	101	4	46100	6505100	139	4	139750	15754900	175	4	64300	7772400
27	4	159850	15422400	65	4	44950	5275550	103	4	7450	648300	141	4	179600	21553040	177	4	78050	9223300
29	4	105050	15153150	67	4	33100	4109400	105	4	4850	482250	143	4	90700	12038200	179	4	98700	9742450
31	4	11700	1211100	69	4	14900	1864200	107	4	115300	9885550	145	4	47350	5477800	181	4	26350	3452750
33	4	12350	1400350	71	4	16300	1932250	109	4	18250	2105100	147	4	51050	5447400	183	4	40200	4880350
35	4	119950	18172696	73	4	51850	7526750	111	4	144450	18757640	149	4	33450	4201750	185	4	174900	25602296
37	4	96400	11663300	75	4	600	66000	113	4	19000	2448000								

TABLE A-2. (CONTINUED)

All Hay

County	Years sampled	Acres	Production (tons)	County	Years sampled	Acres	Production (tons)	County	Years sampled	Acres	Production (tons)	County	Years sampled	Acres	Production (tons)	County	Years sampled	Acres	Production (tons)
Iowa																			
1	3	30100	107200	41	3	9100	33100	81	3	12000	44300	121	3	27600	88800	161	3	15700	59400
3	3	21800	53700	43	3	70800	293000	83	3	8300	25000	123	3	23900	88600	163	3	11200	43600
5	3	63000	230200	45	3	26400	101800	85	3	13900	49300	125	3	32300	100600	165	3	18100	63200
7	3	47600	117500	47	3	30200	99300	87	3	10700	36800	127	3	19400	62700	167	3	21100	77700
9	3	18200	70100	49	3	12700	39700	89	3	27900	105800	129	3	7900	22800	169	3	6300	18700
11	3	28300	111500	51	3	45500	115900	91	3	4300	12500	131	3	18200	63400	171	3	27500	97500
13	3	12200	47900	53	3	43000	104400	93	3	14600	58000	133	3	12000	42500	173	3	30000	78800
15	3	8800	27400	55	3	44800	187500	95	3	34300	111600	135	3	37800	108600	175	3	32500	81800
17	3	21900	85200	57	3	8300	28600	97	3	61000	238800	137	3	13400	38700	177	3	26200	72100
19	3	19200	71100	59	3	6600	22900	99	3	32600	107900	139	3	13000	51500	179	3	28000	81000
21	3	6700	21400	61	3	65300	304400	101	3	23000	67300	141	3	8600	27300	181	3	29000	86900
23	3	19800	72200	63	3	4500	15700	103	3	30000	103000	143	3	5100	21500	183	3	18000	58500
25	3	8300	27000	65	3	46100	177400	105	3	29900	111000	145	3	20800	55800	185	3	52200	128000
27	3	12600	45900	67	3	10500	35300	107	3	24400	88700	147	3	6600	23800	187	3	6400	20000
29	3	21000	73400	69	3	10600	36900	109	3	13300	41900	149	3	21700	81700	189	3	4900	17400
31	3	17000	64800	71	3	8500	23500	111	3	21200	70400	151	3	5200	16700	191	3	84200	332000
33	3	7800	25300	73	3	8700	28000	113	3	26100	93800	153	3	11700	36400	193	3	23300	83000
35	3	12200	42900	75	3	10900	34800	115	3	6800	23500	155	3	25900	99300	195	3	8100	24700
37	3	22800	69200	77	3	27900	85700	117	3	38700	103300	157	3	45600	150400	197	3	4500	15900
39	3	35800	102700	79	3	3900	11700	119	3	15400	61600	159	3	52500	128000				
Kansas																			
1	4	36550	60250	43	4	10000	30100	85	4	59900	117950	127	4	39050	78600	169	4	20200	62850
3	4	53950	98850	45	4	31200	66950	87	4	35350	73950	129	4	3750	10000	171	4	8100	27150
5	4	20800	47700	47	4	19750	87400	89	4	30000	85350	131	4	34050	93950	173	4	45000	148000
7	4	15050	50900	49	4	26050	45250	91	4	22650	46750	133	4	34300	58100	175	4	6950	30550
9	4	41400	140450	51	4	19900	50750	93	4	20900	89850	135	4	7300	20150	177	4	29500	54550
11	4	45100	82700	53	4	26000	54550	95	4	24300	70900	137	4	13350	44900	179	4	10550	39500
13	4	22150	58750	55	4	30100	132000	97	4	14450	49500	139	4	48650	69500	181	4	6650	24000
15	4	61700	112050	57	4	18250	73850	99	4	41900	75800	141	4	17100	44650	183	4	21400	58050
17	4	15900	37250	59	4	35650	77550	101	4	6100	17300	143	4	20600	56250	185	4	25500	83200
19	4	21200	37950	61	4	14500	35650	103	4	34950	91150	145	4	32000	123800	187	4	5350	25300
21	4	25550	40500	63	4	6800	21200	105	4	26950	87550	147	4	23750	71950	189	4	10550	50050
23	4	9650	32700	65	4	13750	42300	107	4	36550	68800	149	4	50050	103950	191	4	28400	75900
25	4	7100	23450	67	4	11050	50100	109	4	5900	16600	151	4	10950	34200	193	4	5000	16550
27	4	25250	53600	69	4	21150	119200	111	4	49800	77450	153	4	13600	44850	195	4	7250	19000
29	4	23450	65750	71	4	3650	10050	113	4	28200	76000	155	4	42850	150800	197	4	47600	94700
31	4	38000	60000	73	4	35150	60150	115	4	54150	118550	157	4	22300	59500	199	4	6900	19550
33	4	8450	29650	75	4	7450	32600	117	4	32300	78050	159	4	19600	60100	201	4	31650	85000
35	4	33300	74850	77	4	13500	39300	119	4	7800	31250	161	4	22400	51200	203	4	6800	26750
37	4	32900	57650	79	4	18650	48650	121	4	55650	94050	163	4	12500	36800	205	4	40950	77050
39	4	13200	48600	81	4	6700	32250	123	4	13500	37350	165	4	12700	31550	207	4	38450	54250
41	4	46500	121300	83	4	8900	29400	125	4	27400	45950	167	4	23350	59550	209	4	2950	8300

TABLE A-2. (CONTINUED)

All Hay (continued)

County	Years sampled	Acres	Production (tons)	County	Years sampled	Acres	Production (tons)	County	Years sampled	Acres	Production (tons)	County	Years sampled	Acres	Production (tons)	County	Years sampled	Acres	Production (tons)
Missouri																			
1	4	47400	77750	47	4	24250	36750	93	4	8350	14250	139	4	19700	35000	185	4	40700	64450
3	4	17150	38550	49	4	25850	40250	95	4	21750	39950	141	4	31200	50750	186	4	19400	36450
5	4	9950	22850	51	4	28000	49550	97	4	41950	75300	143	4	850	1700	187	4	23450	40350
7	4	28850	57850	53	4	33450	61900	99	4	17850	27050	145	4	49300	89050	189	4	3150	5900
9	4	46700	88450	55	4	20000	29250	101	4	66050	119450	147	4	55450	127500	195	4	27900	53150
11	4	34750	52250	57	4	31600	51650	103	4	35250	66450	149	4	21600	42750	197	4	25650	46100
13	4	52450	90650	59	4	49800	90200	105	4	45800	83150	151	4	38600	68750	199	4	27100	52800
15	4	43250	72500	61	4	25750	51150	107	4	30800	60800	153	4	21200	39250	201	4	7700	13750
17	4	22150	41200	63	4	29650	53550	109	4	74700	144350	155	4	1350	3700	203	4	13350	21900
19	4	39000	70000	65	4	20900	35750	111	4	20000	39250	157	4	26300	62800	205	4	22500	47850
21	4	15700	34200	67	4	38600	70100	113	4	22050	43250	159	4	39300	70850	207	4	10850	18000
23	4	9050	15500	69	4	1200	2250	115	4	55350	101800	161	4	20700	35200	209	4	27300	45750
25	4	37100	58150	71	4	47350	84550	117	4	22350	44100	163	4	26450	53700	211	4	67000	115000
27	4	42900	73250	73	4	24400	41350	119	4	32950	58800	165	4	17900	31800	213	4	14150	24300
29	4	22550	33750	75	4	37350	74000	121	4	47500	82200	167	4	67300	126500	215	4	55950	94700
31	4	41400	73750	77	4	72600	148550	123	4	13000	21400	169	4	17150	28000	217	4	50100	91400
33	4	32150	58650	79	4	26400	44900	125	4	27950	48250	171	4	49650	87700	219	4	11350	20900
35	4	6400	10000	81	4	52100	95600	127	4	18700	44300	173	4	21300	38000	221	4	13200	21000
37	4	44050	75950	83	4	49650	87750	129	4	32800	60150	175	4	19750	36900	223	4	12000	18250
39	4	34000	59850	85	4	32650	57500	131	4	31200	53100	177	4	27350	46600	225	4	63200	122000
41	4	36700	64500	87	4	6400	16100	133	4	1800	3750	179	4	10600	16400	227	4	20600	41900
43	4	45300	100750	89	4	25150	42500	135	4	38300	70500	181	4	10550	16700	229	4	54700	106050
45	4	24450	53800	91	4	47600	88450	137	4	29250	52200	183	4	13450	28700				
Nebraska																			
1	3	8400	23590	39	3	26000	95300	77	3	34000	72200	115	3	27000	39400	151	3	16000	42700
3	3	46000	125300	41	3	113000	240300	79	3	13000	37300	117	3	33000	35600	153	3	10500	36290
5	3	46000	51900	43	3	9000	30400	81	3	7300	20800	119	3	19000	65200	155	3	31000	102400
7	3	12000	33200	45	3	59000	102400	83	3	14000	39440	121	3	14500	36100	157	3	23000	99450
9	3	36000	45100	47	3	84000	325400	85	3	10500	29000	123	3	60000	86150	159	3	19000	47400
11	3	37000	115200	49	3	5000	9800	87	3	10500	36600	125	3	15000	41610	161	3	148000	212160
13	3	22000	48600	51	3	13000	45700	89	3	277000	339100	127	3	13000	37580	163	3	42000	103230
15	3	42000	72600	53	3	23000	82800	91	3	13500	21600	129	3	16000	43500	165	3	23000	39800
17	3	92000	89400	55	3	8000	28150	93	3	30000	75480	131	3	19500	59300	167	3	27000	95500
19	3	54000	166300	57	3	16500	57900	95	3	22000	55600	133	3	21000	42200	169	3	14500	45110
21	3	11000	39200	59	3	11000	32600	97	3	18000	40260	135	3	10000	30640	171	3	15500	25400
23	3	17000	60000	61	3	12500	31600	99	3	14000	43480	137	3	15000	52770	173	3	10500	35300
25	3	13500	57040	63	3	14500	30700	101	3	28000	68680	139	3	27000	84900	175	3	30000	75700
27	3	42000	137200	65	3	19000	59900	103	3	65000	78800	141	3	22000	67400	177	3	23000	94870
29	3	10500	29300	67	3	35000	88000	105	3	11500	22900	143	3	10500	28400	179	3	25000	93800
31	3	388000	468000	69	3	73000	102340	107	3	77000	186900	145	3	14000	39670	181	3	27000	61500
33	3	17000	36240	71	3	46000	59000	109	3	29000	78640	147	3	14500	45980	183	3	46000	60500
35	3	16000	49800	73	3	9600	28700	111	3	122000	258700	149	3	87000	93300	185	3	9000	29860
37	3	28000	91400	75	3	36000	41100	113	3	20000	32600								

TABLE A-2. (CONTINUED)

