

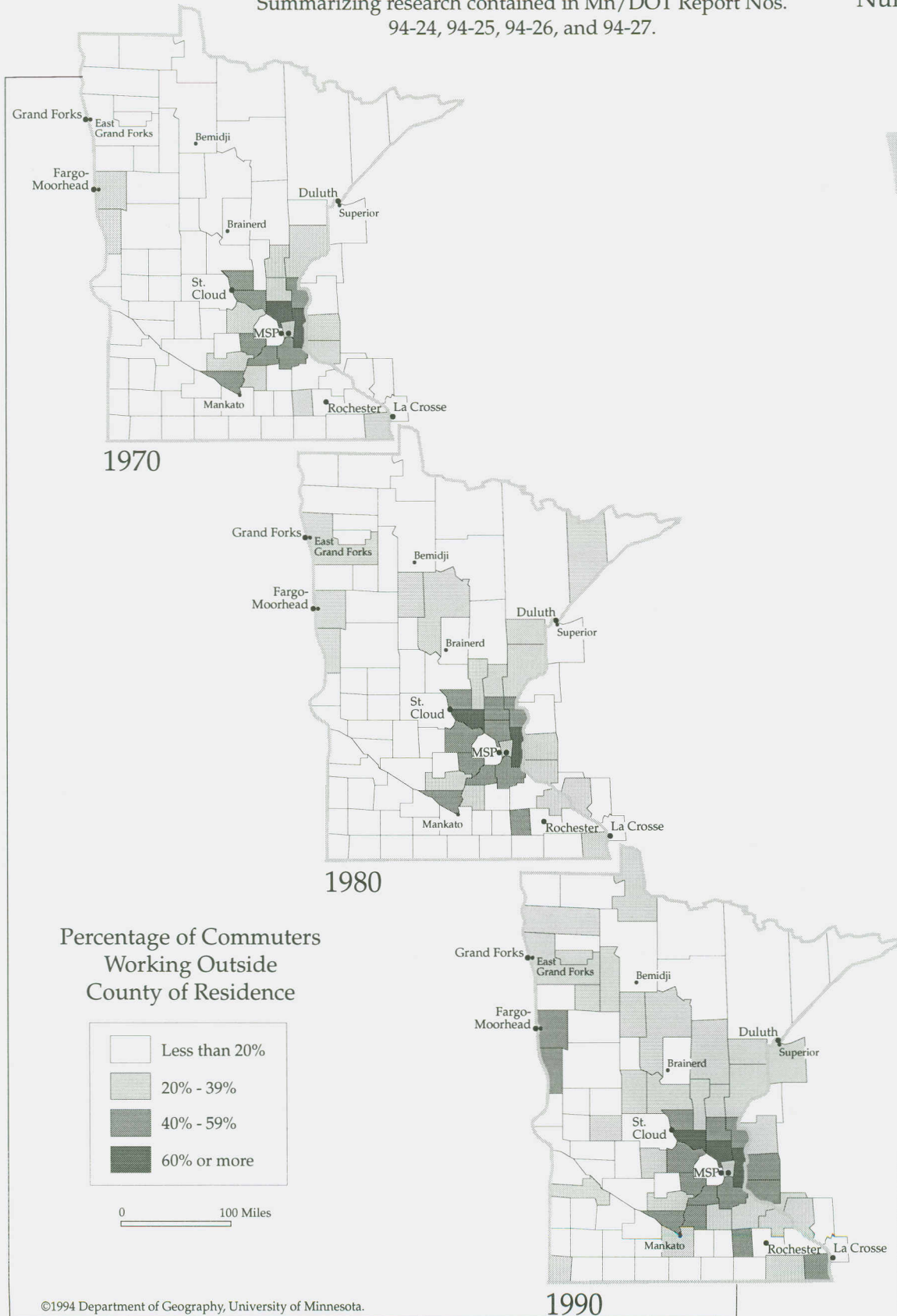
TRANSPORTATION USE IN MINNESOTA

An analysis of the 1990 Census of Population and Housing

Project Summary

Summarizing research contained in Mn/DOT Report Nos. 94-24, 94-25, 94-26, and 94-27.

Report Number **94-28**



Research

Transportation Use in Minnesota

An Analysis of the 1990 Census of Population and Housing

Project Summary

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Project Summary

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An Analysis of the 1990 Census of Population and Housing
John S. Adams, Melissa J. Loughlin, and Elvin K. Wyly*

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From one year to the next, most of us overlook the subtle changes in the complex web of roads around us -- the arteries that link the region's residences, stores, offices, and factories. Yet traffic patterns on the transport network have changed considerably in the past generation, reflecting broader economic and social changes. Economic restructuring has dispersed manufacturing jobs from central cities, added new jobs in burgeoning service industries, brought continued suburban housing growth, and fueled the migration of working-age people from rural to metropolitan areas. Social changes have brought smaller families and more "non-traditional" household types -- single-person households, childless couples, dual-earner families, and female-headed households.

