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September 5, 2002

**BY ELECTRONIC FILING**

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: *Ex parte* in CC Docket No. 96-45 (DA Nos. 02-746 and 02-1465)

Dear Ms. Dortch:

On Wednesday, September 4, 2002, Bobby Williams and Annice Jordan of Millry Telephone Company, Inc., Glenn Brown of McLean & Brown and I had *ex parte* contacts with William Maher, Carol Mattey, Mark Seifert, Anita Cheng, Shannon Lipp, Cara Voght and Romanda Williams of the Wireline Competition Bureau as well as Sam Feder in Commissioner Martin's office. The purpose of each meeting was to discuss the Alabama Rural Local Exchange Companies' (the "Alabama Rural LECs") comments filed in response to the Public Notices issued in CC Docket No. 96-45, specifically the Petitions for Designation as an Eligible Telecommunications Carrier ("ETC") in the State of Alabama filed by RCC Holdings, Inc. and Cellular South License, Inc., DA Nos. 02-746 and 02-1465, respectively (the "Petitions").

In particular, we discussed the reasons why the Bureau should closely examine whether the public interest will be served by the designation of multiple ETCs in rural areas in Alabama, focusing on the fact that the benefits must exceed costs before concluding that Competitive ETC designations would advance the public interest. We discussed that when performing this analysis certain factors must not be overlooked, including increased Universal Service Fund size and network inefficiencies. We stated that the current rural Universal Service Fund represented a finite national resource that must be carefully managed for the public interest benefit for all rural consumers. The impact of multiple ETC designations in the territory of Millry Telephone Company, Inc. was also discussed. Finally, we discussed the requirement that, because of its authority over the service boundaries of the Alabama Rural LECs, any reclassification of wire

centers affected by these Petitions must be done with the active input of the Alabama Public Service Commission.

Mr. Brown distributed the attached materials at the meetings. Also during our discussion, we were asked to provide certain follow-up information. That request was to provide certain additional maps. Mr. Brown transmitted said additional maps directly to Mark Seifert for his distribution to the other meeting participants and they are also attached. In accordance with Section 1.1206 of the Commission's rules, this letter and the attached are being filed via the Commission's ECFS system. Please direct any questions concerning this matter to me at 334/265-1500.

Sincerely,

BRANTLEY, WILKERSON & BRYAN, P.C.

Mark D. Wilkerson /lsc

Mark D. Wilkerson
Counsel for the Alabama Rural LECs

Attachments

cc: Anita Cheng
Samuel Feder
Shannon Lipp
William Maher
Carol Mattey
Mark Seifert
Cara Voght
Romanda Williams
Alabama Public Service Commission
BellSouth Telecom, Inc.
CTIA
Verizon Mid-States/Verizon South, Inc.
ALLTEL Corporation
Lukas, Nace, Gutierrez & Sachs, Chartered

**Alabama Ex-Parte Presentation**
**Rural ETC Designations**
**September 4, 2002**

## Positions of the Parties

### Cellular South/RCC Cellular

- APSC has ceded jurisdiction over CETC designation
- Cellular South/RCC offers all required services and functionalities
- Cellular South/RCC's designation as an ETC will serve the public interest
    - Customer choice, high-quality service, lower price

### Alabama PSC

- The public interest standard must be thoroughly investigated by the FCC
- The Cellular South and RCC requested ETC areas overlap meaning potentially 3 ETCs in some areas
- Increased funding imposes cost on all subscribers
    - The APSC shares concerns expressed by Comm. Martin regarding funding multiple carriers in high cost areas
- APSC has authority over service territory boundaries of rural ILECs, and has serious concerns with the proposed reclassification of wire centers in these petitions

### Alabama Rural LECs

- Cellular South and RCC have not established that they meet the requirements for ETC designation
- For either application to be found to be in the public interest it must be clearly demonstrated that the public benefits exceed the public costs
- There are two significant costs that must be considered
    1. Increased Fund Size
    2. Network Inefficiencies
- The APSC must have an active role in the redefinition of service areas of rural Alabama LECs

## Specific Facts and Data

### The "public interest" requires that benefits exceed costs

- Benefits
  - Customer choice
  - Higher quality, lower cost
- Costs
  - Increased fund size
    - The "customer list" problem
    - High-cost payments for serving existing customers
    - Substantial increase in funding requirements
    - See attached chart
  - Network inefficiencies
    - Commissioner Martin's quote
    - Decreasing density increases costs in sparse areas
  - See attached white paper

### The rural Alabama market

- See Attached Maps
- Millry Telephone Company
  - General description
  - Extremely rural
    - 89% less than 100 HH/sq mi
    - 6.8 HH/sq mi average density
  - Included in Cellular South and RCC ETC request
    - RCC serves 623 lines (per HC7 3Q02)
    - Cellular South not shown of HC7 3Q02