Sorghum

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Iowa																			
1	1	150	8500	53	1	150	6800	121	1	150	6800	141	1	100	6500	165	1	200	11000
3	1	150	8500	71	1	600	36000	125	1	100	4500	145	1	600	35000	173	1	400	24000
7	1	200	8800	77	1	500	27000	129	1	500	30000	147	1	100	6500	175	1	150	6800
27	1	200	11000	85	1	600	31000	131	1	300	14000	149	1	100	6300	181	1	200	9000
29	1	600	36000	109	1	150	6900	133	1	500	27000	155	1	450	27000	185	1	150	6800
35	1	100	6500	117	1	100	4500	135	1	250	12000	159	1	450	20000	193	1	300	16000
39	1	200	9000	119	1	200	13000	137	1	350	21000	161	1	100	5300				
47	1	600	32000																
Kansas																			
1	4	27400	1801700	43	4	11100	1013000	85	4	34450	2324000	127	4	38300	2330500	169	4	18650	1182200
3	4	32150	2467900	45	4	24200	1878100	87	4	30550	2431100	129	4	72150	3641300	171	4	33750	1984800
5	4	34350	2878600	47	4	33900	2300700	89	4	64850	5171900	131	4	67050	5347300	173	4	75050	5186100
7	4	8000	432350	49	4	7050	428800	91	4	16250	1343950	133	4	32700	2557550	175	4	57850	4244650
9	4	51350	3790800	51	4	21400	1165400	93	4	27650	1769100	135	4	40000	1614700	177	4	30100	2059750
11	4	23300	1760650	53	4	24150	1615300	95	4	19200	1158550	137	4	38000	1834800	179	4	46500	3347050
13	4	41100	3758350	55	4	74200	4872600	97	4	32800	2044550	139	4	60500	4351650	181	4	10750	619400
15	4	79000	5989850	57	4	61500	5004800	99	4	30650	2174350	141	4	36550	2422650	183	4	65750	4766950
17	4	13600	1076900	59	4	28550	2270600	101	4	35050	1917450	143	4	17050	1221900	185	4	55550	3520200
19	4	5900	320000	61	4	12750	886850	103	4	22250	1727400	145	4	51450	3781800	187	4	40350	3089750
21	4	24100	1921800	63	4	48100	2766300	105	4	25400	1715350	147	4	35550	2032400	189	4	149100	8635850
23	4	15150	789900	65	4	36850	1756200	107	4	28800	1773200	149	4	37100	2756950	191	4	38150	2116150
25	4	10200	502500	67	4	52450	3691200	109	4	24150	1341850	151	4	49400	3289950	193	4	49300	3439750
27	4	35800	2819300	69	4	57150	5624150	111	4	47600	3281300	153	4	43100	2665950	195	4	31150	1394150
29	4	41550	3449750	71	4	23650	1333350	113	4	50850	3990550	155	4	90500	6339500	197	4	24400	1731650
31	4	36450	2502200	73	4	11650	744850	115	4	90650	6382350	157	4	60200	4657350	199	4	14500	877700
33	4	9450	455350	75	4	39600	1715750	117	4	85800	6585650	159	4	62350	4862200	201	4	99500	7731900
35	4	32350	1960000	77	4	6650	412200	119	4	59300	5167350	161	4	23900	1859700	203	4	30350	2344250
37	4	34650	2267750	79	4	62550	4421100	121	4	29000	2164900	163	4	38850	1913500	205	4	30950	2253450
39	4	50600	3160200	81	4	41900	3978150	123	4	53800	3699300	165	4	36750	2210500	207	4	19950	1538750
41	4	55750	3729750	83	4	34450	2056500	125	4	28450	1757450	167	4	27800	1624900	209	4	900	62700
Missouri																			
1	4	1100	79500	15	4	7200	550500	29	4	250	14850	43	4	250	15800	57	4	7150	473500
3	4	6900	486000	17	4	11700	821500	31	4	14050	1085500	45	4	900	65700	59	4	700	51600
5	4	2600	211500	19	4	6600	456500	33	4	13300	952500	47	4	3950	243500	61	4	9850	736000
7	4	52800	4563500	21	4	6800	511000	35	4	350	17800	49	4	5850	526500	63	4	11000	789000
9	4	1750	84350	23	4	41100	2865500	37	4	20200	1284500	51	4	2950	177500	65	4	250	14900
11	4	33050	2419500	25	4	6950	462500	39	4	1900	104500	53	4	15150	1087000	67	4	375	21350
13	4	39950	2651500	27	4	14800	1066500	41	4	13050	862000	55	4	1100	70050	69	4	45900	3647000

TABLE A-2. (CONTINUED)

Sorghum (continued)

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Missouri (continued)																			
71	4	7700	447000	103	4	3250	283000	135	4	11150	698500	167	4	1200	74400	201	4	35200	2863500
73	4	4900	290000	105	4	600	45050	137	4	35650	2714500	169	4	200	15300	203	4	125	8900
75	4	7300	470000	107	4	6400	418500	139	4	8750	658500	171	4	1350	95000	205	4	16700	1542000
77	4	800	53300	109	4	5150	219500	141	4	5300	329500	173	4	14550	1277000	207	4	85700	7161500
79	4	11700	823000	111	4	4350	384500	143	4	84900	7372500	175	4	6650	439000	209	4	225	13550
81	4	7400	509000	113	4	7350	572500	145	4	2650	133500	177	4	7900	605500	211	4	3100	214000
83	4	31500	2294500	115	4	11200	834500	147	4	5950	413000	179	4	325	18750	213	4	475	24250
85	4	1300	73500	117	4	13000	941500	149	4	150	8750	181	4	10200	692500	215	4	500	30450
87	4	4400	371500	119	4	250	14050	151	4	3950	251500	183	4	2050	162500	217	4	48050	3248000
89	4	6050	410500	121	4	10500	673000	153	4	150	8000	185	4	17300	1151000	219	4	2950	195500
91	4	275	13900	123	4	575	41700	155	4	35300	3056000	186	4	3150	241000	221	4	325	23500
93	4	250	16950	125	4	1350	85600	157	4	5550	429500	187	4	1250	84650	223	4	3200	165000
95	4	6450	445500	127	4	8200	651000	159	4	34100	2640000	189	4	875	57400	225	4	125	7350
97	4	16900	1193000	129	4	2600	201500	161	4	825	46550	195	4	8950	700000	227	4	1050	81500
99	4	1450	93500	131	4	1550	96900	163	4	16250	1404000	197	4	750	44100	229	4	250	13300
101	4	33600	2262000	133	4	37900	3434500	165	4	14050	945500	199	4	950	81300				
Nebraska																			
1	4	34700	2904700	39	4	1100	78000	77	4	3050	168200	115	4	200	10700	151	4	85800	6888000
3	4	400	26750	41	4	2850	157200	79	4	5050	357450	117	4	0	0	153	4	700	48750
5	4	100	5350	43	4	450	27000	81	4	21550	1902750	119	4	600	42800	155	4	28100	2064400
7	4	1100	37950	45	4	300	10900	83	4	30650	2157750	121	4	2000	144900	157	4	500	18800
9	4	50	2750	47	4	1500	92350	85	4	8650	436550	123	4	800	30350	159	4	92300	8042300
11	4	4800	362400	49	4	2400	91500	87	4	26650	1431200	125	4	14000	1012600	161	4	500	18850
13	4	150	5200	51	4	550	32150	89	4	2050	120200	127	4	15000	1368800	163	4	6350	373900
15	4	7200	424400	53	4	6750	527300	91	4	0	0	129	4	67800	5168500	165	4	250	9000
17	4	200	11900	55	4	400	25250	93	4	3700	262350	131	4	56200	4446000	167	4	1250	94450
19	4	10900	718600	57	4	11650	567900	95	4	70850	5540100	133	4	50100	4080650	169	4	67550	5307300
21	4	1350	81900	59	4	69600	5823800	97	4	51500	4105950	135	4	4800	167100	171	4	0	0
23	4	57250	4612950	61	4	34350	2568450	99	4	17550	1440450	137	4	8600	662600	173	4	1000	62850
25	4	28150	2486750	63	4	21750	1290900	101	4	2500	101300	139	4	300	21400	175	4	3400	205050
27	4	700	40800	65	4	45500	2881200	103	4	250	14950	141	4	3450	301300	177	4	850	62300
29	4	4500	216500	67	4	154850	12929150	105	4	400	15000	143	4	46050	3929700	179	4	1450	115850
31	4	200	12800	69	4	600	22400	107	4	4550	239450	145	4	29600	1899900	181	4	44550	3111100
33	4	1450	60050	71	4	250	14500	109	4	139550	11450650	147	4	26300	2250050	183	4	150	8400
35	4	50950	4612200	73	4	19450	1415600	111	4	2100	104700	149	4	300	18650	185	4	48400	4550350
37	4	3350	278100	75	4	0	0	113	4	100	5350								

TABLE A-2. (CONTINUED)

Soybeans

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Iowa																			
1	4	63450	2558500	41	4	126250	4736500	81	4	133650	5006500	121	4	56350	2096500	161	4	120050	4789000
3	4	49300	1912500	43	4	4950	190000	83	4	116600	4937000	123	4	76400	3265500	163	4	43650	2017500
5	4	4000	141000	45	4	71850	3012000	85	4	106850	4101000	125	4	54700	2226500	165	4	88000	3621500
7	4	28650	1049000	47	4	88350	3346500	87	4	61600	2464000	127	4	92350	4068000	167	4	119200	5011500
9	4	69300	2792500	49	4	108750	4175000	89	4	73500	2484000	129	4	94150	3586500	169	4	123600	4785500
11	4	125950	5251000	51	4	42500	1533500	91	4	106500	4126500	131	4	80350	2986500	171	4	108900	4555500
13	4	90100	3811000	53	4	39700	1413500	93	4	74050	2994000	133	4	107100	4041000	173	4	68050	2570000
15	4	115650	4752500	55	4	25200	1055000	95	4	50700	2075000	135	4	22450	767500	175	4	34500	1231500
17	4	57300	2383500	57	4	46400	1797000	97	4	8550	335500	137	4	72900	2688000	177	4	47200	1628500
19	4	64600	2504000	59	4	72550	2645000	99	4	106400	4343000	139	4	54050	2091500	179	4	45200	1751000
21	4	125200	4925000	61	4	2950	126000	101	4	65100	2446500	141	4	134200	5178500	181	4	50400	1902000
23	4	86650	3499500	63	4	92750	3668500	103	4	57800	2213500	143	4	93250	3578000	183	4	69500	2927000
25	4	142500	5647000	65	4	75700	3044000	105	4	42350	1724500	145	4	85550	3185000	185	4	48950	1636500
27	4	100300	4179000	67	4	105350	3882500	107	4	61750	2531500	147	4	132050	5119500	187	4	170700	6905000
29	4	75200	2952500	69	4	128700	5335500	109	4	267300	10842000	149	4	128400	5130000	189	4	94950	3314500
31	4	73050	3336500	71	4	103650	4164500	111	4	59300	2188000	151	4	147650	5504000	191	4	17300	624000
33	4	115350	4273000	73	4	137000	5744000	113	4	88400	3484500	153	4	80850	3067500	193	4	91400	3383500
35	4	96100	3925000	75	4	118150	5183000	115	4	54200	2041500	155	4	157850	6419500	195	4	83500	3042500
37	4	61450	2093500	77	4	70600	2721500	117	4	26200	961500	157	4	80300	3321000	197	4	159750	6303500
39	4	31900	989000	79	4	126700	5070500	119	4	112750	4209000	159	4	53850	1929000				
Kansas																			
1	4	54600	1200750	43	4	53700	2055350	85	4	20750	625500	127	4	8450	247250	169	4	3400	103050
3	4	62850	1910950	45	4	27500	879250	87	4	30800	1092150	129	4	750	28200	171	4	2400	79600
5	4	44000	1544200	47	4	13700	510400	89	4	7350	202650	131	4	24100	657550	173	4	13350	578150
7	4	700	27600	49	4	4700	126550	91	4	30200	982550	133	4	44350	910850	175	4	2100	74700
9	4	5800	35150	51	4	500	14300	93	4	1500	51900	135	4	200	6100	177	4	25550	1017550
11	4	36950	759500	53	4	1550	50350	95	4	3950	159500	137	4	1150	31500	179	4	8050	309250
13	4	73400	2746900	55	4	9000	321350	97	4	9700	430100	139	4	48600	1488950	181	4	9400	315400
15	4	11500	399350	57	4	9650	384450	99	4	63400	1364800	141	4	3750	104450	183	4	4700	124500
17	4	8350	263300	59	4	53750	1591000	101	4	3200	111650	143	4	4050	144550	185	4	14950	658600
19	4	4300	108750	61	4	4200	145550	103	4	25500	795150	145	4	10300	417450	187	4	3250	130650
21	4	90950	2142150	63	4	1700	50650	105	4	1900	53000	147	4	1350	38050	189	4	3150	117950
23	4	4300	151900	65	4	550	22200	107	4	41100	1261550	149	4	16100	496150	191	4	3750	89850
25	4	400	16200	67	4	8500	333950	109	4	450	13850	151	4	21300	962700	193	4	8800	311400
27	4	14150	510100	69	4	8900	398450	111	4	35550	1066100	153	4	800	28400	195	4	400	9950
29	4	7450	213350	71	4	400	12400	113	4	15550	568250	155	4	5800	199550	197	4	8800	281850
31	4	50800	1365000	73	4	13950	316600	115	4	8500	255650	157	4	21300	761100	199	4	2950	91150
33	4	1750	49800	75	4	650	24700	117	4	42900	1127950	159	4	9100	371850	201	4	24450	727500
35	4	1650	47250	77	4	250	8850	119	4	5550	202650	161	4	7100	201400	203	4	2150	68900
37	4	73800	1868700	79	4	9100	394850	121	4	44800	1437700	163	4	400	7900	205	4	40300	808750
39	4	1600	33700	81	4	8950	344500	123	4	6000	124550	165	4	1000	44350	207	4	21500	539650
41	4	7550	206200	83	4	1350	43550	125	4	26900	571550	167	4	250	5500	209	4	4600	182750