These social and economic changes have altered people's needs and expectations of the transport system, and have accentuated regional patterns of interaction (see cover figure). Many residents moving to exurban communities accept daily commutes of 45 minutes or more for the cheaper housing of the metropolitan fringe, while some workers in declining rural labor markets travel an hour or more to broaden their range of job opportunities. Dual-earner families balance two work journeys with the timing and location of housework, child care, school, and shopping, while temporary workers and those with several part-time jobs take many work journeys to different locations. In sum, the transport network has become more important in meeting new social and economic needs. Most of us now see transportation as an ubiquitous commodity: as with the telephone, we expect infrastructure and service everywhere, to reach any location as quickly and cheaply as possible.

People's need for and use of transport services differ greatly from place to place, however. To examine this variation, we posed four research questions and answered them with transportation-related data from the 1990 Census of Population and Housing. Our main findings are summarized below. For further information, request the Mn/DOT report numbers listed for each paper.

The relation between socioeconomic status and commuting time varies between metropolitan and non-metropolitan areas.

Question 1: What is the socioeconomic profile of Minnesota's long-distance commuters?

(Figures 1 and 2; request Mn/DOT Report No. 94-24, "Long-Distance Commuting in Minnesota.")

Conventional urban models explain variations in commuting times in terms of a trade-off between transport costs and the residential amenities of peripheral locations, with affluent workers accepting longer work journeys. Most such models were developed in metropolitan areas, however, and do not describe adequately the complexity of exurban and non-metro labor markets.

Among the state's 1.9 million solo commuters, socioeconomic status is higher among those spending more than 30 minutes in the work journey. Yet outside metro areas, long-distance commuters represent a broad range of the socioeconomic spectrum. Over 40 percent of long-distance commuters in non-metro areas work in blue-collar production and operative occupations (Fig. 1). A case study of the rapidly-growing exurban counties north of the Twin Cities reveals that average travel time is highest for blue-collar workers -- the group with the lowest average income (Fig. 2).

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There is considerable variation among the state's counties and urban neighborhoods in journey-to-work characteristics.

Research on topics such as "reverse commuting" benefits from separate but complementary data sources on travel patterns and socioeconomic characteristics.

One third of employed Minneapolis residents work in the suburbs; only one sixth of low-income workers are reverse commuters, but this ratio is higher for some occupations.

Between 1970 and 1990, the share of Minnesota commuters working outside their county of residence grew from 18 to 29 percent.

Cross-border flows have strengthened not only in suburban and exurban areas, but also in Greater Minnesota's diffuse rural labor markets.

Question 2: How do Minnesota's counties and urban neighborhoods vary according to transport needs and use?

(Figures 3 and 4; request Mn/DOT Report No. 94-25, "Transportation-based Classifications of Minnesota's Counties and Metropolitan Statistical Area Tracts.")

We used common statistical techniques to classify Minnesota's 87 counties and 833 metropolitan census tracts according to a series of demographic and transportation-related measures. Over two dozen of the state's counties may be classified as "commuter counties," registering moderate to high scores on a composite measure of a) percentage of commuters spending more than 30 minutes in the work journey, b) average travel time to work, and c) average number of vehicles per household (Fig. 3). Within the state's metropolitan areas the analysis highlights the diverse and varied composition of commuter flows among suburban labor markets (Fig. 4).

Question 3: How can census data be used together with travel surveys to study the socioeconomic characteristics of travelers?

(Figure 5; request Mn/DOT Report No. 94-26, "Data Sources for Use in Conducting Travel Behavior Research: A Case Study of Reverse Commuting Among Low-Income Residents of Minneapolis.")

Researchers interested in the travel patterns and socioeconomic characteristics of metropolitan residents must choose between data sources providing rich geographic detail and those with detailed social variables. To illustrate how separate sources can be complementary, we used Travel Behavior Inventory (TBI) and census Public-Use Microdata Sample (PUMS) data for a case study of "reverse commuters" in Minneapolis -- that is, central city residents who work in the suburbs. PUMS data provide unparalleled detail on the income, occupation, and household circumstances of individual workers. These data show that among all employed Minneapolis residents, reverse commuting is most prevalent for skilled blue-collar occupations, although in absolute terms the largest number of reverse commuters are white-collar workers (Fig. 5). Among low-income workers only one sixth are reverse commuters, but one quarter of those in services and unskilled blue-collar jobs work in the suburbs (Fig. 5). TBI data provide highly detailed spatial information on the timing and purpose of individual trips. These data show that while travel patterns of many Minneapolis residents cover a wide range of the metropolitan area, low-income residents have daily activity spaces of a much more localized nature (Fig. 5).

