Journal of the Minnesota Academy of Science

Volume 28 | Number 1 Article 21

1960

The Effects of a Limited-Access Freeway on Occupance in Rural Areas

Everett G. Smith Jr.
University of Minnesota

THE EFFECTS OF A LIMITED-ACCESS FREEWAY ON OCCUPANCE IN RURAL AREAS

EVERETT G. SMITH, JR.
University of Minnesota. Minneapolis

The geographer, with his desire to know the variable character of places and how phenomena, as, for example, highways, are interrelated with other phenomena over the face of the earth, stands in a favored position to make meaningful statements about advantages and disadvantages of such highways to people from place to place.

One approach for geographers lies in the study of roads as resultant features related to terrain, population, and resources. Significant relationships may be noted were one to analyze the location of the existing rural road network with distributional patterns of surface features, population, and land use, because the existing road system serves the occupants of areas through which the roads pass. In the Federal-Aid Highway Act of 1956 the U. S. Government instituted an entirely new type of highway, the function of which varies considerably from that of the existing road network. This new road system is known as the Interstate System.

Endless comment has been forthcoming regarding this program. For one reason, it is big. When completed the system will comprise 41,000 miles of multiple-laned, divided highways. Over three miles of every four will be constructed on new right-of-way land. In square-mile sections through which the roads are being built, one acre in sixteen will be converted to highway right-of-way. One may visualize an area twenty-times the size of the central cities of Minneapolis-St. Paul; this area will equal the amount of land to be allocated to the Interstate System in the United States. A second reason for widespread discussion of the Interstate program is its expense. It is the largest public works program in the history of the republic.

The Interstate System is designed to connect by routes as direct as practicable, the principal metropolitan areas of the country. One might characterize the multi-laned freeway as dominating the area through which it is constructed. One driving a freeway is more conscious of the road than he is of the country through which he is passing. In contrast, more common two-laned trunk highways might be classed as equal to the surrounding countryside, that is, the highway is an intimate and integral part of that countryside. At the other extreme from the Interstate Highway is a narrow township road, domi-

nated by surrounding fields and forests where it is oppressed and gradually loses its identity.

Except for interchanges and grade separations, the Interstate System will be completely isolated from abutting land. Access to the freeway is restricted to designated interchanges. In rural Minnesota, one interchange is planned for approximately every five miles. Access across the freeway is restricted to either an interchange or a grade separation. In rural Minnesota, one grade separation is planned for every eight to nine miles. Thus it appears that to many occupants of rural areas the Interstate System, when completed, will act as a barrier to economic and social activity rather than serving as a means of access from farm to market.

Instead of studying limited-access freeways as effects or results of terrain influences, population distribution, and resource patterns, as one might do with the existing road grid, it seems more fruitful to analyze Interstate Highways as causal factors affecting a wide variety of features in areas through which they traverse.

This paper focuses on the effects on occupance in rural areas of a limited-access highway, in this case, as shown in Fig. 1, an eight-mile segment of Interstate Route 35 in Steele and Rice Counties. Opened for traffic in August, 1958, this eight-mile section was the only completed link of limited-access freeway in rural Minnesota in 1960. Of land acquired from private owners for highway right-of-way, 99% was devoted to agricultural production.

In the initial stages of the present research, two questions were

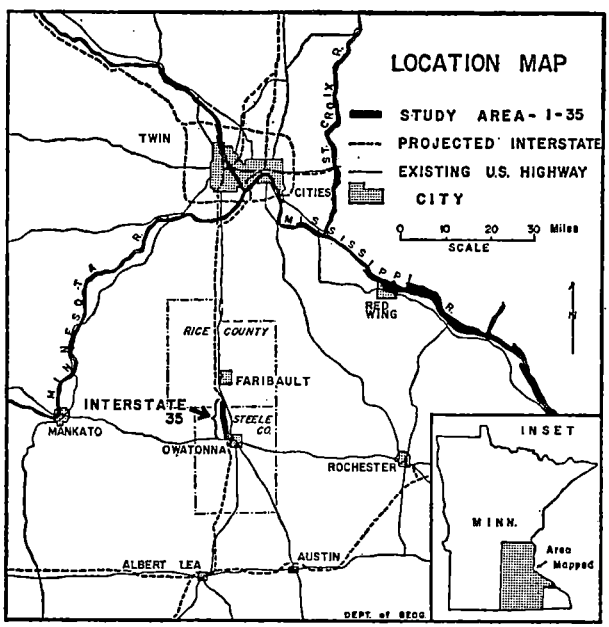

Figure 1.