TABLE A-2. (CONTINUED)

Soybeans (continued)

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Missouri																			
1	4	51050	1538000	47	4	26400	897500	93	1	0	0	139	4	54900	1688000	185	4	21250	591500
3	4	68250	2468500	49	4	46750	1671000	95	4	35600	1244000	141	4	10000	340000	186	4	6700	236500
5	4	111000	4197500	51	4	6250	185500	97	4	40800	884000	143	4	178750	5476500	187	4	1150	34150
7	4	167500	5005000	53	4	55700	1880000	99	4	7650	203500	145	4	10950	228000	189	4	13100	327000
9	4	3100	68750	55	1	0	0	101	4	53950	1809500	147	4	138000	4731500	195	4	121000	4595500
11	4	80500	2353500	57	4	24200	580500	103	4	79250	2460500	149	1	0	0	197	4	22800	737000
13	4	80300	2319500	59	1	0	0	105	3	600	12400	151	4	5850	169000	199	4	60900	1639500
15	4	15950	544500	61	4	100750	3482000	107	4	93050	3243500	153	1	0	0	201	4	85250	2718000
17	4	15200	379000	63	4	51350	1708500	109	4	9300	211000	155	4	166750	5074000	203	1	0	0
19	4	49600	1570500	65	4	1000	27100	111	4	74600	2412500	157	4	27550	859000	205	4	96650	3075000
21	4	53700	1958000	67	1	0	0	113	4	48550	1385500	159	4	74100	2515500	207	4	152750	4888000
23	4	72750	2035500	69	4	113000	3233500	115	4	79400	2605500	161	4	800	21150	209	1	0	0
25	4	62250	1882000	71	4	15500	375500	117	4	108000	3573000	163	4	70950	2097000	211	4	43700	1419000
27	4	49400	1673000	73	4	5450	133000	119	1	0	0	165	4	44900	1546000	213	1	0	0
29	1	0	0	75	4	66650	2317500	121	4	88600	2869500	167	4	3050	80450	215	1	0	0
31	4	47250	1489000	77	4	1350	33150	123	4	700	17000	169	4	700	17300	217	4	79250	2098000
33	4	143500	5005500	79	4	90350	2829500	125	4	1050	25400	171	4	26250	845500	219	4	22500	592000
35	1	0	0	81	4	78800	2527000	127	4	62850	1978500	173	4	78250	2251500	221	1	0	0
37	4	65300	2096500	83	4	45850	1458500	129	4	35700	1269500	175	4	48950	1612000	223	4	5850	138500
39	4	6400	159000	85	4	1150	31550	131	4	1700	48600	177	4	93550	3027000	225	1	0	0
41	4	137000	4898500	87	4	103750	3902500	133	4	141500	4841500	179	1	0	0	227	4	27800	862500
43	1	0	0	89	4	39750	1401500	135	4	15700	395000	181	4	10950	248500	229	1	0	0
45	4	78300	2284000	91	1	0	0	137	4	90300	2613000	183	4	58650	1824500				
Nebraska																			
1	4	22750	905600	39	4	79050	2871450	77	4	9850	333750	115	4	600	22250	151	4	28850	1071450
3	4	43700	1497650	41	4	17150	567600	79	4	16100	666100	117	4	0	0	153	4	36050	1296650
5	4	0	0	43	4	33100	1063700	81	4	36900	1563950	119	4	68500	2103350	155	4	120150	3910850
7	4	0	0	45	4	0	0	83	4	12600	447150	121	4	16950	545550	157	4	50	1950
9	4	0	0	47	4	12900	469650	85	4	10400	357150	123	4	0	0	159	4	48250	1826250
11	4	22650	701050	49	4	200	6400	87	4	2400	88550	125	4	16350	506450	161	4	0	0
13	4	0	0	51	4	40450	1203300	89	4	10350	391100	127	4	55450	2027450	163	4	8300	272350
15	4	850	26200	53	4	85150	3013400	91	4	0	0	129	4	21200	800750	165	4	0	0
17	4	950	35650	55	4	37350	1377250	93	4	9450	303400	131	4	70700	2447700	167	4	39850	1134750
19	4	30900	1319650	57	4	2500	82650	95	4	24100	840350	133	4	20550	665600	169	4	32300	1301050
21	4	110950	4044050	59	4	46800	1771400	97	4	21400	707700	135	4	4200	135150	171	4	0	0
23	4	67250	2389500	61	4	14750	545550	99	4	25150	977000	137	4	16000	688250	173	4	40850	1359650
25	4	91100	3176400	63	4	16700	568400	101	4	3250	109550	139	4	49950	1586500	175	4	16850	635050
27	4	61650	1912000	65	4	12200	396550	103	4	900	30650	141	4	80650	2668100	177	4	70800	2638600
29	4	2650	90100	67	4	52800	1704400	105	4	0	0	143	4	34500	1329600	179	4	52850	1724400
31	4	0	0	69	4	100	3900	107	4	23550	710100	145	4	7150	217100	181	4	9950	296850
33	4	0	0	71	4	1150	43400	109	4	47150	1609250	147	4	93200	3242900	183	4	1600	56400
35	4	39300	1642400	73	4	9050	330900	111	4	5450	192800	149	4	3350	125550	185	4	32100	1314300
37	4	65800	2213000	75	4	0	0	113	4	250	7800								

TABLE A-2. (CONTINUED)

All Wheat

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Iowa																			
1	4	600	17500	41	2	200	7350	85	4	2050	56850	121	4	675	20800	161	3	450	12300
3	4	1500	36950	45	4	275	13100	87	4	1325	58350	123	3	200	8400	163	2	275	15150
7	4	1200	39700	47	4	775	24750	89	1	100	4800	125	4	525	20400	165	3	450	14000
9	3	650	20800	49	4	175	5200	93	3	100	4200	129	4	2700	80500	167	4	275	8350
11	3	450	21400	51	4	3050	101000	95	4	300	13450	131	4	775	26800	171	3	300	9900
13	3	350	14200	53	4	2550	77500	97	4	400	18700	133	4	2150	67500	173	4	3850	95000
15	4	175	5950	55	2	200	9800	99	3	200	6000	135	4	650	21150	175	4	1275	38250
17	2	150	6800	57	4	1925	92000	101	4	2400	93500	137	4	3250	96500	177	4	3650	134100
19	3	150	6100	59	3	150	5300	103	4	500	21050	139	4	575	25350	179	3	1100	39600
21	2	200	8050	61	1	100	5300	105	4	400	19350	143	4	200	7800	181	4	1075	39900
23	2	150	5850	65	3	200	7500	107	4	1850	65000	145	4	4500	125050	183	4	1100	47050
25	2	100	3600	67	3	200	6600	111	4	4000	170000	147	2	200	7900	185	4	1450	47550
27	2	200	6900	69	4	200	7350	113	4	350	17500	149	4	525	17700	189	4	250	8200
29	4	2300	74000	71	4	3500	110000	115	4	1100	50000	153	4	425	13000	191	2	150	6250
31	2	200	10900	73	3	350	10100	117	4	525	15800	155	4	3350	112500	193	4	1000	26950
39	4	475	15300	77	4	675	21000	119	4	400	13050	159	4	4650	136000				
Kansas																			
1	4	25750	755350	43	4	22300	824700	85	4	26450	666050	127	4	50950	1609000	169	4	141400	4960750
3	4	25250	813100	45	4	17150	576300	87	4	14050	553250	129	4	114050	4042050	171	4	147450	6160650
5	4	20300	662200	47	4	107150	3882100	89	4	140650	5274150	131	4	43950	1674700	173	4	223250	6973150
7	4	138200	4457900	49	4	13000	257900	91	4	11850	395100	133	4	25800	653250	175	4	100300	4185700
9	4	176100	6224600	51	4	113950	3639850	93	4	139350	5445500	135	4	153100	5963500	177	4	22800	674800
11	4	14600	360700	53	4	94250	3308950	95	4	204200	6475800	137	4	105700	4085250	179	4	115150	4455050
13	4	42900	1730800	55	4	221000	8490550	97	4	85000	2784250	139	4	26350	826850	181	4	200250	8705350
15	4	95450	2861800	57	4	211500	7965900	99	4	46600	1102750	141	4	113700	4346750	183	4	104250	4303050
17	4	20950	590300	59	4	18950	555350	101	4	116100	4558750	143	4	142750	5112100	185	4	146300	5412000
19	4	13800	316850	61	4	25500	844500	103	4	13600	494850	145	4	152800	5401300	187	4	135600	5454100
21	4	57250	1903100	63	4	124550	5212150	105	4	116600	4100000	147	4	93500	3656150	189	4	113050	4943650
23	4	136000	6243800	65	4	122650	4158300	107	4	18500	573300	149	4	31950	1191500	191	4	392600	11888750
25	4	81750	2610650	67	4	105450	4786750	109	4	164550	6001850	151	4	179600	6493500	193	4	197200	7557400
27	4	94950	3584100	69	4	163650	6746900	111	4	31450	881600	153	4	140150	5687600	195	4	108150	4533350
29	4	138950	5429450	71	4	152100	5685750	113	4	213150	7716350	155	4	293800	9476250	197	4	24400	822600
31	4	29600	832750	73	4	23600	594400	115	4	147050	4907600	157	4	92400	3543900	199	4	114250	4554650
33	4	91800	2598150	75	4	150000	5571200	117	4	85850	3350550	159	4	152800	5743150	201	4	99800	3855650
35	4	117700	3661100	77	4	234000	7392700	119	4	125300	4932650	161	4	28100	1029450	203	4	140850	6193350
37	4	36250	857600	79	4	109400	3682450	121	4	15500	422400	163	4	113400	4082400	205	4	38500	786100
39	4	120750	5112350	81	4	130400	6512800	123	4	162600	6311150	165	4	136450	4622950	207	4	16800	421400
41	4	166200	5975650	83	4	120500	4218050	125	4	35250	806900	167	4	128050	4581700	209	4	1650	61350

TABLE A-2. (CONTINUED)

All Wheat (continued)