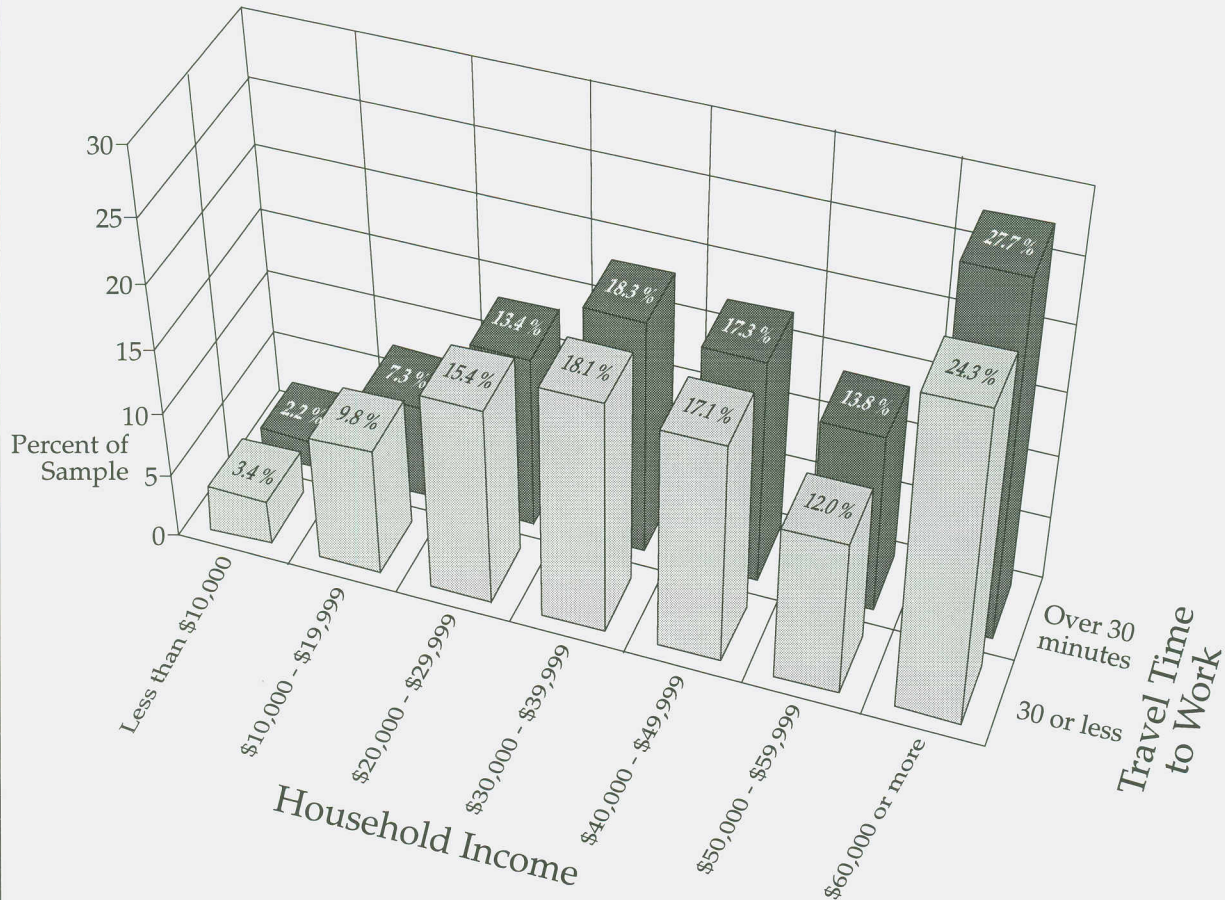
Question 4: How has interaction among the state's local labor markets changed in the last twenty years?

(Figure 6; request Mn/DOT Report No. 94-27, "Modeling Commuter Flows Among Local Labor Markets in Minnesota, 1970-1990.")

Between 1970 and 1990, the share of Minnesota's commuters crossing a county boundary on their way to work grew from 18 to 29 percent. While much of this growth is a direct reflection of underlying changes in the settlement system -- regional differences in population and employment growth -- the exact relations are complex and vary from place to place. To examine these patterns we constructed a series of statistical models relating commuter flows to economic and demographic changes in a 120-county study area encompassing Minnesota and counties in adjacent states.

Commuter flows have strengthened not only in suburban and exurban areas, but also in Greater Minnesota's labor markets (Fig. 6), where longer work journeys appear to reflect individual coping strategies as workers adjust to changes in regional employment distribution. In these diffuse labor markets commuter flows connect widely-scattered job centers with labor deficits to areas of labor surplus, resulting in patterns too complex to be modeled solely in terms of aggregate population and housing variables.

(a) Household Income and Travel Time to Work, Solo Commuters.



(b) Occupation of Long-Distance Solo Commuters in Metro and Non-Metro Areas.