raised: first, how does land acquisition for Interstate Highway right-of-way modify the size and arrangement of farm operating units? And second, what adjustments did farmers make to the changed layout of their farms? The purpose of the research along this road in southern Minnesota was to study this segment of Interstate Highway not as an individual, isolated case, but rather in the hope of developing some generic conclusions that may prove useful not only to highway department officials in understanding the impact of a limited-access route in other rural areas, but also to affected occupants elsewhere as they learn to adapt to new freeways.

Modifications of Farm Units: A limited-access freeway modifies the spatial arrangement of a farm unit in two ways: first, it decreases

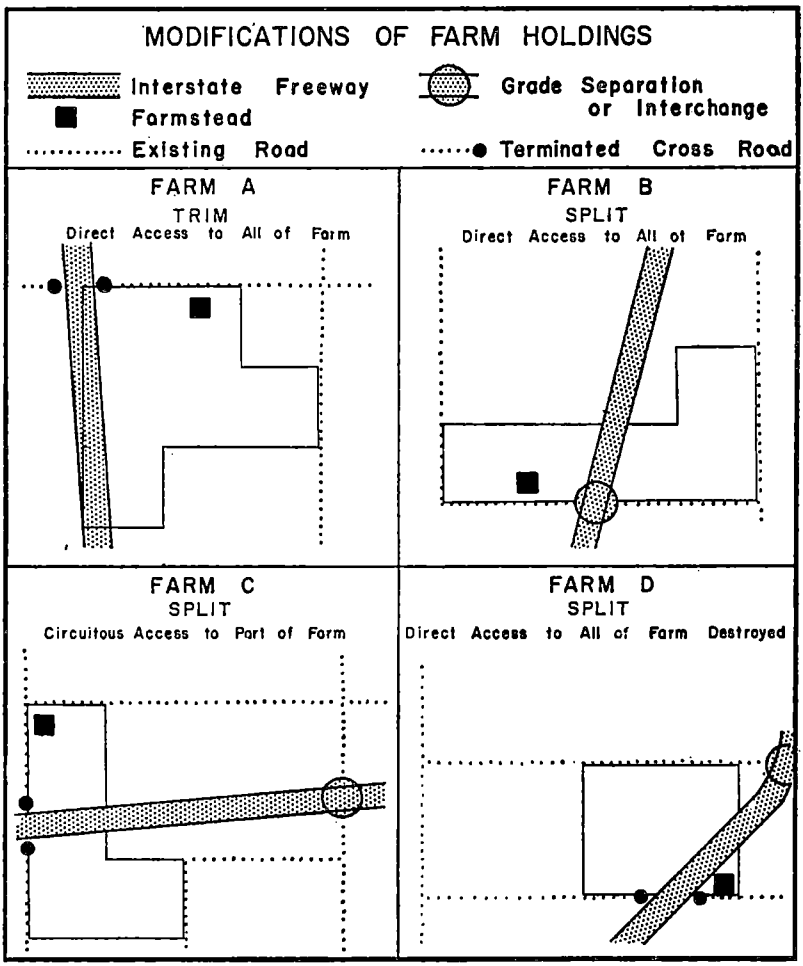

Figure 2.

the size of the operating unit; second, it either trims land from one side of the farm or separates the farm into two or more parcels. As shown in Fig. 2, on a trimmed farm the operator retains access to all his farm. Of farms that are split, in one instance, an interchange is located adjacent to the farm and access is retained to all the farm. In the second example, an interchange is located some distance away from the farm and access is circuitous to part of the farm. In the third, an interchange is located away from the farm, but the manner of separating all fields from the farmstead results in circuitous access to all the farm.