| RCC | CS | Part. | Company_Name | Loops | Monthly Support | % 0 to 5 HH/sq mi | % 5 to 100 HH/sq mi | % over 100/sq mi | Density HH/sq mi | Proxy Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| X | | X | ALLTEL ALABAMA | 28,346 | $12.90 | 1.1% | 47.5% | 51.4% | 33.0 | $43.04 |
| X | X | X | BUTLER TEL CO INC | 8,771 | $19.60 | 9.5% | 61.5% | 29.0% | 10.2 | $59.32 |
| | X | | CASTLEBERRY TEL CO | 1,010 | $15.90 | 8.8% | 61.5% | 29.7% | 9.8 | $78.31 |
| X | X | X | FRONTIER - ALABAMA | 14,341 | $5.12 | 13.0% | 46.5% | 40.5% | 8.8 | $55.85 |
| X | | | FRONTIER - LAMAR CTY | 2,469 | $14.33 | 8.1% | 55.2% | 36.8% | 13.4 | $72.05 |
| X | X | X | FRONTIER - SOUTH | 13,543 | $12.81 | 9.3% | 36.1% | 54.6% | 10.9 | $48.04 |
| X | | | GTC, INC. - AL | 2,687 | $16.52 | 16.7% | 38.6% | 44.7% | 7.4 | $65.88 |
| | X | | GULF TEL CO | 51,169 | $5.13 | 0.4% | 26.2% | 73.4% | 69.1 | $38.62 |
| X | | | HAYNEVILLE TEL CO | 2,611 | $26.53 | 10.7% | 57.8% | 31.5% | 8.1 | $74.95 |
| X | | X | INTERSTATE TEL CO | 12,273 | $8.07 | 0.7% | 19.6% | 79.7% | 77.4 | $33.65 |
| X | X | X | MILLRY TEL CO | 7,127 | $22.17 | 17.5% | 71.5% | 11.0% | 6.8 | $75.13 |
| X | | X | MON-CRE TEL COOP | 3,492 | $23.95 | 12.8% | 79.3% | 7.9% | 9.9 | N/A |
| X | | | MOUNDVILLE TEL CO | 1,871 | $36.06 | 12.5% | 50.7% | 36.8% | 10.1 | $51.26 |
| X | | | PINE BELT TEL CO INC | 2,674 | $37.44 | 14.8% | 75.4% | 9.8% | 7.9 | $86.23 |
| X | | | ROANOKE TEL CO INC | 5,434 | $10.75 | 1.5% | 48.0% | 50.5% | 30.6 | $43.30 |

McLean & Brown

ISSUE UPDATE
SPECIAL EDITION

June 25, 2002

# USF Portability – Getting it Right

## Introduction

In our last white paper *The Coming Train Wreck in Universal Service Funding – Why is it coming and how do we avoid it?* (Issue Update January 18, 2002) we outlined several forces that were causing the size of the universal service fund to grow at significant and unsustainable levels. One of those factors is portability of support to Competitive Eligible Telecommunications Carriers (CETCs). In this paper we will focus on portability of high-cost universal service support, and how portability issues can be addressed in a manner that both the pro-competitive and universal service goals of the 1996 Act can be achieved.

In his separate statement accompanying the MAG Order, Commissioner Kevin Martin made the following observation:

> I also note that I have some concerns with the Commission's policy – adopted long before this Order – of using universal service support as a means of creating "competition" in high cost areas. I am hesitant to subsidize multiple competitors to serve areas in which costs are prohibitively expensive for even one carrier. This policy may make it difficult for any one carrier to achieve the economies of scale necessary to serve all of the customers in a rural area, leading to inefficient and/or stranded investment and a ballooning universal service fund.[1]

In this paper we will outline a framework to examine the issue of portability of high-cost universal service support to determine areas where portability may be in the public interest, and areas where it may not. We will develop an analytical construct to measure the public benefits and public costs of portability. We will also present a tool, using publicly available data, to identify rural areas of "extreme cost" where, as Commissioner Martin observes, costs are prohibitively expensive even for one carrier. Finally, we will comment on other policy issues raised by the portability question.

## Implementing the 1996 Act

Section 214(e) of the Act states that support is only available to Eligible Telecommunications Carriers (ETCs), and specifies the rules for designation of an ETC. Section 214(e)(1) provides that to be an ETC, a carrier must offer the defined list of universal service services as specified by the Joint Board and the FCC, and that the carrier must advertise its services in media of general distribution. Section 214(e)(2) specifies the rules for the designation of multiple ETCs. It provides different rules for study areas served by rural and non-rural carriers. Specifically, it states:

- The Commission <u>may</u> for rural companies, and <u>shall</u> for non-rural rural companies, designate more than one ETC.
- Before designating additional ETCs for a rural company area the State PUC shall find that the designation is in the <u>public interest</u>. (emphasis added)

Thus, before a CETC is designated in a rural study area, an affirmative finding must be made that such designation serves the public interest. In the remainder of this paper we will focus on the public interest aspects of multiple ETCs, and what factors would influence whether or not a particular CETC designation would advance the public interest.

Section 254 outlines the universal service principles of the 1996 Act. Six basic principles are provided calling for comparable services at comparable and affordable rates in both urban and rural areas. It also calls for specific, predictable and sufficient support mechanisms, and equitable contributions from all interstate telecommunications providers. In a seventh "principle", Congress provided for "...other principles as the Joint Board and the Commission determine are necessary and appropriate for the protection of the public interest, convenience, and necessity and are consistent with this Act". In the Joint Board recommendation made in November, 1996, as well as in the FCC's decision in May, 1997, an additional principle of "competitive neutrality" was added as they felt that this would be consistent with the Act's general encouragement of competition in local telecom markets.

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[1] 2nd R&O and FNPRM in CC Docket No. 00-256, 15th R&O in CC Docket No. 96-45, and R&O in CC Docket Nos. 98-77 and 98-166, Released November 8, 2001, *Separate Statement of Commissioner Kevin J. Martin.*

## Measuring the Public Interest

While Congress directs Commissions to approve an ETC filing for a rural study area only when it is in the public interest, they provide no specific guidance as to how such a determination should be made. We would suggest that a reasonable means of doing so would be the method normally used when facing any decision – do the benefits outweigh the costs? Specifically in this case, do the public benefits of having multiple ETCs exceed the public costs of supporting multiple ETCs. This relationship can also be expressed as a formula as follows:

**Public Benefits – Public Costs = Public Interest Impact**

If the benefits exceed the costs, then the impact is positive. Conversely, if the costs exceed the benefits, then the impact would be negative.