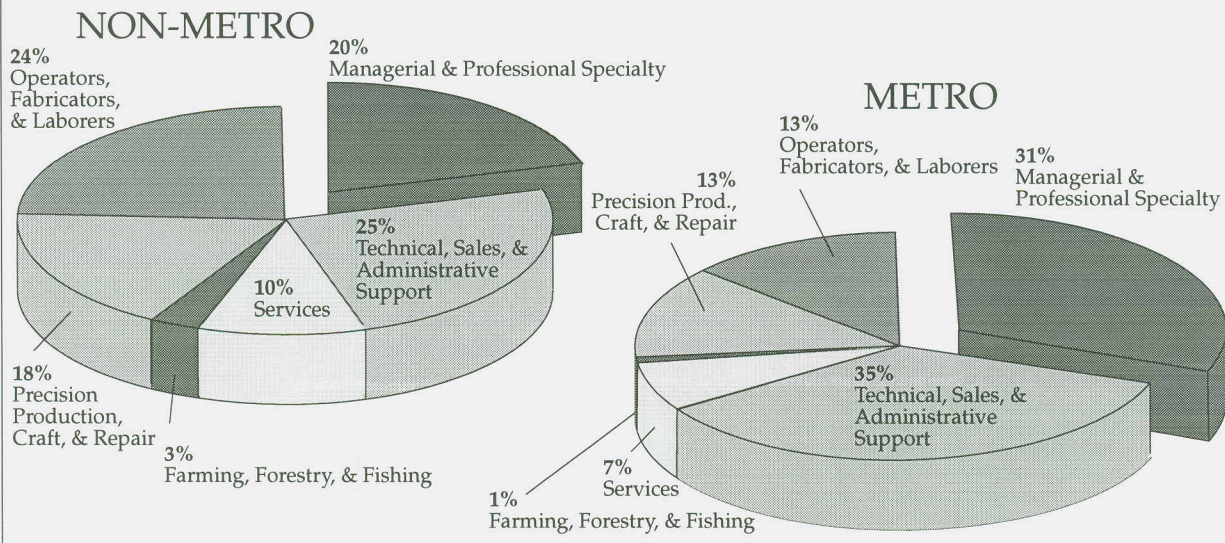
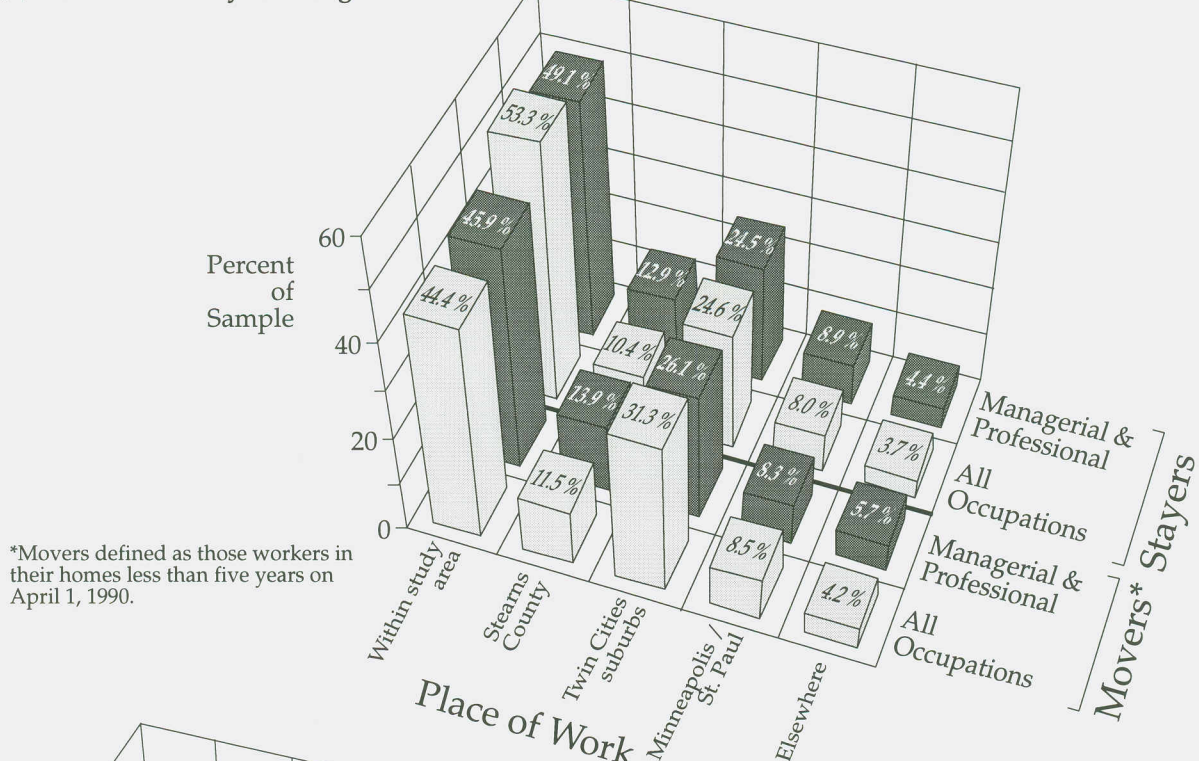


Figure 1. Socioeconomic Profile of Minnesota's Long-Distance Commuters. (For the full report, request Mn/DOT Report No. 94-24, "Long-Distance Commuting in Minnesota.") Almost a quarter of Minnesota's 1.9 million solo commuters spend more than 30 minutes in the daily journey to work. Long-distance commuters come disproportionately from higher-income households (a), but their profiles differ according to place of residence (b). The majority of long-distance commuters in metro areas work in white-collar occupations, while many in non-metro Minnesota are blue-collar. (Data Source: Special tabulations of the U.S. Bureau of the Census Public-Use Microdata Sample, 1% file.)

(a) Place of Work by Housing Tenure.



*Movers defined as those workers in their homes less than five years on April 1, 1990.

(b) Income and Travel Time of Blue- and White-Collar Workers, by Housing Tenure.