In addition to altering the layout of the farm unit, building an Interstate Highway may destroy several acres of planted crops, damage farmsteads, impair drainage and fences, and encroach on the farm to the extent that the decreased size of the farm will harm operating efficiency.

Fig. 3 presents examples of reorganizations of farm units in the study area. There were twenty-eight farms fronting or astride the path of Interstate 35 in 1955, when initial construction of the road began Thirteen of these were trimmed. These thirteen units lost an average of five acres per farm. As a result of trimming, the thirteen farms were decreased in size an average of 3%. Fifteen of the farms were split. Of these fifteen, four retained direct access to all the farm because of proximity of an interchange; nine lost access to part of the farm; and two lost access to all of the farm. Operators of these fifteen farms gave up an average of twenty acres per farm for highway right-of-way. As a result of splitting, the farms were decreased in size an average of 13%.

Along the eight-mile stretch of road, the State acquired 376 acres for right-of-way. Of this total, 370 acres were in farm use and six acres in non-farm uses. Right-of-way land allocated for the main road, frontage roads, and three interchanges averaged forty-seven acres per mile.

One can assume that given the varied shapes and sizes of Midwestern farms with their usual orientation to the cardinal points of the compass, superposition of an Interstate Highway on the established landscape will result inevitably in some farms being trimmed, others being split. One might postulate that the direction of the Interstate Highway—either in a north-south or east-west course, or on some deviation to the cardinal points—will determine the relationship of trimmed farms to split farms.

Interstate 35 in Steele and Rice Counties is oriented mainly in a north-south direction. In contrast, Interstate 94 from Fargo, North Dakota, to the Twin Cities will run on a northwest-southeast course, that is, on a diagonal to the general arrangement of farm units. A field survey of an 11.8-mile segment of Interstate 94 under construction in 1960 revealed that thirty-three farm units were directly affected by road grading. Nearly one less farm has been damaged per mile of freeway in this section of Minnesota than was damaged by Interstate 35 in Steele and Rice Counties. The segment of Interstate 94 under construction in 1960 is located in Otter Tail County near Fergus Falls,

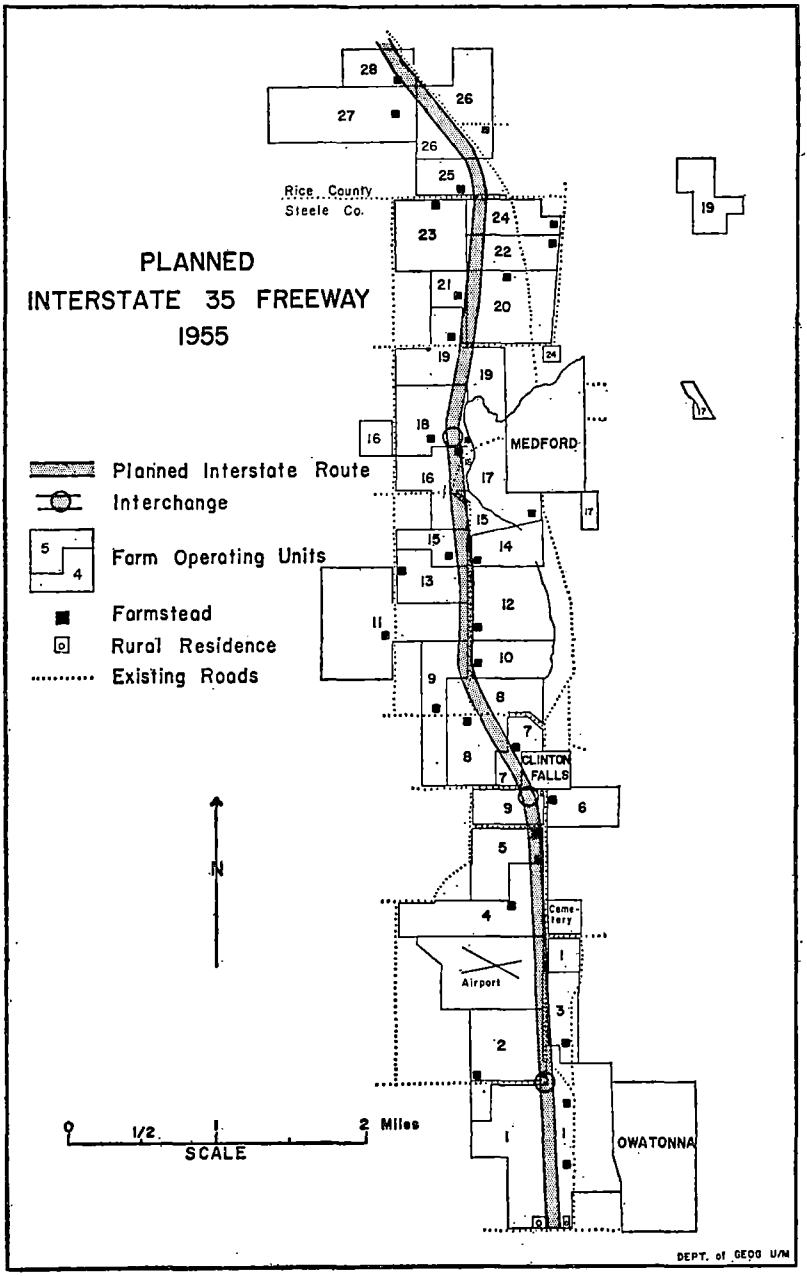
PLANNED
INTERSTATE 35 FREEWAY
1955
Planned Interstate Route
Interchange
Farm Operating Units
Farmstead
Rural Residence
Existing Roads
Rice County
Steele Co.
MEDFORD
CLINTON FALLS
Airport
Cemetery
OWATONNA
N
0 1/2 1 2 Miles
SCALE
DEPT. of GEOG U/M