Following are some of the major benefits and costs that might be expected from having multiple ETCs in a given area:

**Benefits:**

- Additional market entrants
- Service to higher-cost areas that competitors would not serve absent support
- General benefits of a competitive market including:
  - Additional customer choices of suppliers and technology
  - Lower price/higher quality

**Costs:**

- A larger fund size resulting in higher assessments on all users
- Higher costs for all suppliers as multiple networks are less efficient than a single network

**Benefits of Multiple ETCs**

The benefits of having multiple ETCs are those generally associated with competition in any market – greater choice, lower prices, more services, etc. Federal and state decisions supporting ETC designations have not specifically quantified such benefits, and rarely have considered any of the potential costs of portability of support.[2] The FCC's Order granting the application of Western Wireless for ETC status in the state of Wyoming provides a good example of the type of generalized reasoning that is found in decisions granting ETC status in rural areas.[3] In this Order the Commission states:

- Wyoming consumers will benefit from the provision of competitive service and new technologies in high-cost and rural areas.
- An important goal of the Act is to open local telecommunications markets to competition.
- Designation of competitive ETCs promotes competition and benefits consumers in rural and high-cost areas by increasing customer choice, innovative services, and new technologies.
- It will also provide an incentive to the incumbent rural telephone companies to improve their existing network to remain competitive, resulting in improved service to Wyoming consumers.
- The provision of competitive services will facilitate universal service to the benefit of consumers in Wyoming by creating incentives to ensure that quality services are available at "just, reasonable and affordable rates".
- Rural consumers may benefit from expanded local calling areas by making intrastate calls more affordable to those consumers.

The Commission does address concerns regarding possible negative consequences of competition in rural areas, but does so in a very general and dismissive manner:

- We find no merit to the contention that designation of an additional ETC in areas served by rural telephone companies will necessarily create incentives to reduce investment in infrastructure, raise rates, or reduce service quality to consumers in rural areas.
- To the contrary, we believe that competition may provide incentives to the incumbent to implement new operating efficiencies, lower prices, and offer better service to its customers.
- While we recognize that some rural areas may in fact be incapable of sustaining more than one ETC, no evidence to demonstrate this has been provided relating to the requested service area.

In the last statement above, the Commission clearly lays down the challenge that any attempt to argue against ETC designation in certain high-cost rural markets will require strong and convincing facts and data. In the remainder of this paper we will lay out ideas on how to quantify the costs associated with portability of support in high-cost rural areas. We will focus on two major areas of cost - the cost of increased funding, and the cost of network inefficiencies.

**Costs of Multiple ETCs**

**Increased Fund Size**

As the number of companies eligible to receive funding increases, the demands on the fund are sure to grow. Under current federal rules, there is no limitation to the number of supported lines that an individual customer may have. There has been discussion of perhaps limiting support to one "primary line" to each customer location as a means of mitigating the growth of the fund. The primary line concept, however, brings with it additional complications that will be discussed more fully in a following section.

There is another problem associated with the grant of ETC status to existing carriers, particularly wireless carriers, that we will call the "customer list" problem. Many carriers applying for ETC status already provide service to customers within the study area for which they seek ETC designation. These customers were obtained under business plans that did not anticipate or require explicit support. When such a carrier is granted ETC status, however, they often request funding for all of the existing customer lines. This results in an immediate and significant increase in the size of the fund for little tangible near-term benefit. Some state Commissions have attempted to impose service requirements or pricing limitations on wireless carriers who have been granted ETC status, however the wireless industry has been insistent that federal law precludes state regulation of wireless services. When a wireless carrier (or any carrier who currently provides

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[2] A recent exception occurred in Utah where the Utah Supreme Court recently upheld an order by the Utah PSC denying Western Wireless CETC status on the basis that this would increase demands on the state USF without any offsetting benefits.

[3] DA 00-2896 released December 26, 2000.

service in the study area) seeks ETC designation, it should be determined whether that carrier will seek support for pre-existing lines, and the costs of any such support must be included in the cost/benefit calculus.

Recent data regarding USF payments to CETCs tends to support the impact that the customer list problem is having on the overall fund size. Chart 1 shows the amount of support payments to CETCs for the third quarter of 2001 through the third quarter of 2002. It is evident that the amount of this funding is growing rapidly. Chart 2 shows the top 20 fund recipients for the third quarter of 2002 as shown on USAC report HC1. Of interest is the fact that 15 of the top 20 recipients are receiving their first payments from the fund in the third quarter.[4] This would tend to support the idea that the customer list problem is having a significant impact on the size of the fund, as their support begins at a high level.