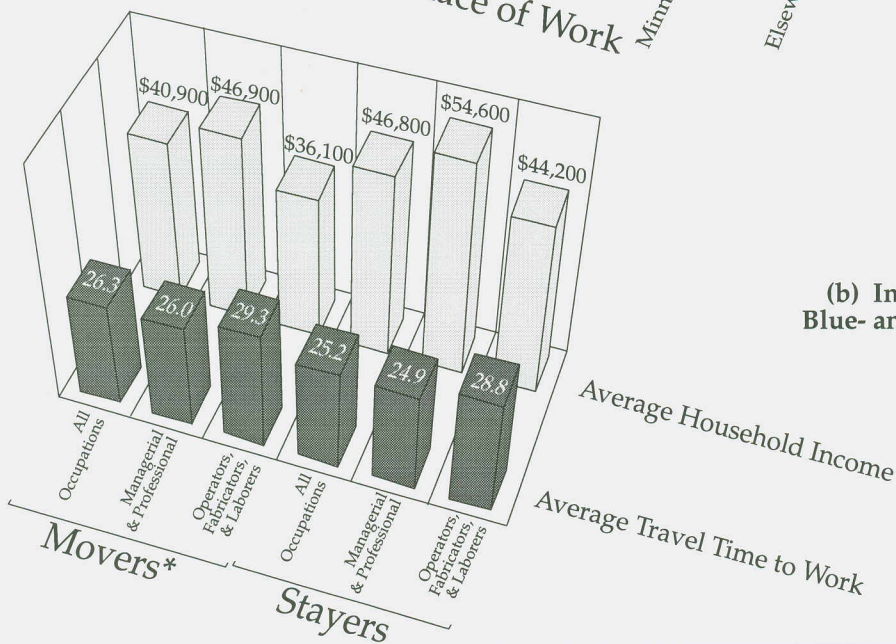


Figure 2. Socioeconomic Profile of Exurban Commuters. (For the full report, request Mn/DOT Report No. 94-24, "Long-Distance Commuting in Minnesota.") Conventional models relating socioeconomic prestige to commuting distance were developed from metropolitan travel studies, and do not describe adequately the complexity of exurban labor markets. We examined the income, occupation, housing tenure, and travel time of workers living within a five-county study area on the northern fringe of the Twin Cities (including Wright, Sherburne, Benton, Isanti, and Chisago counties). As expected, recent movers are more likely to work outside the study area (a), but these commuters are not disproportionately white-collar professionals; workers in managerial and professional occupations are slightly less likely to work in the Twin Cities than other workers. In another reversal of the conventional pattern, blue-collar workers with the lowest household incomes report the longest work journeys (b). Blue-collar workers who have moved at least once in the last five years report an average work journey of more than 29 minutes, suggesting that families of modest means are willing to endure a long commute for the lower housing costs of exurbia. (Data Source: Special tabulations of the U.S. Bureau of the Census Public-Use Microdata Sample, 1% file.)