Figure 3.

190 miles northwest of the Twin Cities. The fact that farm units in Otter Tail County are nearly twice the size of those in South Central Minnesota accounts for this variance in number of farms affected per mile.

On the diagonal stretch of road near Fergus Falls, nineteen farms have been split, seven of them retaining direct access, and twelve having circuitous access. Thirteen farms have been trimmed, and one lost no land, only access. In contrast, along Interstate 35 in Steele County, fifteen farms were split and thirteen trimmed. Thus, there is evidence that when an Interstate Highway is constructed on a diagonal to the rectangular orientation of farm units, more farms will be split and potentially more damage result.

Adjustments: The second question raised is what adjustments did farmers make to the changed layout of their farms as a result of Interstate Highway construction?

In the four-year interval of 1955-1959, eighteen operators of the original twenty-eight farms fronting Interstate 35 either sold their entire holding, sold or rented portions of their units, or purchased additional land. Most of these adjustments were associated with the way in which the freeway modified the operating units. The extent of adjustment depended, in general, on the severity of modification. Among the thirteen farms that were trimmed in 1955, ten of the operators had made no change by 1959 that could be attributed directly to highway construction. For example, as shown in Fig. 4, Farm 2 comprised 180 acres in 1955. The State acquired six acres of right-of-way from this farm, reducing its size to 174 acres. By 1959, the operator had made no change in his farm unit. On another trimmed farm, Farm 22 was 47.5 acres in size in 1955. The State took 4.3 acres for right-of-way. During the four-year study interval, the operator purchased 1.3 acres separated from an adjoining farm to the east, and in 1959, his farm totaled 44.5 acres.

On the other hand, among the fifteen farms that were split, eleven of the operators reorganized in some manner the layout of their farming units between 1955 and 1959. There were four cases of farms split with operators retaining complete access to all the fields. Some of these farmers made adjustments. From Farm 1, totaling 484 acres in 1955, the Interstate Highway used 68.43 acres. The owner-operator, in turn, rented six acres to a neighbor on the north, sold fifteen acres to commercial developers at the edge of Owatonna, and purchased 149 additional acres of farmland. In 1959, this farmer still operated his severed parcel and his farm unit comprised 543.6 acres.