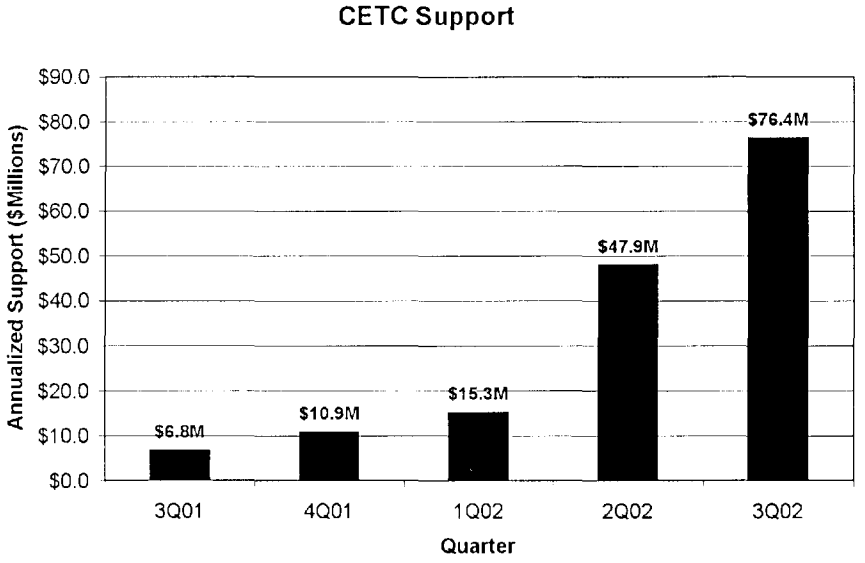


**Chart 1**

| Company | State | Type | Annual |
|---|---|---|---|
| * CELLULAR SOUTH LICENSE | MS | R | $27,831,228 |
| CENTENNIAL PCS OPER | PR | N | $15,089,856 |
| SMITH BAGLEY | AZ | R | $7,145,508 |
| UNITED STATES CELLULAR | WA | R | $6,082,608 |
| * MIDWEST WIRELESS-MN | MN | R | $5,802,012 |
| * MIDWEST WIRELESS-IA | IA | R | $2,035,884 |
| * NE COLORADO CELLULAR | CO | R | $1,938,552 |
| * VIRGINIA CELLULAR | VA | R | $1,739,700 |
| * RCC HOLDINGS | AL | R | $1,377,804 |
| * GUAM CELLULAR | MP | R | $1,045,188 |
| * RFB CELLULAR | MI | R | $945,972 |
| * HARGRAY WIRELESS | SC | R | $756,888 |
| * MCI METRO | NY | N | $651,096 |
| * MID-RIVERS TEL COOP | MT | N | $475,668 |
| * CUMBY TEL | TX | N | $470,568 |
| * WESTERN WIRELESS | SD | R | $405,516 |
| WESTERN WIRELESS | MN | R | $340,668 |
| BEN LOMAND COMM | TN | R | $282,864 |
| * SANTA ROSA TEL | TX | N | $254,508 |
| * GCI | AK | R | $170,052 |

Source: USAC HC1 3Q02

* Indicates 3Q02 is the first quarter in which company is receiving funding

**Chart 2**

[4] There appear to be several anomalies in the USAC data. As an example, in 2Q02 Centennial PCS is shown as receiving $37M in funding vs. $7.8M 1Q02 and $15.1M 3Q02.

**Network Efficiencies**

The telecommunications industry is often said to exhibit economies of scale – that is, the larger the network, the lower the average cost of serving each of the customers connected to it becomes. This is due in large part to the high fixed costs associated with constructing a network. Telecommunications networks are also sensitive to the density of the serving area, with costs being inversely proportional to population density. In high-density urban or town areas, costs tend to be low, as customers are located close to one another, and infrastructure costs can be shared among more customers. In low-density rural areas costs tend to be high, since there are often long distances between customers, and fewer customers must shoulder the burden of fixed network costs. In the landmark *White Paper II -- The Rural Difference*,[5] the Rural Task Force (RTF) documented the significant differences between rural and non-rural study areas. Key among these differences were low population density and high fixed costs.

The relationship of population density to cost can be easily seen in publicly available data from the FCC's proxy model proceeding. The following Chart 3 shows the nationwide average monthly cost of providing basic telephone service in each of the nine density bands identified by the FCC.[6] While the RTF found that proxy models were not sufficiently accurate to develop support requirements for individual rural companies, *White Paper IV* states that this is due to the inability to accurately estimate costs at the individual rural wire center or study area level.[7] By using a nationwide average of costs for each density zone, these individual inaccuracies will tend to average out, and the resulting data forms a reasonable basis for comparing the relative costs of the different density zones.

| Households per Square Mile | Nationwide Average Cost |
|---|---|
| 0 to 5 | $133.00 |
| 5 to 100 | $48.44 |
| 100 to 200 | $30.72 |
| 200 to 650 | $26.87 |
| 650 to 850 | $25.05 |
| 850 to 2550 | $23.11 |
| 2550 to 5000 | $21.83 |
| 5000 to 10,000 | $20.25 |
| > 10,000 | $18.16 |

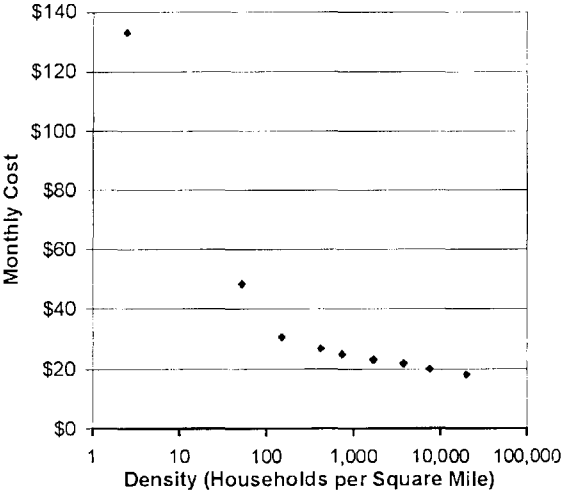


**Chart 3**

Source: BCPM3.0 with FCC Common Inputs

[5] Copies of this and other RTF documents referenced in this paper can be obtained on the RTF web site at www.wutc.wa.gov/rtf.

[6] The data is taken from the BCPM 3.0 with FCC Common Inputs. The BCPM is the only model with publicly available data for all rural and non-rural study areas. Other proxy models show a similar relationship of density to cost.