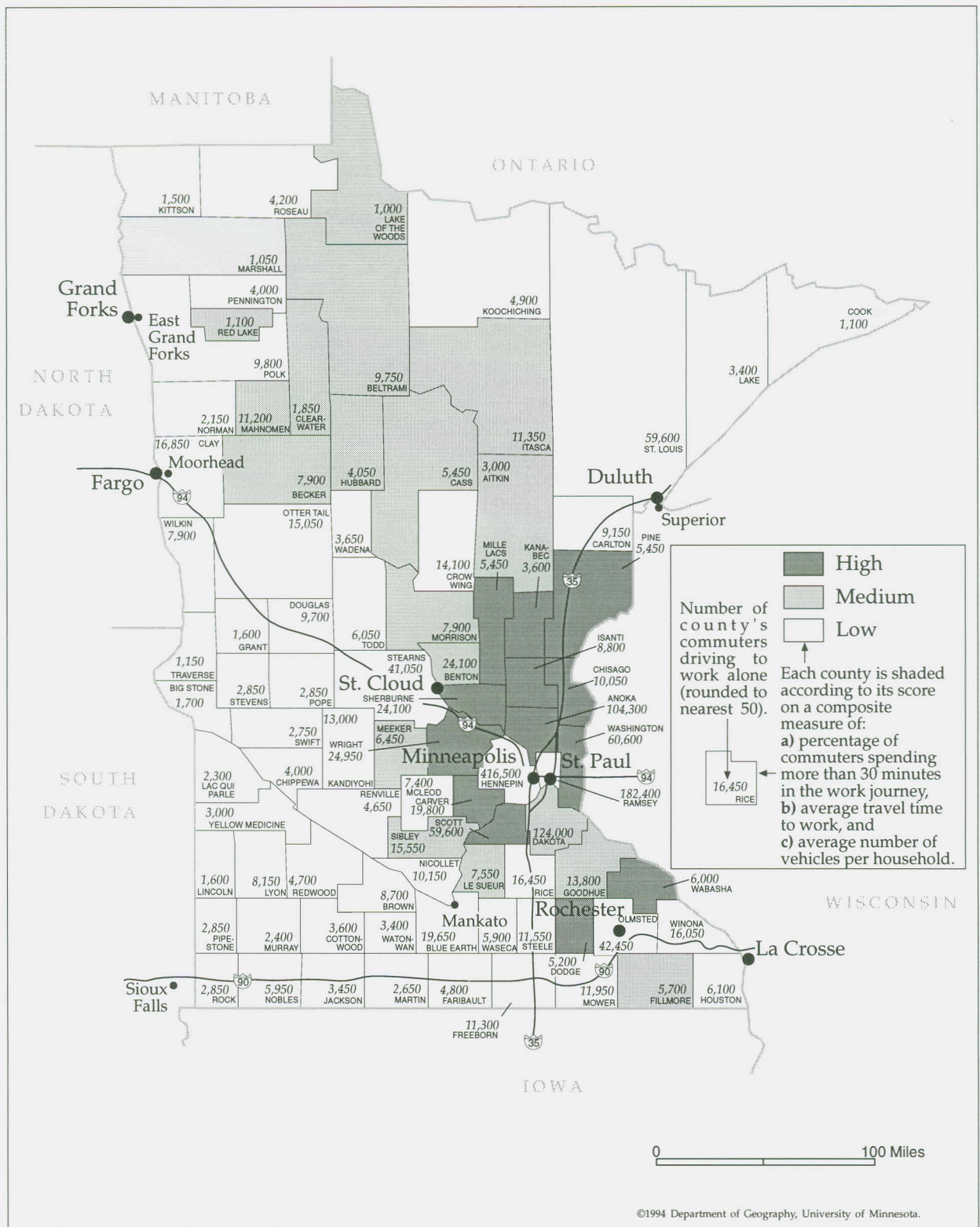


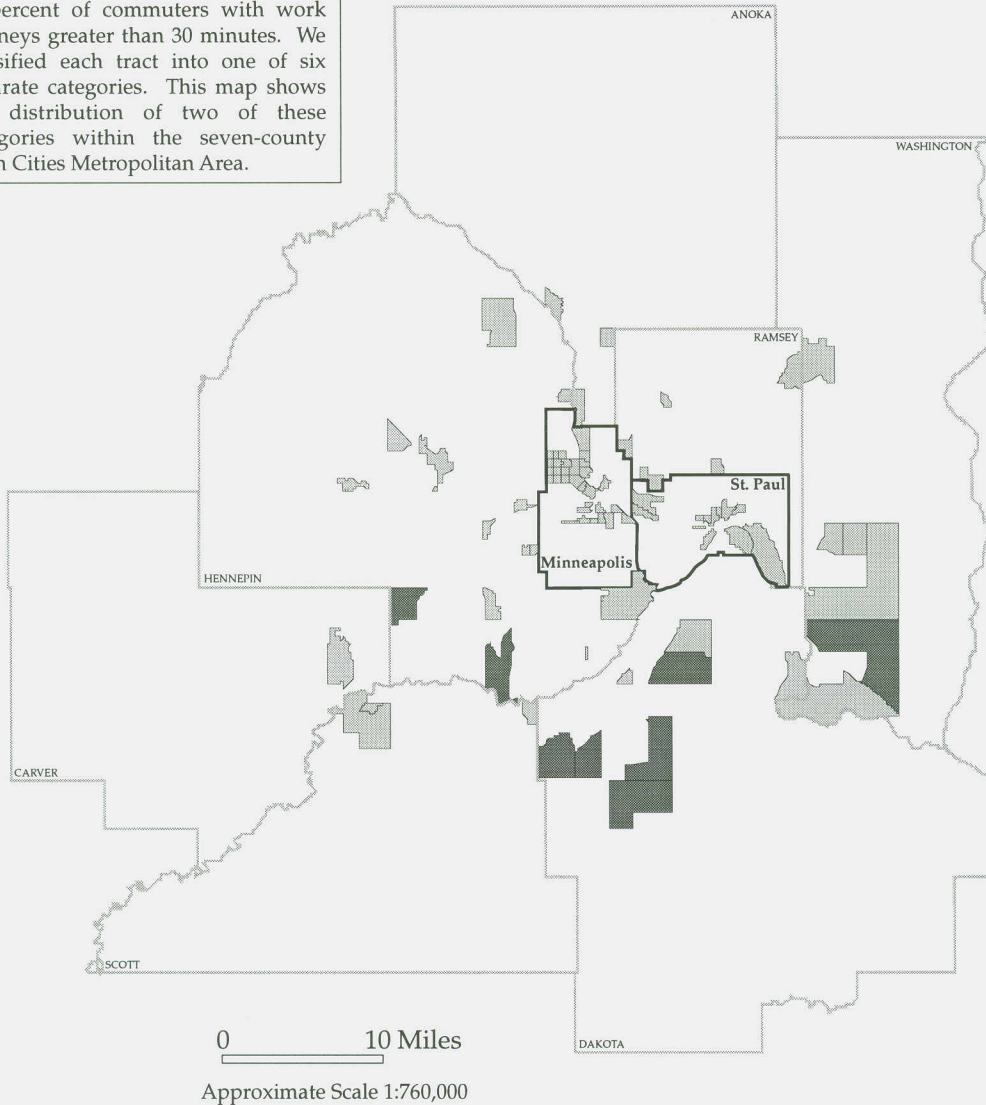
Figure 3. Minnesota's Commuter Counties. (For the full report, request Mn/DOT Report No. 94-25, "Transportation-Based Classifications of Minnesota's Counties and Metropolitan Statistical Area Tracts.") Classifying the state's counties according to the manner in which residents get to work highlights regional differences among local labor markets. Long-distance commuting and high average travel times are most prevalent in a broad band of counties following the region's historic settlement corridor -- a reminder of the century-old patterns of interaction established by the railroads connecting the Twin Cities to the rest of the Upper Midwest -- and in the diffuse settlement fields of north-central Minnesota. (Data Source: U.S. Bureau of the Census, Summary Tape File 3.)