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Missouri																			
1	4	3700	148500	47	4	7550	310000	93	4	100	3250	139	4	15800	728000	185	4	11900	352500
3	4	8300	371500	49	4	7950	362500	95	4	8550	359000	141	4	3450	138000	186	4	6550	271500
5	4	2950	113350	51	4	3550	116800	97	4	29100	782000	143	4	32000	1515000	187	4	2300	83100
7	4	24250	1234000	53	4	19000	707000	99	4	3700	116000	145	4	8900	271500	189	4	5450	231500
9	4	3100	102000	55	4	475	13300	101	4	6900	222000	147	4	8950	399500	195	4	16800	751000
11	4	43700	1448000	57	4	17200	567000	103	4	8250	437500	149	4	2200	77150	197	4	1800	83650
13	4	21800	838000	59	4	550	17800	105	4	1175	35950	151	4	3000	104250	199	4	3700	172000
15	4	4000	138500	61	4	11900	563500	107	4	14300	680500	153	4	125	3800	201	4	34200	1470500
17	4	6000	214000	63	4	8500	363500	109	4	7900	260000	155	4	32900	1441500	203	4	150	4800
19	4	12600	526000	65	4	625	19350	111	4	9500	436000	157	4	15250	607500	205	4	11850	663000
21	4	10550	417500	67	4	325	10700	113	4	16400	796000	159	4	16500	566000	207	4	44500	2132000
23	4	15150	668000	69	4	35750	1428000	115	4	11350	488500	161	4	875	27600	209	4	75	2450
25	4	11300	470500	71	4	10250	397000	117	4	11200	513500	163	4	14150	752500	211	4	4100	163450
27	4	13350	601500	73	4	3700	127500	119	4	700	24000	165	4	14300	546500	213	4	175	5500
29	4	300	9300	75	4	11350	417000	121	4	10800	496000	167	4	2850	95800	215	4	1225	42050
31	4	13850	560000	77	4	2650	105850	123	4	300	9200	169	4	300	9750	217	4	28700	908000
33	4	22350	958500	79	4	6950	298500	125	4	2200	63850	171	4	1700	68700	219	4	8400	319500
35	4	175	5800	81	4	9000	348000	127	4	12650	557000	173	4	13100	662000	221	4	200	6500
37	4	7300	251000	83	4	8900	315500	129	4	3650	136700	175	4	9700	449000	223	4	1800	58400
39	4	3450	104500	85	4	1250	38250	131	4	1850	59850	177	4	17950	834500	225	4	1050	34250
41	4	19200	940000	87	4	9250	349500	133	4	26650	1117500	179	4	300	9200	227	4	2700	101650
43	4	625	22900	89	4	13450	575500	135	4	6400	235000	181	4	3050	103650	229	4	525	17400
45	4	6300	255500	91	4	1450	48300	137	4	16250	794500	183	4	14950	616000				
Nebraska																			
1	4	28200	1194950	39	4	400	12350	77	4	1700	52850	115	4	500	16750	151	4	35650	1337000
3	4	550	21350	41	4	26650	1181100	79	4	4350	145700	117	4	250	10100	153	4	2000	68500
5	4	450	17350	43	4	900	31700	81	4	3500	130600	119	4	600	21400	155	4	11100	348950
7	4	53650	1684150	45	4	33700	1308250	83	4	32550	1473400	121	4	3150	94350	157	4	13400	463800
9	4	250	9600	47	4	6950	291850	85	4	42850	1800250	123	4	27050	995150	159	4	12550	503100
11	4	3150	115350	49	4	80500	3444800	87	4	72000	2978000	125	4	7350	275000	161	4	47100	1889250
13	4	81150	3110900	51	4	100	3900	89	4	4200	133800	127	4	18300	679600	163	4	6050	222600
15	4	2350	72250	53	4	2400	82850	91	4	0	0	129	4	38100	1649750	165	4	6000	240600
17	4	400	15400	55	4	1200	34350	93	4	5300	173350	131	4	29200	1063100	167	4	1100	37100
19	4	19300	662250	57	4	37600	1703200	95	4	34600	1275150	133	4	17100	490600	169	4	42350	1653700
21	4	2400	88200	59	4	20150	816600	97	4	15550	519450	135	4	139950	5528250	171	4	100	3900
23	4	10400	324300	61	4	20850	814050	99	4	19500	738650	137	4	11550	481500	173	4	300	8700
25	4	21150	850200	63	4	43200	1690350	101	4	68300	2895700	139	4	650	22800	175	4	6600	242300
27	4	450	14350	65	4	65350	2916550	103	4	1550	56600	141	4	4400	175800	177	4	4000	129550
29	4	50800	2371600	67	4	58950	2325700	105	4	127950	3921250	143	4	3950	148800	179	4	450	16050
31	4	1150	41450	69	4	44350	1927550	107	4	1900	73200	145	4	62850	2755200	181	4	35350	1393300
33	4	187450	8401700	71	4	450	16000	109	4	57850	1973550	147	4	18900	634450	183	4	150	4750
35	4	12800	512250	73	4	18650	833250	111	4	41150	1504550	149	4	2000	79250	185	4	3000	127850
37	4	3400	117300	75	4	50	1700	113	4	4300	152250								

TABLE A-3. MEDIAN ACREAGE AND PRODUCTION VALUES FOR IRRIGATED CROPS FOR 1984–1987 BY CROP, STATE, AND COUNTY (PATTON 1989a)

Corn for Grain

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Kansas																			
1	4	1350	138000	43	4	200	23550	85	4	100	9000	127	4	100	10300	169	4	400	46000
3	4	1050	117550	45	4	1550	224500	87	4	500	67400	129	4	3200	432000	171	4	13200	1582750
5	4	800	91600	47	4	39350	5394200	89	4	6550	885000	131	4	0	0	173	4	17650	2516900
7	4	850	127100	49	4	0	0	91	4	600	78950	133	4	150	15600	175	4	8100	1255050
9	4	10450	1540550	51	4	100	11650	93	4	19250	2591650	135	4	200	25700	177	4	10750	1539000
11	4	1200	131100	53	4	200	25550	95	4	3350	375250	137	4	5550	707200	179	4	25700	3966000
13	4	200	23000	55	4	38550	5434550	97	4	9200	1357800	139	4	0	0	181	4	33500	4626050
15	4	0	0	57	4	38700	6215150	99	4	600	69950	141	4	1350	161750	183	4	2000	240850
17	4	150	17200	59	4	2600	318350	101	4	1200	137550	143	4	1250	151750	185	4	24750	3909150
19	4	150	15900	61	4	500	58450	103	4	0	0	145	4	6300	981200	187	4	36000	5096950
21	4	350	34300	63	4	2800	362750	105	4	200	20000	147	4	3450	470450	189	4	16000	2468450
23	4	11900	1602650	65	4	4150	538900	107	4	0	0	149	4	7300	980750	191	4	300	42800
25	4	100	15450	67	4	25150	4558200	109	4	4100	573650	151	4	22000	2870300	193	4	41700	6046300
27	4	8050	1136250	69	4	49950	7234350	111	4	550	54000	153	4	4000	537000	195	4	1050	126950
29	4	6100	850000	71	4	7550	939800	113	4	9700	1429650	155	4	4050	540950	197	4	1850	258650
31	4	150	15500	73	4	200	20200	115	4	800	88600	157	4	38500	5263850	199	4	18200	2436050
33	4	500	74200	75	4	5550	829400	117	4	1300	150550	159	4	6650	881900	201	4	5100	655300
35	4	50	4900	77	4	200	29300	119	4	18450	2765950	161	4	1300	172800	203	4	14950	2102400
37	4	1000	108700	79	4	7000	933800	121	4	250	27050	163	4	1050	141500	205	4	550	53300
39	4	7000	971600	81	4	67650	10972750	123	4	1550	206100	165	4	1050	132500	207	4	200	19750
41	4	1400	170450	83	4	2550	322600	125	4	1250	131450	167	4	0	0	209	4	0	0
Nebraska																			
1	4	123000	18358544	39	4	17500	2407900	77	4	46100	6041100	115	4	4450	555950	151	4	48700	6839000
3	4	141550	20391000	41	4	149300	20228896	79	4	160050	23179992	117	4	3400	410900	153	4	3850	538600
5	4	4300	534800	43	4	6950	998000	81	4	188450	28491448	119	4	61250	8249150	155	4	41300	5505950
7	4	4400	529900	45	4	2900	318800	83	4	50250	7083000	121	4	132900	18352000	157	4	59800	8061400
9	4	4250	509700	47	4	175350	24509744	85	4	21050	2768600	123	4	42450	5516400	159	4	66700	9807850
11	4	101750	13529600	49	4	9250	1370250	87	4	23450	3201400	125	4	43050	5413400	161	4	21250	2535150
13	4	35400	4823300	51	4	12450	1602000	89	4	192050	28196792	127	4	1750	270550	163	4	44100	5753900
15	4	4000	463300	53	4	63900	8599800	91	4	250	28950	129	4	34950	5242500	165	4	11050	1511350
17	4	41850	5389200	55	4	9050	1191600	93	4	78900	10902700	131	4	1750	259700	167	4	21450	2719500
19	4	170800	23275896	57	4	66700	9997800	95	4	32650	4623550	133	4	750	104450	169	4	70400	10419200
21	4	27650	3679300	59	4	122450	18131600	97	4	5950	840300	135	4	92800	14007700	171	4	850	104250
23	4	69750	9662300	61	4	57000	7990450	99	4	143700	21254800	137	4	176200	26270640	173	4	6150	750750
25	4	2650	356000	63	4	50350	7276950	101	4	43750	6385700	139	4	77100	10603400	175	4	52100	6917900
27	4	40750	5407750	65	4	31700	4094950	103	4	3900	467100	141	4	101550	13889600	177	4	13050	1775650
29	4	95400	14495900	67	4	26450	3492100	105	4	4600	474400	143	4	84800	11374400	179	4	11700	1572750
31	4	10750	1171300	69	4	14000	1818200	107	4	23300	2934000	145	4	35500	4719200	181	4	24650	3308000
33	4	11200	1351400	71	4	14700	1798050	109	4	7200	936200	147	4	800	117750	183	4	35650	4542350
35	4	118750	18018000	73	4	48750	7188600	111	4	126750	17749392	149	4	32750	4139000	185	4	169200	24922400
37	4	47250	6484500	75	4	600	66000	113	4	13750	1969000								

TABLE A-3. (CONTINUED)

Sorghum

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Kansas																			
1	4	0	0	43	4	0	0	85	4	0	0	127	4	250	22500	169	4	950	85700
3	4	350	33500	45	4	100	8400	87	4	0	0	129	4	21950	1948800	171	4	16050	1324950
5	4	650	42500	47	4	14000	1292600	89	4	3350	291350	131	4	0	0	173	4	15250	1280900
7	4	1650	143400	49	4	150	12750	91	4	250	23500	133	4	400	31800	175	4	31700	3289300
9	4	11850	1187300	51	4	2100	175750	93	4	11250	917900	135	4	2550	178400	177	4	650	62250
11	4	500	47300	53	4	800	71350	95	4	6250	587800	137	4	1900	185200	179	4	19750	1818000
13	4	150	10550	55	4	31000	3215100	97	4	12450	1016350	139	4	400	34150	181	4	5850	442950
15	4	300	26400	57	4	33450	3715050	99	4	850	69300	141	4	4250	402050	183	4	4600	415300
17	4	250	18700	59	4	1900	197800	101	4	5500	496700	143	4	2400	213900	185	4	19100	1643550
19	4	200	15700	61	4	750	73400	103	4	0	0	145	4	19550	2008100	187	4	27100	2617550
21	4	650	56350	63	4	8100	704450	105	4	1050	101950	147	4	1100	97500	189	4	53000	4705250
23	4	3700	330050	65	4	3900	325950	107	4	200	14150	149	4	1000	93350	191	4	4200	342550
25	4	750	68200	67	4	29550	2864150	109	4	2750	246500	151	4	15500	1515600	193	4	23050	2024450
27	4	1850	168200	69	4	44500	4824800	111	4	300	25650	153	4	6450	529650	195	4	1750	115100
29	4	4300	471300	71	4	8600	721350	113	4	11400	1198150	155	4	12750	1088050	197	4	2200	204750
31	4	200	20100	73	4	200	16000	115	4	2000	160150	157	4	4000	346350	199	4	6900	544150
33	4	1250	112750	75	4	6300	479500	117	4	400	32800	159	4	8150	785100	201	4	4800	452850
35	4	1300	115750	77	4	650	48250	119	4	44300	4441050	161	4	950	96300	203	4	22200	1967850
37	4	1250	102050	79	4	7800	709200	121	4	100	8600	163	4	1200	124350	205	4	1400	114050
39	4	5850	408700	81	4	30800	3425150	123	4	2300	189600	165	4	6950	595250	207	4	50	4200
41	4	1750	155100	83	4	8500	814700	125	4	800	68400	167	4	250	18700	209	4	0	0
Nebraska																			
1	4	8300	803500	39	4	150	12150	77	4	100	7800	115	4	0	0	151	4	10150	1011100
3	4	0	0	41	4	600	43800	79	4	400	33200	117	4	0	0	153	4	0	0
5	4	0	0	43	4	0	0	81	4	8200	802950	119	4	50	4250	155	4	1000	84350
7	4	0	0	45	4	0	0	83	4	3850	332700	121	4	350	29200	157	4	100	6750
9	4	0	0	47	4	450	34700	85	4	550	49000	123	4	100	6000	159	4	10300	953350
11	4	200	17000	49	4	200	11750	87	4	900	80750	125	4	1100	106850	161	4	50	2750
13	4	0	0	51	4	0	0	89	4	350	25500	127	4	150	12000	163	4	600	48600
15	4	150	11000	53	4	1800	134600	91	4	0	0	129	4	4900	511800	165	4	0	0
17	4	0	0	55	4	0	0	93	4	550	43300	131	4	950	87200	167	4	0	0
19	4	1450	104000	57	4	500	43750	95	4	7300	687600	133	4	550	52750	169	4	18000	1746350
21	4	0	0	59	4	14200	1308000	97	4	2800	295350	135	4	300	26500	171	4	0	0
23	4	4550	451300	61	4	5950	584550	99	4	2700	255900	137	4	1000	94500	173	4	0	0
25	4	0	0	63	4	1450	138900	101	4	200	19500	139	4	50	4250	175	4	400	31000
27	4	0	0	65	4	2150	187000	103	4	0	0	141	4	200	17450	177	4	0	0
29	4	300	26500	67	4	10600	936700	105	4	100	6500	143	4	6500	605150	179	4	100	9000
31	4	0	0	69	4	50	2750	107	4	0	0	145	4	1650	158300	181	4	3900	387000
33	4	350	23500	71	4	50	3500	109	4	1950	171900	147	4	0	0	183	4	0	0
35	4	16550	1652050	73	4	2300	203600	111	4	300	28500	149	4	100	7500	185	4	9750	938250
37	4	250	21600	75	4	0	0	113	4	0	0								