[7] See *White Paper IV- A Review of the FCC's Non-Rural Universal Service Fund Method and Synthesis Model for Rural Telephone Companies*, at Page 10.

What is clear from the data on Chart 3 is that costs increase gradually with decreasing population density until around 100 households per square mile. Below this level costs increase geometrically as density decreases. When two or more ETCs serve the same territory, the average subscriber density for each will be less than if a single company served the same territory. One possible way to measure the efficiency loss experienced by funding more than one ETC is to look at the increase in average cost that will be experienced as a result of the decrease in average density. The following Chart 4 illustrates this for two different scenarios:

Company A, shown on the right side of the chart, serves a densely populated area with relatively low costs. If the entry of an additional carrier results in a reduction in subscriber density from $A_1$ to $A_2$, the resulting efficiency loss is negligible. On the other hand, Company B, shown on the left side of the chart, serves a relatively sparsely populated area. Notice that an equivalent reduction in density from $B_1$ to $B_2$ results in a significant and much larger loss of efficiency due to the nature of the density/cost relationship.

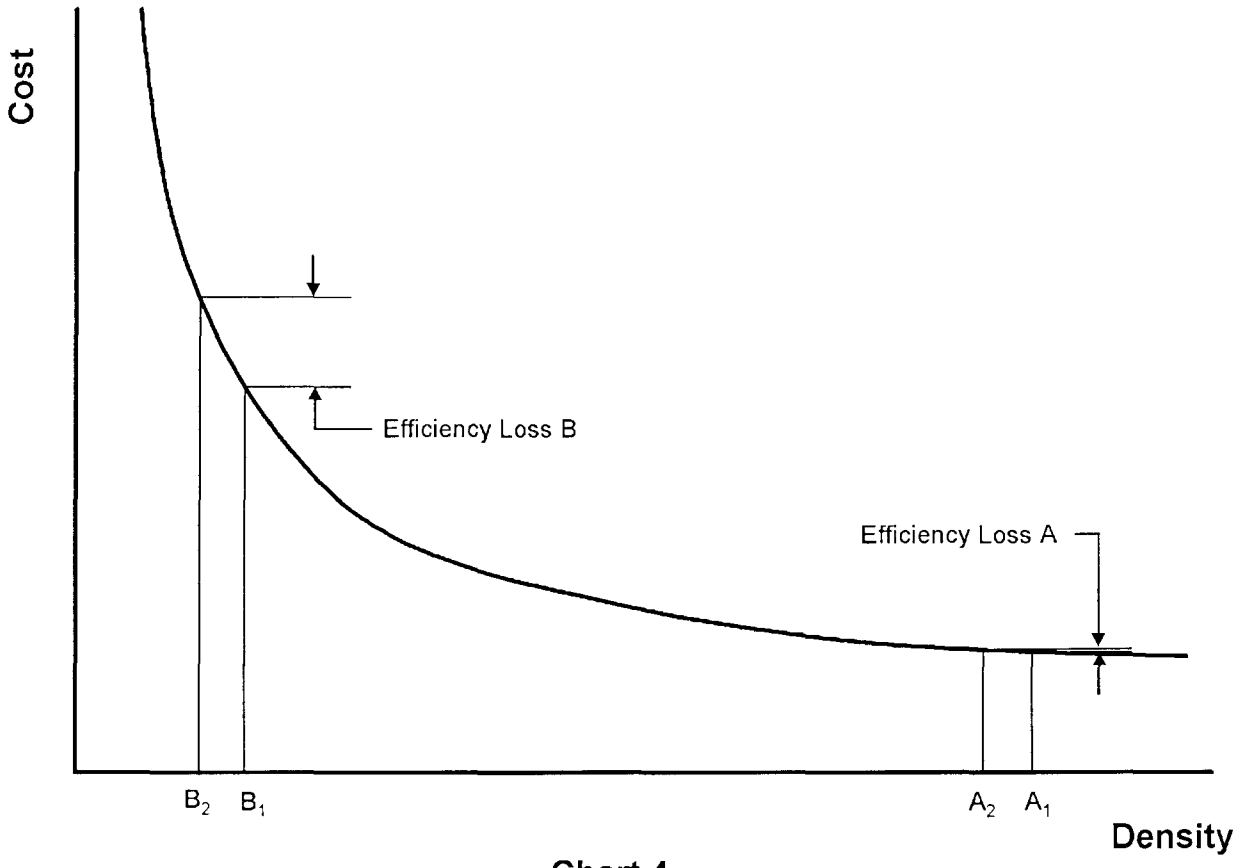


**Chart 4**

## Note to Readers

Due to the importance of the subject matter, this *Special Edition* of the *Issue Update* is being made publicly available on the M&B web site, and may be distributed to other parties. Effective November 19, 2001 the McLean & Brown *Issue Update* underwent changes to provide more in-depth coverage of the fast moving world of universal service and access reform. At the same time, the publication began distribution on a subscription basis. Recent topics covered in the *Issue Update* have included summaries of FCC Orders regarding universal service and access reform, concise summaries of comments and reply comments in key FCC proceedings, and timely commentary on these critical issues.

For information on the *Issue Update* and to subscribe, visit the M&B web site at www.mcleanbrown.com.

**Measuring Density/Cost Relationships**

One way to approximate the increased costs associated with declining customer density is to use the data in Chart 3. This data represents nationwide average costs by density zone taken from the publicly available proxy model. Using the data points in two highest cost density zones (0 to 5 and 5 to 100), and using the mid-point of the range as the measure of density, it can be computed that each unit decrease in households per square mile in a serving area will result in an increase of approximately $1.70 per line per month for all of the lines in that particular area for densities within this range. For example, a decrease in density from 40 households per square mile to 30 households per square mile would result in an approximate $17 per line per month increase in cost for all customers in this service area. Since we are dealing with nationwide averages, these numbers should be viewed as approximate, however this data does confirm that there are significant costs associated with decreased customer density, particularly when density is less than 100 households per square mile.