There were nine farms split so that operators had circuitous travel to part of their farm. Farm 8 was 242 acres in size in 1955. The Interstate Highway split this farm into two equal tracts and consumed 25 acres for right-of-way. The owner sold portions of his remaining acreage to three separate farmers and discontinued farming.

There were two farms split in such a fashion that the operators had circuitous travel from their farmsteads to all their fields. On Farm 5, which consisted of 117.5 acres in 1955, the Interstate took

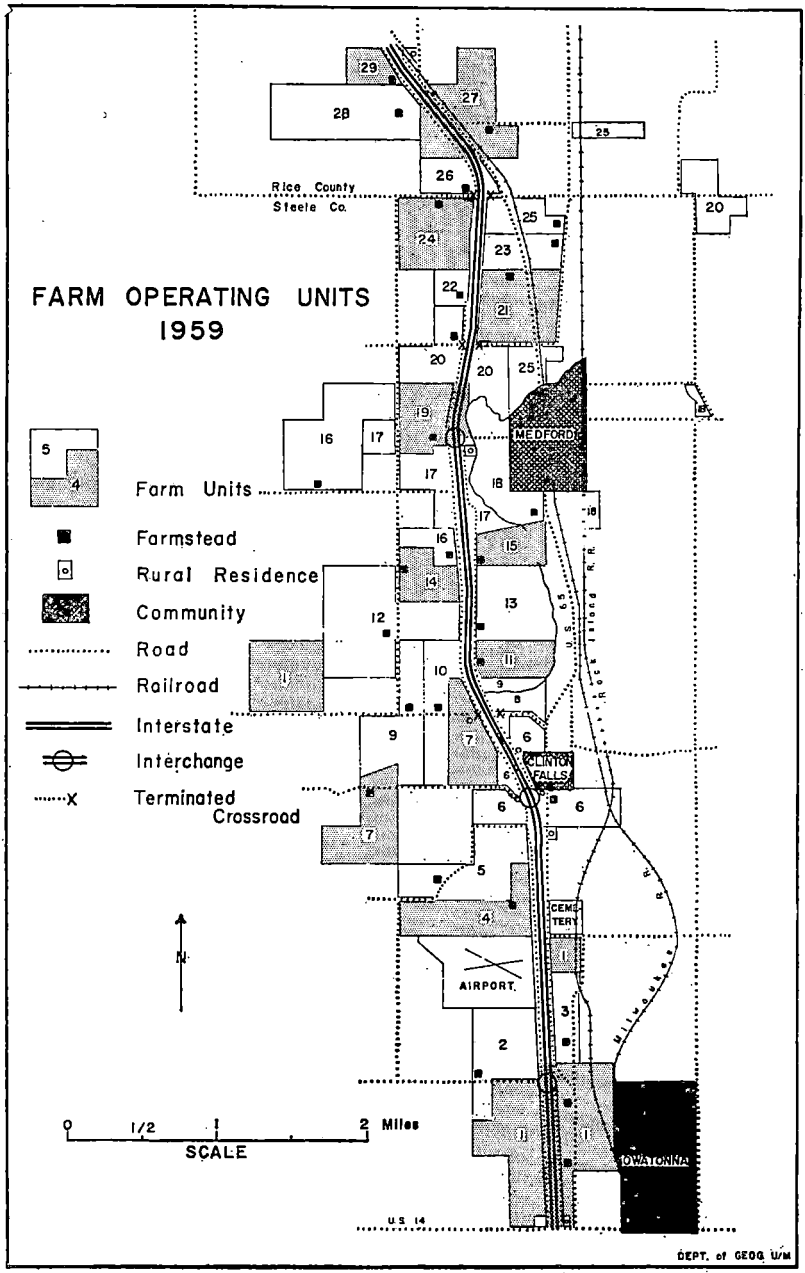
FARM OPERATING UNITS
1959
Farm Units
Farmstead
Rural Residence
Community
Road
Railroad
Interstate
Interchange
Terminated Crossroad
Rice County
Steele Co.
MEDFORD
CLINTON FALLS
CEMETERY
AIRPORT
OWATONNA
U.S. 14
N
0 1/2 1 2 Miles
SCALE
DEPT. of GEOG. U/M

Figure 4.