How this Map was Made:

We used common statistical techniques to classify the 833 census tracts of Minnesota's Metropolitan Statistical Areas (MSAs) according to eight measures: 1) total population, 2) percent over age 65, 3) percent with mobility limitation, 4) percent below poverty line, 5) average number of vehicles per household, 6) average travel time to work, 7) percent of commuters driving to work alone, and 8) percent of commuters with work journeys greater than 30 minutes. We classified each tract into one of six separate categories. This map shows the distribution of two of these categories within the seven-county Twin Cities Metropolitan Area.

Commuter Suburbs: Tracts in this category are large, heavily-populated neighborhoods with few poor or elderly residents. Fully one-third of the workers spend more than 30 minutes in the daily work journey, and over 85 percent drive to work alone.

Poverty Concentrations: These tracts are small neighborhoods with significant concentrations of poor or elderly residents, and with correspondingly lower rates of automobile use. On average, one-fifth of the residents are below the poverty line, and 13 percent are over age 65.



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Figure 4. Commuter Suburbs and Poverty Concentrations in the Twin Cities Metropolitan Area. (For the full report, request Mn/DOT Report No. 94-25, "Transportation-Based Classifications of Minnesota's Counties and Metropolitan Statistical Area Tracts.") The development boom of the 1980s brought rapid growth to several neighborhoods on the south side of the metropolitan area, and these "commuter suburbs" now stand out on a variety of measures of automobile reliance. In contrast, the residents of other neighborhoods live more local lives, and average commuting times and vehicle availability for these areas are the lowest in the metropolitan area. These "poverty concentrations" have above-average poverty rates (particularly in the central cities), elderly population, and mobility-limited population. (Data Source: U.S. Bureau of the Census, Summary Tape File 3.)