Actual density statistics for particular service areas can be developed from publicly available data. A simple, but misleading, measurement of density can be performed by dividing the number of lines a company serves by the area of its serving territory. This would be misleading, since the cost of providing service is strongly influenced by the presence or absence of "clustering" of customers. A given number of customers uniformly distributed over the serving area would have very different cost characteristics from a situation where the same serving area had most customers densely clustered in a town, with only a few scattered through the surrounding area. Indeed, the cost data shown in Chart 3 was developed by examining the costs of small areas of geography.

A rural ILEC can experience a reduction in density and increase in cost in two ways. First, as described earlier, any reduction in total line count measured against a fixed land area will result in a reduction in average density for that particular area. Second, and more significant, the CETC is likely to compete most vigorously in the densely populated portions of the study area (a town for example) where costs will be lowest. To the extent that the CETC captures more of these lower-cost customers, the percentage of the ILEC's customers in the highest-cost zones will increase.

To analyze density and cost characteristics for real-world telephone companies, McLean & Brown has developed a database using data from the 2000 Census. This database starts with housing data at the Census Block level, and processes this data through sophisticated mapping software that includes telephone company wire center and study area boundaries. This allows the identification of high-density low-cost population clusters, as well as other areas with low population density and higher costs.

From the density zone/cost relationships shown on Chart 3, it is evident that at approximately 100 households per square mile the density/cost curve begins its dramatic upward ascent. Thus, by measuring the proportion of lines that are in the lowest two density zones – 0 to 5 and 5 to 100 households per square mile – it is possible to develop a measure of the relative high-cost nature or "ruralness" of a particular area.

The data in Chart 5 provides an illustration of the capabilities of this data base using a five state sample, and looking at density and cost at the wire center level. (While this particular sort was done at the wire center level, it is possible to develop similar data at the study area level or any other level of aggregation.) This table shows the number of wire centers having more than a given percentage of their lines in the two highest cost density zones. The Table shows this relationship separately for rural and non-rural study areas. This data clearly shows the differences between rural and non-rural study areas, as well as the diversity that exists within the universe of rural study areas.

From the left-hand side of Chart 5 it can be seen that 6.1% of rural wire centers in this sample area have more than 75% of their lines in the 0 to 5 households per square mile density zone. There are 12,993 households in these rural wire centers, with an average cost per line of $198.09. In contrast, only 0.2% of non-rural wire centers have over 75% of lines in the 0 to 5 density zone. Almost one third (32.9%) of rural wire centers have more than 25% of their lines in the 0 to 5 density zone vs. 3.5% of non-rural wire centers.

**Wire Center Density/Cost Summary**

**5 State Sample (CO, NM, NY, OR, TX)**

**Population Density < 5 Households (HH) per Square Mile**

| Percentage of Lines < 5 HH/mi$^2$ | % Wire Centers | Number of WCs | % HHs | Number of HHs | Average Cost/Line |
|---|---|---|---|---|---|
| **Rural Carriers** | | | | | |
| 75% or more | 6.1% | 83 | 0.7% | 12,993 | $198.09 |
| 50% | 16.9% | 230 | 2.7% | 53,682 | $163.16 |
| 25% | 32.9% | 447 | 7.2% | 168,362 | $127.27 |
| 0% | 100.0% | 1,359 | 100.0% | 1,988,593 | $52.54 |
| **Non-Rural Carriers** | | | | | |
| 75% or more | 0.2% | 4 | 0.0% | 191 | $153.04 |
| 50% | 0.8% | 16 | 0.0% | 6,025 | $128.42 |
| 25% | 3.5% | 67 | 0.1% | 47,510 | $81.41 |
| 0% | 100.0% | 1,906 | 100.0% | 35,990,186 | $23.61 |

**Population Density < 100 Households (HH) per Square Mile**

| Percentage of Lines < 100 HH/mi2 | % Wire Centers | Number of WCs | % HHs | Number of HHs | Average Cost/Line |
|---|---|---|---|---|---|
| **Rural Carriers** | | | | | |
| 75% or more | 31.8% | 432 | 11.9% | 237,297 | $106.45 |
| 50% | 59.7% | 812 | 32.2% | 640,641 | $79.23 |
| 25% | 84.5% | 1,149 | 62.1% | 1,235,352 | $63.95 |
| 0% | 100.0% | 1,359 | 100.0% | 1,988,593 | $52.54 |
| **Non-Rural Carriers** | | | | | |
| 75% or more | 5.6% | 106 | 0.3% | 113,729 | $70.67 |
| 50% | 20.0% | 382 | 1.8% | 648,383 | $52.32 |
| 25% | 41.3% | 788 | 6.0% | 2,160,384 | $42.62 |
| 0% | 100.0% | 1,906 | 100.0% | 35,990,186 | $23.61 |

**Chart 5**

The right-hand side of Chart 5 provides similar data for line density that is less than 100 households per square mile (both the 0 to 5 and 5 to 100 density zones). Here it can be seen that almost one third (31.8%) of rural wire centers have 75% of their lines in the lowest two density zones vs.5.6% for non-rural wire centers. Most rural wire centers (84.5%) have at least 25% of their lines in zones with less than 100 households per square mile, while less than half (41.3%) of non-rural wire centers have at least 25% of their lines in these zones.