8.84 acres of land. The operator sold over 100 acres separated from his farmstead to a farmer tilling adjoining land on the west, rebuilt his farm home into a modern rural residence, and discontinued farming.

Thus, eleven farmers faced potential damage from possible circuitous travel to severed parcels. Ten of these eleven took steps to adjust to this situation. Six sold all the land to which they had lost direct access; two sold part of their land, usually the severed parcels; and two altered the land use on the separated parcel.

It is evident that operators of farm holdings who suffered major damage, for example, circuitous travel and/or building loss, responded with major adjustments such as discontinued farming, purchase of more land, and the like. These adjustments, it should be noted, have not been unique to this study strip in Steele and Rice Counties. To be sure to some occupants, construction of Interstate 35 constituted a significant disruption to their lives. Most responded, however, with adjustments that are in accord with trends elsewhere in American agriculture.

With each passing year, there are fewer American farms and those remaining farms are becoming larger. In Steele County, for instance, the number of farms decreased 7% between 1954 and 1959. While one farm in four was larger than 180 acres in 1954, one farm in three was larger than 180 acres in 1959.

In the Interstate 35 study area, as shown in Fig. 5, there were also fewer farms and more larger farms between 1955 and 1959. Although five of the original twenty-eight farmers left farming, these five oper-

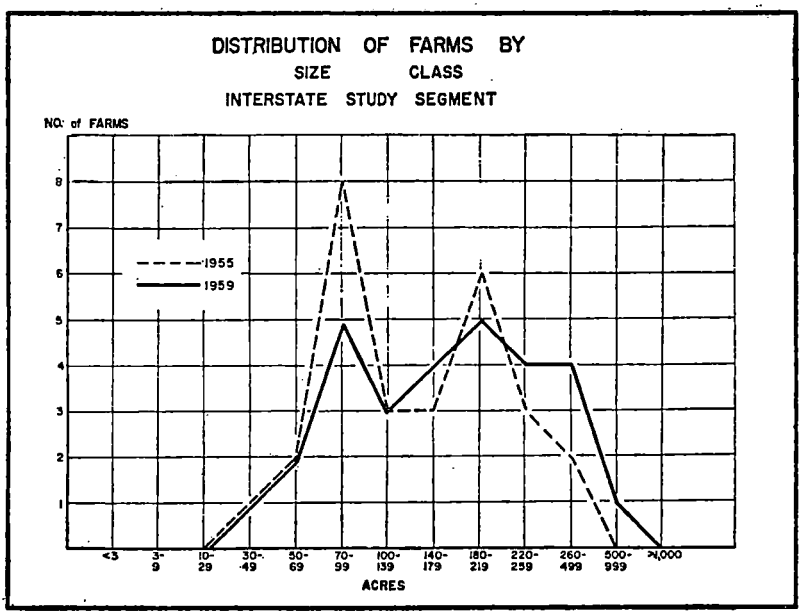

Figure 5.