TABLE A-3. (CONTINUED)

Soybeans

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Kansas																			
1	4	0	0	43	4	350	12400	85	4	400	15950	127	4	350	12050	169	4	550	20750
3	4	850	44250	45	4	450	18100	87	4	400	16150	129	4	750	28200	171	4	2000	70800
5	4	600	25250	47	4	12100	460450	89	4	1050	41950	131	4	0	0	173	4	9600	455900
7	4	550	23800	49	4	0	0	91	4	0	0	133	4	300	9050	175	4	1650	64150
9	4	5250	219650	51	4	0	0	93	4	1200	47750	135	4	200	6100	177	4	2600	113300
11	4	800	32050	53	4	300	13050	95	4	3300	144050	137	4	650	23250	179	4	7700	304200
13	4	1100	45850	55	4	8150	310200	97	4	9400	420100	139	4	650	26450	181	4	9200	309600
15	4	200	7600	57	4	9150	368850	99	4	1800	67600	141	4	1550	57800	183	4	800	31800
17	4	100	4250	59	4	2100	74200	101	4	2850	104950	143	4	2350	82650	185	4	14550	649700
19	4	100	3650	61	4	550	24500	103	4	0	0	145	4	9250	391550	187	4	3250	130650
21	4	1200	43500	63	4	1400	44650	105	4	0	0	147	4	250	11250	189	4	2850	110450
23	4	4050	146250	65	4	450	18800	107	4	0	0	149	4	500	27000	191	4	650	24800
25	4	400	15600	67	4	8500	333950	109	4	350	12200	151	4	20850	952150	193	4	8600	305750
27	4	3800	174100	69	4	8900	395650	111	4	150	6250	153	4	700	25600	195	4	200	6450
29	4	1900	82350	71	4	350	11950	113	4	3500	187150	155	4	3950	160300	197	4	700	34600
31	4	100	4500	73	4	50	1750	115	4	0	0	157	4	9850	426850	199	4	2350	81050
33	4	500	22200	75	4	600	23450	117	4	300	13000	159	4	6900	325750	201	4	3200	150350
35	4	100	4000	77	4	100	4650	119	4	5300	196400	161	4	500	20550	203	4	2150	68900
37	4	1200	39650	79	4	5450	268750	121	4	350	12850	163	4	50	1500	205	4	1500	50500
39	4	0	0	81	4	8750	337500	123	4	1050	35700	165	4	950	42600	207	4	200	6250
41	4	700	29850	83	4	1100	38550	125	4	350	13300	167	4	0	0	209	4	0	0
Nebraska																			
1	4	14700	649600	39	4	4350	182250	77	4	4650	184250	115	4	500	19500	151	4	8250	330750
3	4	22750	875350	41	4	7450	297550	79	4	12800	561100	117	4	0	0	153	4	900	34250
5	4	0	0	43	4	2650	103750	81	4	30150	1317000	119	4	12750	466650	155	4	14800	619200
7	4	0	0	45	4	0	0	83	4	5900	260600	121	4	12700	425750	157	4	50	1950
9	4	0	0	47	4	10450	397600	85	4	7550	287000	123	4	0	0	159	4	17250	787950
11	4	5100	175750	49	4	200	6400	87	4	1800	71900	125	4	4200	158400	161	4	0	0
13	4	0	0	51	4	2850	104850	89	4	9050	353100	127	4	1050	42650	163	4	2850	109750
15	4	300	11400	53	4	17450	615800	91	4	0	0	129	4	12350	524700	165	4	0	0
17	4	950	35650	55	4	1900	65700	93	4	3900	140750	131	4	750	31150	167	4	4800	166400
19	4	24400	1134150	57	4	1750	67200	95	4	10000	374500	133	4	200	8000	169	4	15500	698450
21	4	7900	328850	59	4	27350	1145600	97	4	1950	72300	135	4	2950	114850	171	4	0	0
23	4	16200	671700	61	4	8500	358950	99	4	16300	741700	137	4	13750	602150	173	4	1700	66000
25	4	900	37800	63	4	9450	396350	101	4	2300	87400	139	4	17550	697300	175	4	8600	378000
27	4	12300	479800	65	4	5950	252700	103	4	600	24000	141	4	24650	938050	177	4	6750	261700
29	4	1950	78600	67	4	4800	199150	105	4	0	0	143	4	15700	644100	179	4	1550	62850
31	4	0	0	69	4	100	3900	107	4	2600	95650	145	4	3550	145300	181	4	3200	134050
33	4	0	0	71	4	1000	39000	109	4	1300	43100	147	4	900	35100	183	4	1300	50600
35	4	27500	1221500	73	4	5150	229500	111	4	4050	165200	149	4	3250	125550	185	4	19800	857850
37	4	14800	508050	75	4	0	0	113	4	200	7800								

TABLE A-3. (CONTINUED)

All Wheat

County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)	County	Years sampled	Acres	Production (bushels)
Kansas																			
1	3	0	0	43	3	0	0	85	3	0	0	127	3	0	0	169	3	0	0
3	3	0	0	45	3	0	0	87	3	0	0	129	3	22800	1332200	171	3	16000	926600
5	3	0	0	47	3	13400	624800	89	3	600	25000	131	3	0	0	173	3	4200	184000
7	3	400	19200	49	3	0	0	91	3	0	0	133	3	0	0	175	3	39600	2100800
9	3	6400	289500	51	3	700	38700	93	3	21500	1065100	135	3	3100	157200	177	3	0	0
11	3	0	0	53	3	600	34000	95	3	2300	106400	137	3	900	47700	179	3	6000	312700
13	3	0	0	55	3	66000	3507400	97	3	12500	529300	139	3	0	0	181	3	29600	1569000
15	3	0	0	57	3	25400	1200800	99	3	0	0	141	3	800	38700	183	3	900	41300
17	3	0	0	59	3	0	0	101	3	7700	402900	143	3	600	27000	185	3	23000	1132700
19	3	0	0	61	3	0	0	103	3	0	0	145	3	15200	702600	187	3	58700	3074800
21	3	0	0	63	3	5000	228500	105	3	700	29800	147	3	200	9100	189	3	49000	2991400
23	3	8100	372000	65	3	6600	297700	107	3	0	0	149	3	0	0	191	3	1700	85400
25	3	2000	83600	67	3	50300	2858200	109	3	900	53300	151	3	16700	811700	193	3	21000	840800
27	3	300	11100	69	3	55600	2963100	111	3	0	0	153	3	2400	127700	195	3	500	25000
29	3	1500	67300	71	3	7000	461300	113	3	900	44700	155	3	3300	140000	197	3	0	0
31	3	0	0	73	3	0	0	115	3	0	0	157	3	700	31300	199	3	17700	967400
33	3	1700	74800	75	3	9900	573700	117	3	0	0	159	3	1600	81900	201	3	2300	102800
35	3	0	0	77	3	700	31300	119	3	36500	1811200	161	3	0	0	203	3	35000	2268500
37	3	0	0	79	3	700	31300	121	3	0	0	163	3	0	0	205	3	0	0
39	3	1200	57400	81	3	81900	4879800	123	3	100	3700	165	3	3100	149300	207	3	0	0
41	3	0	0	83	3	5500	277100	125	3	0	0	167	3	0	0	209	3	0	0
Nebraska																			
1	4	600	33850	39	4	0	0	77	4	100	4550	115	4	100	4750	151	4	300	11300
3	4	0	0	41	4	1100	47600	79	4	950	40500	117	4	100	4500	153	4	0	0
5	4	150	6950	43	4	0	0	81	4	400	17700	119	4	100	4000	155	4	150	5900
7	4	1300	73300	45	4	1600	90300	83	4	500	27100	121	4	200	8300	157	4	1050	62300
9	4	100	4500	47	4	1200	52950	85	4	1500	91500	123	4	750	43600	159	4	100	4250
11	4	800	30950	49	4	2850	167300	87	4	1350	78300	125	4	350	14200	161	4	2850	141300
13	4	7700	493100	51	4	0	0	89	4	350	15700	127	4	0	0	163	4	450	19500
15	4	150	6700	53	4	100	4250	91	4	0	0	129	4	1650	66000	165	4	600	32550
17	4	150	6800	55	4	50	2050	93	4	250	10900	131	4	0	0	167	4	0	0
19	4	2000	86300	57	4	7300	434950	95	4	350	16400	133	4	0	0	169	4	550	20900
21	4	100	3800	59	4	600	26750	97	4	0	0	135	4	9300	557750	171	4	0	0
23	4	100	4400	61	4	1100	58150	99	4	800	43600	137	4	800	42700	173	4	0	0
25	4	50	1750	63	4	1000	58950	101	4	7450	458650	139	4	100	3950	175	4	200	9500
27	4	0	0	65	4	1800	93500	103	4	400	19400	141	4	250	11200	177	4	0	0
29	4	6750	444750	67	4	500	25100	105	4	3000	172400	143	4	450	17550	179	4	0	0
31	4	400	17600	69	4	1000	60800	107	4	0	0	145	4	2100	113400	181	4	650	36700
33	4	6700	380900	71	4	150	7150	109	4	400	18200	147	4	100	3400	183	4	0	0
35	4	250	9450	73	4	600	31800	111	4	3450	195350	149	4	1200	54200	185	4	100	4450
37	4	50	2200	75	4	0	0	113	4	650	29100								

TABLE A-4. MEDIAN VALUES FOR LIVESTOCK FOR 1984–1987 BY STATE AND COUNTY (PATTON 1989b)