**Putting it all Together**

In any other situation where a private entity sought tens, if not hundreds, of millions of dollars of scarce public funds, the burden of proving that such a grant would be in the public interest would fall squarely on their shoulders. In the case of portability of universal service support, however, the burden appears to fall to the ILEC to prove that such a grant is not in the public interest. As discussed earlier, the benefits advanced in support of portability are often generalized observations regarding the positive effects of competition. To the extent that an acknowledgement is made that there are public costs associated with portability, these are dismissed as not having been proven or substantiated.

One approach to this problem would be to set out an approximation of the costs associated with the CETC portability, and challenge the party seeking access to high-cost funding to demonstrate that the public benefits exceeded this level. This white paper has identified two primary costs associated with portability – increased fund size and decreased network economies. Approximations of both of these costs can be developed, as discussed earlier. These costs would, of course, be dependent on the density distribution of customers in the serving area, the area in which the new CETC seeks to market its services, and whether funding is sought for existing customers within this serving area.

Benefits will be dependent on a number of factors, particularly what new areas that are currently un-served will receive service, and what new services, pricing plans and options will be offered. If no new areas will be served, and no new services will be provided, then it would appear that such a grant of CETC status would fail the pubic interest test. The job of the policy maker thus becomes one of determining if there is a proper balance of benefits to costs to conclude that a CETC grant is in the public interest.

As demonstrated on Chart 4, in areas of low customer density there is a finite and undeniable network efficiency loss caused by the introduction of a second ETC. In some subset of rural America, it is possible to demonstrate that the costs associated with the designation of a second ETC can never be overcome by public gains from having multiple competing providers. In such "extreme cost" areas the public interest would be best served by one ETC functioning as Carrier of Last Resort.

## Other Policy Issues

**The Primary Line Issue**

As discussed more fully in the *Train Wreck* white paper, the issue of limiting support to one "primary line" for each customer raises a number of difficult public policy issues, and calls into question the meaning and sustainability of the Carrier of Last Resort (COLR) concept that lies at the heart of universal service. In addition to the difficulties of determining which line is the "primary" line, there are other issues involving the obligations and regulation of the incumbent including:

- If only one primary line in a high-cost area can receive support, is the provision of additional lines to a given customer location deregulated?
- If a customer were to select a carrier other than the ILEC as its "primary carrier", what would be the remaining obligations of the ILEC for that customer?
- If the ILEC still provided a line to the customer (without support), would the provision of that line be deregulated?
- Would the ILEC be obligated to provide an unsupported line?
- Would the ILEC be obligated to reconnect the customer if they became dissatisfied with the initial "primary carrier"?
- Does the concept of COLR have any meaning in a multi-primary carrier environment?
- Can the ILEC still be required to assume COLR obligation for the extreme-cost customers as the low-cost customers are gradually picked off?

**Level of Support**

Under current FCC rules, a CETC is eligible to receive the same level of support as the incumbent. Since the ILEC's support is based upon its embedded cost, this means that all CETCs, regardless of the technology that they employ, will receive support based upon the cost structure of the wireline incumbent. This can cause serious problems, since other technologies (particularly wireless) have markedly different cost structures, and wireline carriers experience costs that other carriers might not (e.g., presubscribed interexchange carrier, unlimited local usage, minimum bandwidth requirements, state regulatory costs, etc.). Section 254(e) of the 1996 Act states that the support that a carrier receives must be "sufficient", and that it be used only for the provision of supported services. To the extent that a CETC is provided with excessive support it not only needlessly drives up the level of the fund, but it also violates the specific provisions of the Act.

**Disaggregation of Support**

Recognizing that costs of serving individual customers vary widely within a study area, the RTF proposed, and the FCC approved, plans to allow ILECs to disaggregate support into two or more support zones. This would prevent a competitor from serving low-cost customers and receiving support based on study area averages. Carriers were required to elect one of three filing "Paths" – including a "self-certification" Path 3 – by May 15, 2002. After this date, carriers are limited only to the more cumbersome Path 2. Unfortunately, due in large part to the uncertainties created by the level and treatment of support to wireless carriers, many of the highest cost companies who would benefit most from disaggregation, were forced to choose the no-disaggregation Path 1 option. If, and when, a more rational and balanced plan for the determination of support portability is determined, carriers should be given an additional opportunity to make a Path 3 self-certification filing, if they so choose. Of course, if it is determined that in some subset of extreme-cost areas portability would not be in the public interest, then disaggregation will become a moot issues in these areas.

**The Proxy Model Issue**

In his separate statement to the FCC's Rural Universal Service Order issued in response to the RTF Recommendation, Chairman Michael Powell said the following:

> As the Order emphasizes, this is an interim five-year plan, reflecting the fact that we have more work to do in this area. Specifically, I believe it is important that we develop a permanent support mechanism, based on forward-looking costs, or another appropriate measure of costs, by which we can ensure that the rural high-cost loop fund grows no larger than is truly necessary to accomplish its purpose.[8]

The proxy model adopted by the FCC for use in determining support for non-rural carriers assumes a hyper-efficient network constructed by a single carrier in one instantaneous build-out. A proxy model is not, and never can be, precise enough at the individual rural wire center or study area level to serve as the basis for determining sufficient levels of support for rural carriers. Nonetheless, it is ironic that the Commission would in the case of proxy models insist on hyper-efficiency, yet in the case of USF portability, it promotes plans that result in hyper-inefficiency.

## Conclusion

For much of the previous century, the telephone network was considered to be a natural monopoly. Natural monopolies are generally defined as situations where the firm experiences decreasing unit costs over the entire extent of the market.[9] Beginning in the 1970s, motivated in part by promising advances in telecommunications technology, policy makers began to question whether this was still the proper model, and gradually began introducing competition. Competition was first introduced in customer premise equipment, then expanded into long haul transmission and long distance services. In each of these cases the competitive dynamics of multiple suppliers and technologies led to wider choice, lower cost, and advancing services for consumers. Clearly in these markets the benefits of competition far outweighed any loss of scale economy that may have existed.