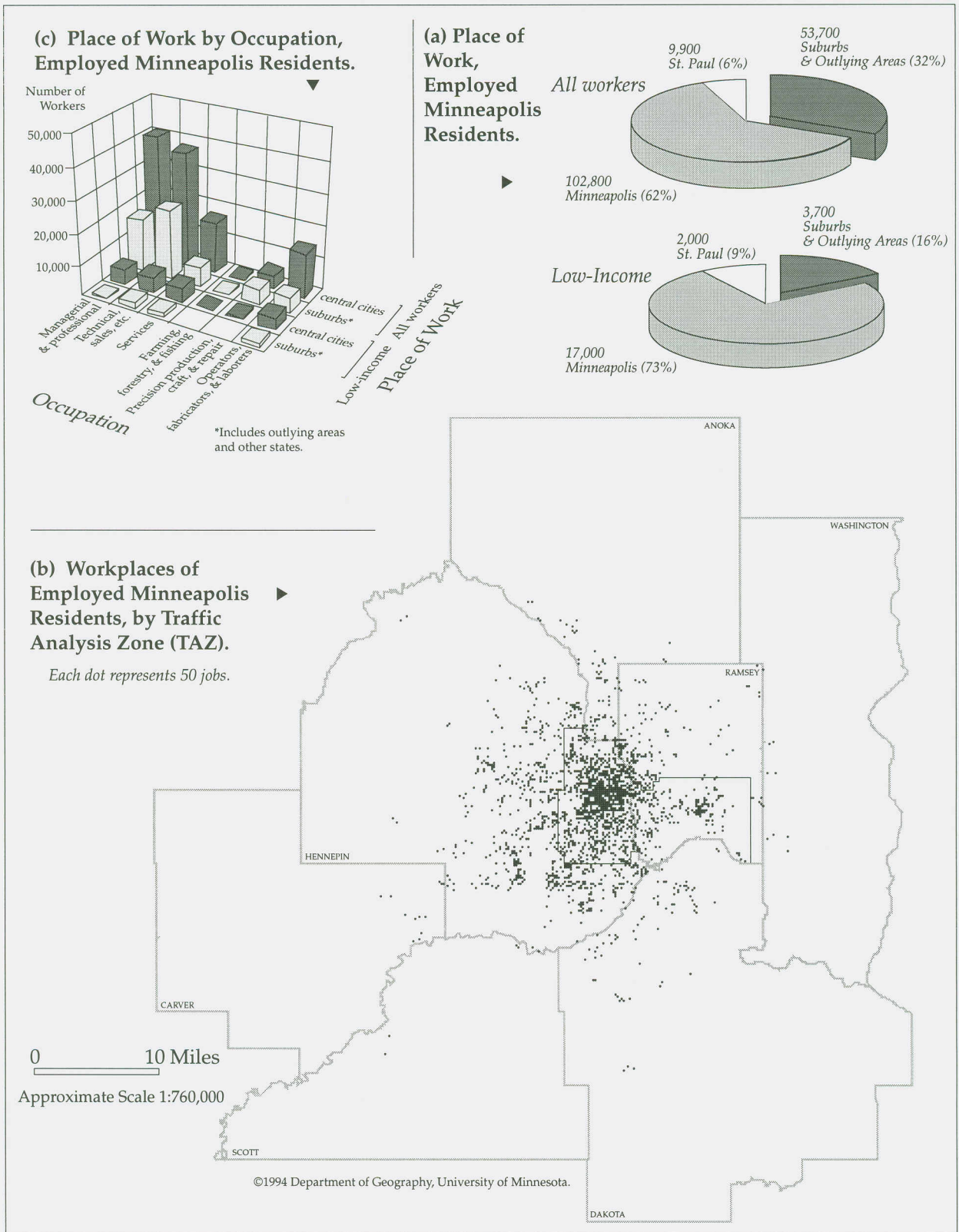
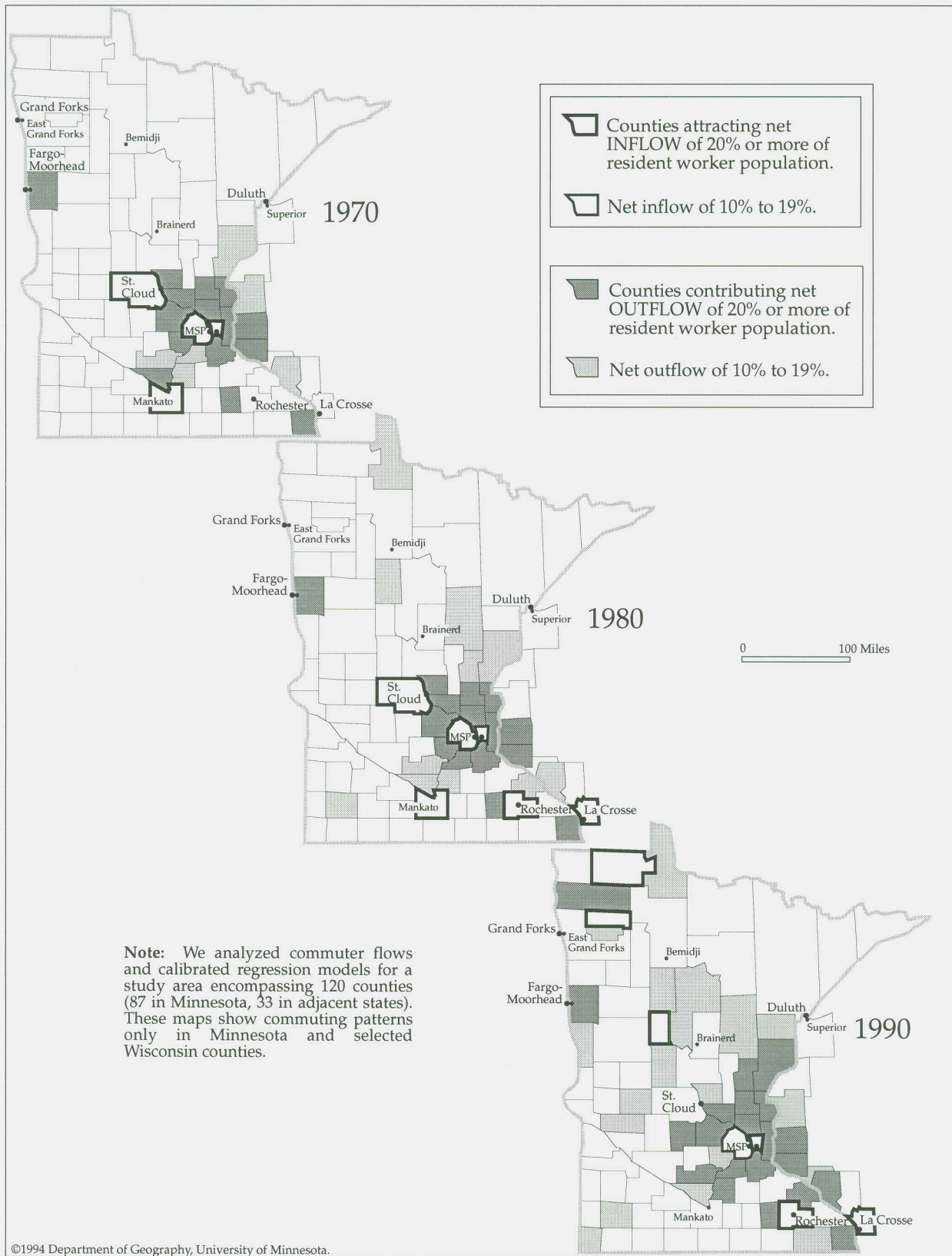


Figure 5. Reverse Commuters in Minneapolis. (For the full report, request Mn/DOT Report No. 94-26, "Data Sources for Use in Conducting Travel Behavior Research.") Overall, nearly a third of employed Minneapolis residents work in the suburbs (a), and the travel patterns of many workers take them across a broad range of the metropolitan area (b). Workers in low-income households, however, have daily activity spaces of a much more localized nature, except where suburban growth in services and unskilled blue-collar jobs requires reverse commuting (c). (Data Sources: U.S. Bureau of the Census Public-Use Microdata Sample; Metropolitan Council Travel Behavior Inventory.)



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Figure 6. Commuting Among Minnesota's Local Labor Markets. (For the full report, request Mn/DOT Report No. 94-27, "Modeling Commuter Flows Among Local Labor Markets in Minnesota, 1970-1990.") The last twenty years have altered the relation of commuter flows to demographic and economic conditions. Cross-county flows have strengthened not only in rapidly-growing communities near metropolitan areas, but also in the diffuse labor markets of Greater Minnesota. (Data Source: Special tabulations of U.S. Bureau of the Census Journey-to-Work Frequency Tables, and Bureau of Economic Analysis data.)