Iowa

County	Total cattle	Years sampled	Total hogs	Years sampled	County	Total cattle	Years sampled	Total hogs	Years sampled	County	Total cattle	Years sampled	Total hogs	Years sampled	County	Total cattle	Years sampled	Total hogs	Years sampled	County	Total cattle	Years sampled	Total hogs	Years sampled
1	80000	4	106000	4	41	35500	4	127000	4	81	29400	4	163500	4	121	62000	4	82000	4	161	73000	4	225000	4
3	41650	4	80500	4	43	110000	4	260500	4	83	56000	4	209000	4	123	68500	4	257000	4	163	34250	4	150500	4
5	99500	4	128500	4	45	87000	4	193500	4	85	42400	4	75000	4	125	50000	4	130000	4	165	79000	4	179000	4
7	46000	4	27000	4	47	94500	4	188000	4	87	25300	4	116000	4	127	39250	4	114500	4	167	162000	4	428000	4
9	62500	4	152000	4	49	33500	4	81000	4	89	45900	4	88000	4	129	35200	4	51500	4	169	24300	4	110500	4
11	67000	4	167000	4	51	48500	4	51500	4	91	18800	4	92500	4	131	41550	4	138000	4	171	65500	4	139000	4
13	33200	4	128000	4	53	52500	4	48000	4	93	77500	4	117000	4	133	55000	4	75000	4	173	49000	4	68500	4
15	28600	4	112500	4	55	68500	4	427500	4	95	70500	4	190000	4	135	55000	4	54000	4	175	60000	4	54000	4
17	34800	4	93500	4	57	25350	4	64000	4	97	85000	4	119000	4	137	42850	4	66500	4	177	35200	4	62000	4
19	47000	4	210000	4	59	34850	4	77000	4	99	71000	4	247000	4	139	29150	4	102000	4	179	33150	4	60000	4
21	39450	4	229000	4	61	109000	4	290000	4	101	31850	4	90500	4	141	78000	4	203000	4	181	49500	4	93000	4
23	35300	4	179000	4	63	27250	4	70500	4	103	55000	4	231500	4	143	33850	4	105000	4	183	43950	4	316000	4
25	32550	4	124500	4	65	86000	4	228000	4	105	65000	4	206500	4	145	52250	4	108000	4	185	62000	4	47500	4
27	109000	4	237000	4	67	26600	4	95000	4	107	51500	4	245500	4	147	26800	4	139500	4	187	16250	4	105500	4
29	61500	4	103000	4	69	34900	4	164000	4	109	53250	4	227500	4	149	95000	4	400500	4	189	10300	4	66000	4
31	40850	4	199000	4	71	34050	4	43500	4	111	38100	4	121000	4	151	32050	4	119000	4	191	125500	4	168000	4
33	19550	4	149500	4	73	35550	4	102000	4	113	40400	4	103500	4	153	16000	4	40000	4	193	126000	4	185000	4
35	94000	4	197000	4	75	34700	4	142000	4	115	18900	4	76500	4	155	105000	4	139000	4	195	10600	4	70500	4
37	42650	4	123000	4	77	65000	4	80500	4	117	40250	4	36000	4	157	76500	4	140000	4	197	16500	4	94500	4
39	42000	4	43000	4	79	21150	4	187500	4	119	85500	4	216000	4	159	70550	4	54000	4					

Kansas

1	35100	4	8000	4	45	33700	4	11000	4	87	39750	4	18050	4	129	16650	4	500	4	171	147500	4	18250	4
3	44100	4	12200	4	47	55450	4	1600	4	89	49250	4	44550	4	131	68000	4	70400	4	173	49500	4	16200	4
5	35750	4	20700	4	49	49600	4	12650	4	91	20700	4	7350	4	133	53050	4	22950	4	175	83100	4	80750	4
7	84900	4	1650	4	51	64050	4	3700	4	93	79700	4	2400	4	135	48200	4	1400	4	177	24300	4	5750	4
9	87300	4	5450	4	53	38900	4	6050	4	95	52550	4	9600	4	137	44500	4	13500	4	179	58400	4	8900	4
11	45650	4	10050	4	55	153000	4	4800	4	97	35600	4	4100	4	139	45150	4	12000	4	181	42450	4	5300	4
13	46750	4	35500	4	57	144000	4	4800	4	99	54750	4	16450	4	141	56300	4	7750	4	183	68600	4	24700	4
15	119000	4	34750	4	59	45500	4	19300	4	101	66600	4	3200	4	143	45300	4	5250	4	185	60900	4	2900	4
17	34000	4	7750	4	61	21200	4	19150	4	103	36150	4	17150	4	145	57850	4	8200	4	187	41250	4	650	4
19	43750	4	5800	4	63	92450	4	8950	4	105	47000	4	5050	4	147	69100	4	33200	4	189	42500	4	2700	4
21	24450	4	6300	4	65	47150	4	3250	4	107	40650	4	17700	4	149	69600	4	34700	4	191	51050	4	22250	4
23	53250	4	7150	4	67	83300	4	3450	4	109	29500	4	2500	4	151	56350	4	21600	4	193	43400	4	6300	4
25	72400	4	200	4	69	114500	4	4400	4	111	68850	4	14500	4	153	49500	4	8450	4	195	41900	4	3700	4
27	43200	4	30250	4	71	41950	4	2100	4	113	60650	4	23150	4	155	77000	4	31950	4	197	61300	4	15950	4
29	38150	4	14200	4	73	70850	4	6200	4	115	69200	4	29700	4	157	61650	4	24550	4	199	35050	4	2000	4
31	38450	4	7300	4	75	42000	4	1300	4	117	54000	4	51900	4	159	55100	4	19650	4	201	67350	4	76500	4
33	50200	4	1950	4	77	71550	4	3800	4	119	45950	4	27600	4	161	36800	4	25900	4	203	113500	4	5500	4
35	80700	4	31150	4	79	37000	4	23600	4	121	43250	4	14150	4	163	43100	4	6100	4	205	35550	4	14450	4
37	41700	4	6700	4	81	141500	4	8550	4	123	47200	4	22100	4	165	29600	4	1550	4	207	37850	4	4350	4
39	69500	4	11050	4	83	69850	4	1650	4	125	37050	4	19500	4	167	37150	4	4300	4	209	4350	4	1000	4
41	83450	4	20400	4	85	50250	4	17500	4	127	62800	4	24050	4	169	40350	4	21450	4					
43	24200	4	23500	4																				

TABLE A-4. (CONTINUED)

County	Total cattle	Years sampled	Total hogs	Years sampled	County	Total cattle	Years sampled	Total hogs	Years sampled	County	Total cattle	Years sampled	Total hogs	Years sampled	County	Total cattle	Years sampled	Total hogs	Years sampled	County	Total cattle	Years sampled	Total hogs	Years sampled
Missouri																								
1	40600	4	13500	4	47	32750	4	11600	4	93	12250	4	1200	4	139	25350	4	60900	4	185	47400	4	17800	4
3	34200	4	38950	4	49	39250	4	45950	4	95	26250	4	12550	4	141	41000	4	37300	4	186	29800	4	37250	4
5	31050	4	32050	4	51	39000	4	19000	4	97	63900	4	10050	4	143	3050	4	4550	4	187	26800	4	5150	4
7	48150	4	85250	4	53	56000	4	65050	4	99	19200	4	4350	4	145	79300	4	7450	4	189	3100	4	1000	4
9	96200	4	13000	4	55	31650	4	8450	4	101	79850	4	45800	4	147	91550	4	98600	4	195	49500	4	70100	4
11	50400	4	17250	4	57	62800	4	18800	4	103	38100	4	35300	4	149	56200	4	28250	4	197	25900	4	13650	4
13	80350	4	23700	4	59	61000	4	6500	4	105	77500	4	9200	4	151	64000	4	83300	4	199	28050	4	35300	4
15	49000	4	22750	4	61	33050	4	36000	4	107	55600	4	110650	4	153	60150	4	8000	4	201	13600	4	11550	4
17	30300	4	24350	4	63	38400	4	41900	4	109	121300	4	12700	4	155	2750	4	400	4	203	20600	4	3950	4
19	41000	4	27000	4	65	37500	4	5650	4	111	33000	4	46150	4	157	41000	4	51050	4	205	30900	4	75150	4
21	20950	4	18750	4	67	70250	4	6600	4	113	36050	4	106050	4	159	56500	4	69900	4	207	14150	4	14650	4
23	10450	4	6600	4	69	1900	4	2300	4	115	49850	4	40650	4	161	40000	4	7550	4	209	50100	4	3700	4
25	33300	4	29250	4	71	54200	4	70250	4	117	24950	4	22700	4	163	44200	4	105400	4	211	58900	4	17300	4
27	49000	4	29250	4	73	29800	4	32450	4	119	58100	4	41000	4	165	20950	4	12600	4	213	28350	4	2800	4
29	26000	4	5050	4	75	42350	4	48100	4	121	50350	4	45100	4	167	105000	4	13700	4	215	96250	4	10250	4
31	45300	4	39700	4	77	110900	4	7800	4	123	19750	4	12200	4	169	30000	4	5450	4	217	62300	4	24750	4
33	41300	4	64550	4	79	26150	4	27650	4	125	43500	4	21550	4	171	49150	4	10750	4	219	16100	4	49300	4
35	7450	4	3700	4	81	60700	4	41700	4	127	28600	4	39600	4	173	24100	4	37350	4	221	20150	4	6050	4
37	57150	4	26500	4	83	63350	4	30400	4	129	34700	4	16650	4	175	25150	4	24200	4	223	13650	4	7100	4
39	42750	4	12850	4	85	32000	4	8600	4	131	47500	4	36950	4	177	41800	4	28750	4	225	86500	4	10400	4
41	48000	4	63300	4	87	15000	4	23400	4	133	3800	4	15250	4	179	12850	4	7850	4	227	29700	4	17400	4
43	76250	4	6250	4	89	33500	4	29850	4	135	59000	4	47500	4	181	18200	4	7500	4	229	86300	4	7300	4
45	23800	4	34300	4	91	100750	4	22800	4	137	41100	4	76200	4	183	16800	4	42750	4					
Nebraska																								
1	80000	3	36000	3	39	175000	3	195000	3	77	57000	3	23000	3	115	29000	3	5500	3	151	33000	3	45000	3
3	90000	3	75000	3	41	210000	3	47000	3	79	80000	3	40000	3	117	38000	3	4300	3	153	63000	3	14000	3
5	35000	3	500	3	43	17000	3	20000	3	81	37000	3	40000	3	119	58000	3	65000	3	155	85000	3	67000	3
7	24000	3	2500	3	45	52000	3	4000	3	83	48000	3	18000	3	121	54000	3	35000	3	157	140000	3	17000	3
9	38000	3	8500	3	47	205000	3	92000	3	85	50000	3	12000	3	123	75000	3	4900	3	159	52000	3	58000	3
11	74000	3	73000	3	49	19000	3	5500	3	87	40000	3	23000	3	125	37000	3	26000	3	161	135000	3	13000	3
13	66000	3	4400	3	51	50000	3	65000	3	89	200000	3	120000	3	127	23000	3	42000	3	163	50000	3	29000	3
15	41000	3	31000	3	53	62000	3	95000	3	91	18000	3	2000	3	129	38000	3	47000	3	165	80000	3	2200	3
17	75000	3	13500	3	55	27000	3	8000	3	93	65000	3	45000	3	131	33000	3	49000	3	167	68000	3	64000	3
19	105000	3	47000	3	57	65000	3	17000	3	95	42000	3	40000	3	133	25000	3	34000	3	169	42000	3	36000	3
21	54000	3	73000	3	59	45000	3	67000	3	97	24000	3	33000	3	135	22000	3	7000	3	171	24000	3	1100	3
23	42000	3	40000	3	61	45000	3	22000	3	99	60000	3	24000	3	137	78000	3	38000	3	173	34000	3	45000	3
25	28000	3	34000	3	63	53000	3	18000	3	101	70000	3	3000	3	139	72000	3	82000	3	175	68000	3	47000	3
27	80000	3	135000	3	65	53000	3	14000	3	103	49000	3	11000	3	141	60000	3	123000	3	177	38000	3	72000	3
29	58000	3	19000	3	67	52000	3	98000	3	105	22000	3	3100	3	143	78000	3	48000	3	179	62000	3	65000	3
31	355000	3	5500	3	69	90000	3	3000	3	107	115000	3	140000	3	145	60000	3	20000	3	181	52000	3	13000	3
33	55000	3	19000	3	71	35000	3	6600	3	109	38000	3	41000	3	147	32000	3	39000	3	183	150000	3	8000	3
35	67000	3	170000	3	73	34000	3	15000	3	111	170000	3	28000	3	149	67000	3	3400	3	185	42000	3	65000	3
37	49000	3	70000	3	75	50000	3	300	3	113	36000	3	6000	3										