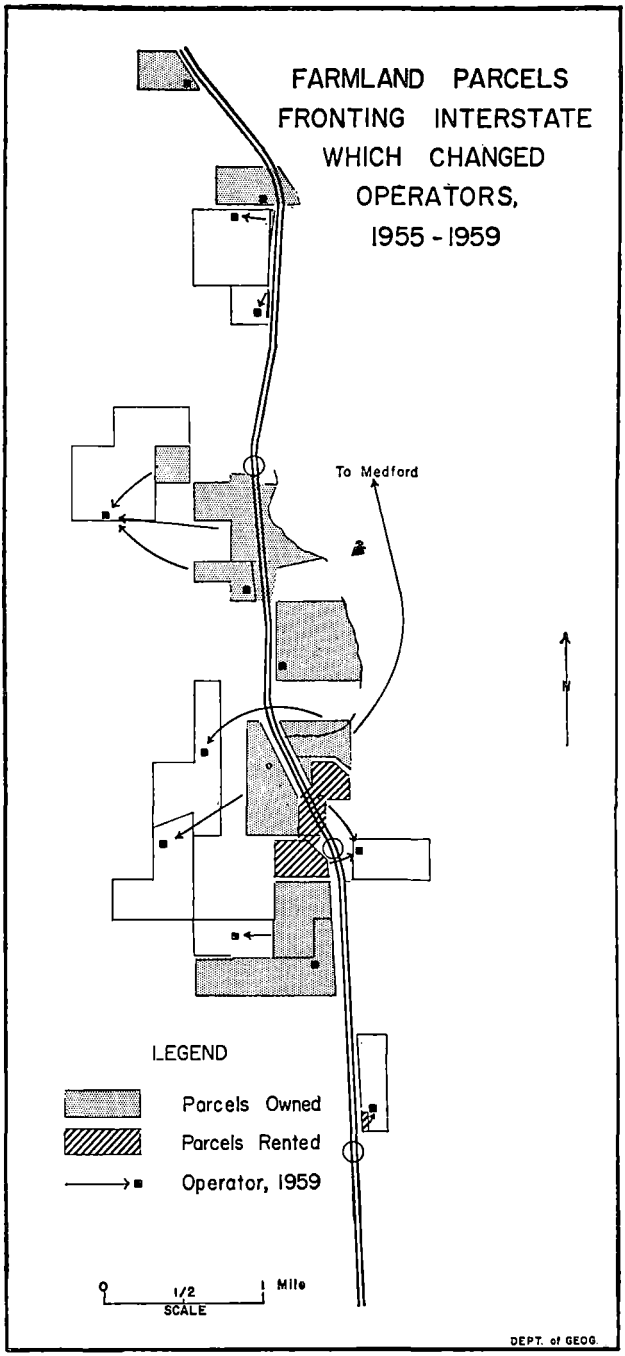
FARMLAND PARCELS
FRONTING INTERSTATE
WHICH CHANGED
OPERATORS,
1955 - 1959
To Medford
N
LEGEND
Parcels Owned
Parcels Rented
Operator, 1959
0
1/2
1 Mile
SCALE
DEPT. of GEOG.

Figure 6.

ators sold their land to other farmers in a way that by 1959, twenty-nine farms abutted the Interstate Highway. The increasing complexity of farm boundaries suggests that farms are becoming increasingly fragmented.

There are no analyses for a large rural area of how farm units are becoming more fragmented and are split by railroads, roads, or intervening farmland.

In the study segment in 1955, five of the original twenty-eight farmers operated tracts that were separated by intervening farmland. By 1959, twelve of the twenty-nine farmers with land fronting the Interstate Highway operated parcels separated by intervening farmland. Thus, construction of Interstate 35 instigated adjustments that included sale of farmland, which in turn resulted in more fragmentation of operating units. Moreover, the number of sales or transfers of farmland among operators increased along the eight-mile study segment after 1955. In southern Minnesota from 1955 to 1959, one farm in five experienced a title transfer. In the Interstate segment, for the same time period, one farm in two had a title transfer – either for a whole farm or for a portion, usually a severed tract.

Fig. 6 presents the pattern of farmland parcels fronting the Interstate which changed operators between 1955 and 1959. It does not reveal other parcels that farmers along the route may have purchased some distance away from the route. Note how some operating units became increasingly fragmented, how they increased in size, and how a few of the original units were combined into one farm. Thus, the Interstate Highway accelerated changes in land ownership as it accelerated trends toward fewer farms, larger farms, and increasing fragmentation.

Conclusions: It is apparent that in rural areas the Interstate System is not only consuming large amounts of land but also is rearranging the pattern of farm operating units. Farms fronting or astride the path of highway construction are either trimmed or severed into two or more parcels. Initially, highway construction decreases the size of farm operating units. In some cases, the freeway decreases the efficiency of a farm by isolating a portion of the farm so that portion cannot be reached directly.

Farmers appear to adjust to the change in numerous ways. The farmers buy, sell, and rent more land as they seek to reestablish optimum patterns of land use. These adjustments are in the same direction as trends underway elsewhere in American agriculture except that the adjustments along an Interstate Route are accelerated and take place at a faster rate than they do elsewhere.