APPENDIX B

Table B-1. Areas of counties in Iowa, Kansas, Missouri, and Nebraska

FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)
Iowa											
1	1,465.013	565.642	51	1,299.902	501.893	101	1,148.015	443.249	151	1,498.346	578.512
3	1,089.023	420.472	53	1,379.789	532.737	103	1,581.706	610.697	153	1,541.696	595.250
5	1,727.132	666.846	55	1,503.127	580.358	105	1,513.320	584.293	155	2,470.165	953.732
7	1,338.422	516.765	57	1,099.293	424.438	107	1,520.879	587.212	157	1,516.671	585.587
9	1,138.563	439.600	59	1,060.833	409.588	109	2,534.594	978.608	159	1,442.922	557.113
11	1,877.859	725.042	61	1,635.844	631.600	111	1,362.187	525.941	161	1,510.561	583.228
13	1,490.314	575.411	63	1,033.111	398.884	113	1,888.064	728.982	163	1,201.632	463.951
15	1,492.738	576.347	65	1,914.618	739.235	115	1,069.903	413.090	165	1,499.417	578.925
17	1,180.048	455.617	67	1,285.618	496.378	117	1,119.354	432.183	167	1,968.643	760.094
19	1,494.435	577.002	69	1,534.549	592.490	119	1,482.410	572.359	169	1,479.156	571.103
21	1,536.847	593.377	71	1,302.855	503.033	121	1,430.542	552.333	171	1,872.310	722.899
23	1,536.050	593.069	73	1,505.833	581.403	123	1,491.913	576.028	173	1,374.561	530.719
25	1,474.333	569.240	75	1,287.557	497.126	125	1,490.063	575.314	175	1,119.225	432.133
27	1,466.967	566.397	77	1,517.160	585.776	127	1,467.651	566.661	177	1,298.927	501.516
29	1,451.525	560.434	79	1,493.989	576.830	129	1,117.040	431.290	179	1,107.882	427.754
31	1,519.311	586.607	81	1,477.516	570.470	131	1,212.013	467.959	181	1,501.885	579.879
33	1,471.106	567.994	83	1,465.841	565.962	133	1,813.604	700.233	183	1,486.460	573.923
35	1,498.933	578.739	85	1,776.914	686.067	135	1,111.373	429.102	185	1,384.921	534.719
37	1,293.055	499.249	87	1,112.908	429.694	137	1,089.234	420.554	187	1,908.628	736.922
39	1,107.013	427.418	89	1,222.211	471.896	139	1,166.643	450.441	189	1,057.192	408.182
41	1,472.618	568.578	91	1,139.022	439.777	141	1,448.895	559.419	191	1,756.199	678.069
43	2,079.326	802.829	93	1,118.529	431.864	143	1,028.660	397.166	193	2,285.633	882.484
45	1,847.178	713.196	95	1,510.899	583.359	145	1,418.213	547.572	195	1,055.168	407.401
47	1,858.896	717.720	97	1,668.830	644.336	147	1,424.723	550.086	197	1,547.667	597.555
49	1,530.842	591.059	99	1,886.329	728.312	149	2,232.584	862.002			
									Total area	145,720.074	56,262.577
Kansas											
1	1,309.102	505.445	41	2,209.392	853.047	81	1,483.860	572.919	121	1,482.519	572.401
3	1,516.752	585.619	43	1,007.011	388.807	83	2,196.257	847.976	123	1,871.791	722.699
5	1,115.266	430.605	45	1,243.584	480.148	85	1,698.903	655.947	125	1,647.252	636.005
7	2,905.882	1,121.962	47	1,589.762	613.808	87	1,440.932	556.344	127	1,809.208	698.536
9	2,324.284	897.407	49	1,671.460	645.351	89	2,403.771	928.097	129	1,893.515	731.087
11	1,579.282	609.761	51	2,366.480	913.699	91	1,218.892	470.615	131	1,882.109	726.683
13	1,489.560	575.120	53	1,842.056	711.218	93	2,246.999	867.567	133	1,504.315	580.817
15	3,763.512	1,453.093	55	3,343.302	1,290.850	95	2,212.591	854.282	135	2,824.670	1,090.606
17	1,976.291	763.047	57	2,836.883	1,095.322	97	1,890.554	729.944	137	2,329.944	899.592
19	1,629.715	629.234	59	1,483.427	572.752	99	1,687.296	651.466	139	1,851.184	714.743
21	1,481.594	572.044	61	1,064.580	411.035	101	1,857.587	717.215	141	2,292.614	885.179
23	2,661.863	1,027.746	63	2,757.885	1,064.820	103	1,179.008	455.215	143	1,886.851	728.514
25	2,542.916	981.821	65	2,321.212	896.221	105	1,890.967	730.103	145	1,936.752	747.781
27	1,719.282	663.816	67	1,464.221	565.336	107	1,570.536	606.385	147	2,361.984	911.963
29	1,847.231	713.217	69	2,226.082	859.491	109	2,773.856	1,070.987	149	2,213.876	854.778
31	1,701.005	656.759	71	2,053.957	793.034	111	2,228.213	860.314	151	1,891.894	730.461
33	2,055.602	793.669	73	2,959.853	1,142.800	113	2,333.568	900.991	153	2,775.517	1,071.628
35	2,909.714	1,123.442	75	2,595.753	1,002.221	115	2,434.817	940.084	155	3,317.374	1,280.839
37	1,572.352	607.086	77	2,060.020	795.375	117	2,326.413	898.229	157	1,885.183	727.870
39	2,312.720	892.942	79	1,386.050	535.154	119	2,523.324	974.256	159	1,879.119	725.529

Table B-1. (continued)

FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)
Kansas (continued)											
161	1,597.647	616.852	175	1,673.530	646.151	189	1,871.905	722.743	203	1,881.032	726.267
163	2,311.452	892.452	177	1,455.680	562.038	191	3,077.172	1,188.097	205	1,472.609	568.575
165	1,889.139	729.397	179	2,307.600	890.965	193	2,799.169	1,080.760	207	1,316.173	508.175
167	2,313.472	893.233	181	2,772.718	1,070.548	195	2,330.156	899.674	209	401.706	155.099
169	1,932.926	746.303	183	2,326.736	898.354	197	2,066.529	797.888			
171	1,888.319	729.081	185	2,055.368	793.578	199	2,393.959	924.308	Total area	212,879.939	82,193.027
173	2,633.890	1,016.946	187	1,769.932	683.371	201	2,308.213	891.202			
Missouri											
1	1,466.033	566.036	61	1,484.256	573.072	119	1,435.276	554.161	177	1,492.250	576.158
3	1,147.231	442.946	63	1,160.287	447.987	121	2,115.797	816.910	179	2,116.431	817.155
5	1,391.873	537.403	65	1,942.675	750.067	123	1,307.323	504.758	181	1,689.865	652.457
7	1,785.420	689.351	67	2,114.405	816.373	125	1,340.582	517.599	183	1,519.626	586.728
9	2,065.133	797.349	69	1,379.400	532.587	127	1,147.674	443.117	185	1,826.597	705.250
11	1,535.117	592.709	71	2,416.042	932.835	129	1,207.718	466.300	186	1,293.649	499.478
13	2,186.926	844.373	73	1,373.389	530.266	131	1,554.593	600.229	187	1,184.163	457.206
15	1,954.513	754.638	75	1,282.368	495.123	133	1,157.186	446.790	189	1,362.231	525.958
17	1,600.284	617.870	77	1,733.819	669.428	135	1,094.196	422.469	195	1,981.623	765.105
19	1,819.106	702.357	79	1,148.553	443.457	137	1,722.986	665.245	197	802.866	309.987
21	1,023.736	395.265	81	1,874.663	723.808	139	1,416.106	546.759	199	1,149.781	443.931
23	1,818.371	702.074	83	1,905.226	735.608	141	1,606.654	620.330	201	1,115.973	430.878
25	1,099.927	424.682	85	1,092.299	421.737	143	1,813.000	700.000	203	2,618.700	1,011.081
27	2,175.526	839.972	87	1,175.527	453.871	145	1,638.399	632.586	205	1,278.466	493.616
29	1,847.718	713.405	89	1,240.563	478.982	147	2,271.015	876.840	207	2,157.902	833.167
31	1,522.961	588.016	91	2,411.851	931.217	149	2,104.213	812.437	209	1,341.625	518.002
33	1,811.370	699.370	93	1,424.632	550.051	151	1,569.356	605.929	211	1,674.779	646.633
35	1,332.258	514.385	95	1,612.004	622.395	153	2,018.724	779.430	213	1,747.986	674.898
37	1,825.638	704.879	97	1,618.439	624.880	155	1,353.830	522.714	215	3,014.357	1,163.844
39	1,262.983	487.638	99	1,699.763	656.279	157	1,238.496	478.184	217	2,147.051	828.977
41	1,983.283	765.746	101	2,137.379	825.243	159	1,778.592	686.715	219	1,147.599	443.088
43	1,495.136	577.273	103	1,313.325	507.075	161	1,749.010	675.293	221	2,015.383	778.140
45	1,308.333	505.148	105	1,977.332	763.449	163	1,779.727	687.153	223	2,013.689	777.486
47	1,062.109	410.081	107	1,666.516	643.443	165	1,086.097	419.343	225	1,549.749	598.359
49	1,085.246	419.014	109	1,570.648	606.428	167	1,681.153	649.094	227	693.439	267.737
51	1,035.793	399.920	111	1,325.874	511.921	169	1,403.570	541.919	229	1,779.594	687.102
53	1,464.376	565.396	113	1,663.972	642.460	171	1,360.175	525.164	510	189.342	73.105
55	1,933.218	746.416	115	1,619.912	625.449	173	1,240.789	479.069			
57	1,321.600	510.270	117	1,387.146	535.578	175	1,272.467	491.300	Total area	180,887.041	69,840.557
59	1,404.140	542.139									

Table B-1. (continued)

FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)	FIPS code	Area (km^2)	Area ($miles^2$)
Nebraska											
1	1,516.468	585.509	49	1,148.021	443.251	97	993.631	383.641	145	1,806.660	697.552
3	2,186.287	844.126	51	1,272.264	491.222	99	1,337.423	516.380	147	1,483.841	572.912
5	1,863.080	719.336	53	1,401.751	541.217	101	2,873.393	1,109.418	149	2,605.106	1,005.832
7	1,953.384	754.202	55	890.622	343.869	103	2,009.508	775.872	151	1,528.441	590.132
9	1,839.873	710.376	57	2,358.490	910.614	105	2,453.843	947.430	153	619.474	239.179
11	1,757.726	678.659	59	1,514.343	584.688	107	2,979.759	1,150.486	155	1,972.905	761.739
13	2,803.325	1,082.365	61	1,472.476	568.524	109	2,186.112	844.059	157	1,885.548	728.011
15	1,403.708	541.972	63	2,564.548	990.173	111	6,683.760	2,580.602	159	1,476.268	569.988
17	3,178.558	1,227.242	65	1,800.207	695.061	113	1,456.592	562.391	161	6,394.183	2,468.797
19	2,496.408	963.864	67	2,272.356	877.358	115	1,468.391	566.946	163	1,474.685	569.376
21	1,252.249	483.494	69	4,450.085	1,718.179	117	2,242.288	865.748	165	5,443.420	2,101.707
23	1,535.011	592.668	71	1,480.158	571.489	119	1,499.259	578.865	167	1,100.267	424.813
25	1,422.139	549.088	73	1,227.032	473.758	121	1,265.361	488.556	169	1,485.417	573.520
27	1,936.136	747.543	75	1,988.445	767.739	123	3,705.901	1,430.850	171	1,822.291	703.587
29	2,353.335	908.624	77	1,499.673	579.024	125	1,155.212	446.028	173	1,007.086	388.836
31	15,557.252	6,006.661	79	1,422.282	549.144	127	1,054.307	407.068	175	1,449.558	559.675
33	3,091.826	1,193.755	81	1,402.233	541.403	129	1,464.117	565.296	177	1,004.200	387.722
35	1,528.674	590.222	83	1,453.997	561.389	131	1,589.294	613.627	179	1,120.714	432.708
37	1,073.314	414.407	85	1,905.217	735.605	133	1,140.471	440.336	181	1,485.866	573.694
39	1,510.747	583.300	87	1,833.566	707.941	135	2,271.627	877.076	183	1,476.513	570.082
41	6,704.672	2,588.677	89	6,298.509	2,431.857	137	1,438.870	555.548	185	1,466.723	566.302
43	675.085	260.651	91	1,863.920	719.660	139	1,512.304	583.901			
45	3,620.632	1,397.927	93	1,512.137	583.837	141	1,791.490	691.695	Total area	200,281.493	77,328.762
47	2,654.837	1,025.034	95	1,497.299	578.108	143	1,155.055	445.967			

Table B-2. Areas of Major Land Resource Areas located within the Iowa-Kansas-Missouri-Nebraska study region (U.S. Department of Agriculture/Soil Conservation Service 1981)

MLRA region number	Area (km^2)	Area ($miles^2$)
60	1,254.900	484.517
63	3,688.213	1,424.020
64	13,430.205	5,185.407
65	49,492.353	19,109.016
66	6,930.297	2,675.790
67	10,670.924	4,120.048
71	20,441.672	7,892.537
72	60,241.077	23,259.103
73	61,461.447	23,730.288
74	10,664.132	4,117.426
75	38,536.780	14,879.066
76	19,371.955	7,479.519
77	5,400.159	2,085.004
78	8,491.509	3,278.575
79	8,153.440	3,148.046
80	10,805.258	4,171.914
84	2,162.950	835.116
02	1,364.200	526.718
102	22,859.217	8,825.952
103	30,878.591	11,922.236
104	18,744.576	7,237.288
105	9,897.203	3,821.314
106	26,892.992	10,383.395
107	52,697.019	20,346.339
108	39,037.606	15,072.435
109	36,859.982	14,231.653
112	39,581.116	15,282.284
113	12,846.868	4,960.181
115	24,910.217	9,617.844
116	81,044.358	31,291.258
131	2,558.063	987.669
131	7,315.736	2,824.608
134	1,133.801	437.761
Total Area	739,818.815	285,644.330

Table B-3. Areas of Subregion and Cataloging Hydrologic Units located within the Iowa-Kansas-Missouri-Nebraska study region (Perlman 1989)

Cataloging Unit	Area (km^2)	Area ($miles^2$)
Subregion 0702		
07020009	1,723.056	665.273
Subregion 0704		
07040008	19.208	7.416
Subregion 0706		
07060001	1,694.106	654.095
07060002	2,053.018	792.671
07060003	1,012.152	390.792
07060004	4,273.921	1,650.162
07060005	956.165	369.176
07060006	5,078.421	1,960.780
Subregion 0708		
07080101	1,174.006	453.284
07080102	4,056.572	1,566.244
07080103	2,409.712	930.391
07080104	1,555.840	600.711
07080105	4,637.131	1,790.398
07080106	2,335.920	901.899
07080107	4,369.397	1,687.026
07080201	2,655.089	1,025.131
07080202	2,260.556	872.801
07080203	1,027.332	396.653
07080204	2,135.347	824.458
07080205	6,264.542	2,418.742
07080206	2,727.460	1,053.073
07080207	3,668.192	1,416.291
07080208	4,309.347	1,663.840
07080209	4,279.354	1,652.260
Subregion 0710		
07100002	2,498.118	964.525
07100003	2,866.690	1,106.830
07100004	4,476.374	1,728.330
07100005	2,605.053	1,005.812
07100006	6,391.085	2,467.601
07100007	2,848.162	1,099.677
07100008	6,192.793	2,391.040
07100009	5,353.254	2,066.893
Subregion 0711		
07110001	3,000.855	1,158.631
07110002	2,396.473	925.279
07110003	1,644.930	635.108
07110004	2,705.296	1,044.516
07110005	2,410.054	930.523
07110006	3,026.204	1,168.419
07110007	2,061.780	796.054
07110008	3,298.890	1,273.703
07110009	977.923	377.576
Subregion 0714		
07140101	2,085.513	805.217
07140102	5,716.787	2,207.254
07140103	2,415.694	932.700
07140104	2,200.868	849.756
07140105	2,559.807	988.343
07140107	2,965.603	1,145.020
07140204	0.073	0.028
Subregion 1012		
10120106	36.389	14.050
10120108	1,172.076	452.539
Subregion 1014		
10140201	4,205.261	1,623.653
10140203	70.232	27.117
Subregion 1015		
10150001	1,053.602	406.796
10150002	2,578.149	995.424
10150003	10,419.407	4,022.937
10150004	8,730.035	3,370.670
10150005	2,348.244	906.658
10150006	1,634.080	630.919
10150007	3,918.045	1,512.759
Subregion 1017		
10170101	4,698.149	1,813.957
10170203	1,581.058	610.448
10170204	2,163.294	835.249
Subregion 1018		
10180009	9,628.917	3,717.729
10180012	343.767	132.729
10180013	2,589.679	999.876
10180014	5,808.781	2,242.772
Subregion 1019		
10190012	190.475	73.542
10190015	255.688	98.721
10190016	3,115.371	1,202.846
10190017	1,364.309	526.760
10190018	3,430.128	1,324.374
Subregion 1020		
10200101	8,827.037	3,408.122
10200102	1,842.750	711.487
10200103	2,964.616	1,144.639
10200201	2,240.929	865.224
10200202	1,483.182	572.657
10200203	4,045.999	1,562.162
Subregion 1021		
10210001	4,784.999	1,847.490
10210002	5,310.248	2,050.289
10210003	3,790.614	1,463.558
10210004	4,298.685	1,659.724
10210005	2,563.007	989.578
10210006	5,997.565	2,315.662
10210007	2,551.907	985.292
10210008	2,956.377	1,141.458
10210009	3,838.302	1,481.970
10210010	3,238.391	1,250.344
Subregion 1022		
10220001	7,477.083	2,886.905
10220002	2,178.520	841.128
10220003	5,523.496	2,132.624
10220004	2,667.416	1,029.890
Subregion 1023		
10230001	4,225.561	1,631.491
10230002	2,351.533	907.928
10230003	6,374.654	2,461.256
10230004	2,485.086	959.493
10230005	1,826.409	705.177
10230006	3,180.616	1,228.037
10230007	2,875.225	1,110.125
Subregion 1024		
10240001	2,130.529	822.598
10240002	4,292.624	1,657.384
10240003	2,796.419	1,079.699
10240004	432.898	167.142
10240005	4,486.244	1,732.141
10240006	2,340.155	903.535
10240007	1,969.870	760.568
10240008	3,204.156	1,237.126
10240009	2,008.259	775.390
10240010	2,516.777	971.729
10240011	2,618.785	1,011.114
10240012	4,567.547	1,763.532
10240013	1,875.545	724.149
Subregion 1025		
10250001	159.091	61.425
10250002	1,335.199	515.521
10250003	1,653.085	638.257
10250004	5,832.885	2,252.079
10250005	1,997.744	771.330
10250006	2,836.488	1,095.169
10250007	2,229.012	860.622
10250008	2,351.081	907.753
10250009	3,612.490	1,394.784
10250010	2,592.763	1,001.067
10250011	1,750.300	675.791
10250012	1,427.363	551.105
10250013	1,558.627	601.786
10250014	1,870.742	722.294
10250015	2,544.282	982.348
10250016	5,688.447	2,196.312
10250017	5,150.311	1,988.537
Subregion 1026		
10260001	1,986.456	766.971
10260002	1,066.097	411.621
10260003	3,860.665	1,490.604
10260004	3,016.385	1,164.627
10260005	1,557.626	601.400
10260006	4,175.328	1,612.096
10260007	2,313.819	893.366
10260008	5,129.690	1,980.575
10260009	4,910.873	1,896.090
10260010	3,674.618	1,418.772
10260011	3,771.035	1,455.998
10260012	3,446.202	1,330.580
10260013	2,935.193	1,133.279
10260014	2,773.253	1,070.754
10260015	4,790.865	1,849.755
Subregion 1027		
10270101	1,438.974	555.589
10270102	5,890.065	2,274.156
10270103	2,890.022	1,115.839
10270104	4,262.132	1,645.611
10270201	2,988.656	1,153.921
10270202	3,259.555	1,258.515
10270203	3,571.703	1,379.036
10270204	1,947.182	751.808
10270205	4,087.485	1,578.180
10270206	5,645.052	2,179.557
10270207	3,284.785	1,268.257

Table B-3. (continued)

Cataloging Unit	Area (km^2)	Area ($miles^2$)
Subregion 1028		
10280101	8,570.489	3,309.069
10280102	5,874.984	2,268.333
10280103	6,058.039	2,339.011
10280201	3,658.947	1,412.721
10280202	2,598.238	1,003.181
10280203	1,805.122	696.958
Subregion 1029		
10290101	5,647.908	2,180.659
10290102	4,123.013	1,591.897
10290103	1,330.561	513.730
10290104	2,849.073	1,100.028
10290105	3,195.734	1,233.874
10290106	4,926.110	1,901.973
10290107	2,127.534	821.442
10290108	5,322.399	2,054.980
10290109	3,572.665	1,379.407
10290110	2,785.977	1,075.667
10290111	2,782.505	1,074.326
10290201	4,463.994	1,723.550
10290202	1,911.355	737.975
10290203	2,449.417	945.721

Cataloging Unit	Area (km^2)	Area ($miles^2$)
Subregion 1030		
10300101	7,107.264	2,744.117
10300102	8,707.491	3,361.966
10300103	2,949.723	1,138.889
10300104	3,936.755	1,519.982
10300200	4,179.706	1,613.786
Subregion 1101		
11010001	925.915	357.496
11010002	3,811.580	1,471.652
11010003	4,053.022	1,564.873
11010006	3,496.718	1,350.084
11010007	4,604.899	1,777.953
11010008	6,608.615	2,551.589
11010009	196.554	75.890
11010010	1,245.243	480.789
11010011	2,587.056	998.863
Subregion 1102		
11020009	94.454	36.469
Subregion 1103		
11030001	5,849.232	2,258.391
11030002	2,888.377	1,115.203

Cataloging Unit	Area (km^2)	Area ($miles^2$)
11030003	2,618.932	1,011.171
11030004	4,172.133	1,610.862
11030005	4,326.059	1,670.293
11030006	2,198.112	848.692
11030007	2,514.907	971.007
11030008	2,465.207	951.817
11030009	3,351.265	1,293.925
11030010	1,611.347	622.142
11030011	2,354.309	908.999
11030012	3,361.805	1,297.994
11030013	2,621.004	1,011.971
11030014	2,352.357	908.246
11030015	2,562.269	989.293
11030016	1,122.258	433.304
11030017	2,415.452	932.607
11030018	2,597.902	1,003.051
Subregion 1104		
11040002	1,359.714	524.986
11040003	1,716.531	662.753
11040004	578.815	223.481
11040005	2,530.741	977.120
11040006	3,703.943	1,430.094
11040007	3,407.219	1,315.529
11040008	3,988.230	1,539.857
Subregion 1105		
11050001	113.670	43.888

Cataloging Unit	Area (km^2)	Area ($miles^2$)
Subregion 1106		
11060001	1,247.265	481.570
11060002	1,917.144	740.210
11060003	2,873.690	1,109.533
11060004	1,051.941	406.155
11060005	4,186.883	1,616.557
Subregion 1107		
11070101	3,183.945	1,229.323
11070102	2,284.830	882.174
11070103	1,722.996	665.250
11070104	1,753.089	676.868
11070106	2,425.425	936.457
11070201	2,891.743	1,116.503
11070202	2,348.822	906.881
11070203	2,310.929	892.251
11070204	3,475.519	1,341.899
11070205	3,802.042	1,467.970
11070206	320.669	123.810
11070207	6,707.706	2,589.848
11070208	1,965.584	758.913
Subregion 1110		
11100102	31.716	12.245

Table B-4. English-metric unit conversions (U.S. Department of Agriculture 1983)

English unit	Metric equivalent
1 bushel of corn	25.4 kg
1 bushel of sorghum	25.4 kg
1 bushel of soybeans	27.2 kg
1 bushel of wheat	27.2 kg
1 ton	907 kg
1 acre	0.004 km^2
1 gallon	3.8×10^{-3} m^3