The Telecommunications Act of 1996 completed this process by extending competition into the local distribution, or "last mile" market. The jury is still out on the success of this experiment. Competitors have emerged in some segments of the local market, but not in others. It is not the purpose of this paper to debate the issue of local competition – Congress has spoken and provided guidelines for its implementation. What we do want to focus on, however, is how the specific guidelines that have been provided for the designation of multiple ETCs should be implemented. In this context it is clear that Congress anticipated that there were some rural markets where portability should not occur.

If Congress had intended for CETCs to be approved in all rural areas, then they would have said so, as they did for non-rural areas. By stating that the Commission may designate more than one ETC if they can determine that such designation was in the public interest, they must have anticipated that there would be circumstances where it was not. In "extreme cost" rural areas the nature of the density/cost relationship is such that the introduction of a new competitor causes an increase in cost for all providers that greatly exceeds any benefits from having multiple suppliers. This is the phenomenon that Commissioner Martin was commenting on in the statement contained at the beginning of this paper. It is also noteworthy that several recent court decisions have taken a negative view of efforts to create "artificial competition".[10]

It is entirely possible that the local telephone marketplace is not a single homogenous market, and that some subset of the high-cost rural market might indeed be considered to be a natural monopoly, best served by a single ETC. This is not to say that there is not a role for competition in the evolution of this marketplace. As stated in the *Train Wreck* white paper, it may be possible to allow carriers to compete for the ability to become the single Carrier of Last Resort, and sole recipient of universal service funding.

The analytical framework and tools presented in this paper can provide an objective means for state commissions and the FCC to evaluate specific requests for CETC designation, and to insure that the public interest is preserved. Only by carefully assessing the costs and benefits of portability can policy makers assure that scarce public funds are used efficiently, and that the overall level of the fund can be maintained at sustainable levels. Universal service is a vital American resource. It is critical that we get it right.

McLean & Brown

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[8] 14th Report & Order and 22nd Order on Reconsideration, and FNPRM in CC Docket No. 96-45 and Order in CC Docket No. 00-256, released May 23, 2001, *Separate Statement of Michael K. Powell.*

[9] Alfred E. Kahn, The Economics of Regulation – Principles and Institutions, Page 119 / II.

[10] In USTA v. FCC the Court of Appeals for the D.C. Circuit comments that the Commission needs to look at differentiated markets, and that "synthetic competition" is not what Congress had in mind. In Verizon v. FCC, Justice Breyer (concurring in part and dissenting in part) states that the Statute supports competition "in so far as local markets can support that competition without serious waste".

# CETC Funding by Quarter

## Source USAC HC1

### 4Q02

| ST | SAC | Name | R | Annual |
|---|---|---|---|---|
| MS | 289001 | CELLULAR SOUTH LICENSE | N | $29,011,380 |
| PR | 639001 | CENTENNIAL PCS OPER | N | $5,466,104 |
| AZ | 459001 | SMITH BAGLEY | R | $7,065,231 |
| WA | 529001 | UNITED STATES CELLULAR | R | $6,258,744 |
| MN | 369002 | MIDWEST WIRELESS MN | R | $5,955,936 |
| CO | 469001 | NE COLORADO CELLULAR | R | $2,177,378 |
| IA | 359010 | MIDWEST WIRELESS IA | R | $2,002,692 |
| AL | 259001 | RCC HOLDINGS | R | $1,454,004 |
| VA | 199001 | VIRGINIA CELLULAR | R | $1,420,656 |
| MI | 319001 | RFB CELLULAR | R | $1,115,117 |
| MP | 659001 | GUAM CELLULAR | R | $1,111,740 |
| SC | 249001 | HARGRAY WIRELESS | R | $901,500 |
| GU | 669001 | GUAM CELLULAR | R | $713,436 |
| WA | 529002 | RCC HOLDINGS | R | $563,220 |
| SD | 399001 | WESTERN WIRELESS | R | $507,747 |
| MT | 489001 | MID-RIVERS TEL COOP | N | $475,992 |
| TX | 449004 | CUMBY TEL | N | $467,856 |
| WI | 339001 | CTC COMM | R | $414,323 |
| NY | 159001 | MCI METRO | N | $383,148 |
| MN | 369001 | WESTERN WIRELESS | R | $341,405 |
| TN | 299001 | BEN LOMAND COMM | R | $316,404 |
| AK | 619002 | ALASKA DIGITEL | R | $277,968 |
| TX | 449006 | SANTA ROSA TEL | N | $251,256 |
| AK | 619001 | GCI | R | $185,459 |
| NV | 559001 | WESTERN WIRELESS | R | $176,960 |
| NM | 499001 | SMITH BAGLEY | R | $169,993 |
| TX | 449003 | WESTERN WIRELESS | R | $166,332 |
| WV | 209002 | FIBERNET LLC | N | $145,740 |
| MO | 429001 | MARK TWAIN COMM | R | $127,886 |
| MT | 489002 | INTERBEL TEL COOP | R | $127,476 |
| KS | 419001 | WESTERN WIRELESS | R | $110,250 |
| IA | 359001 | HAWARDEN MUNICIPAL UTIL | R | $92,700 |
| IA | 359008 | SOUTH SLOPE COOPERATIVE | R | $85,776 |
| IA | 359005 | HEART OF IOWA COMM | R | $42,900 |
| TX | 449001 | W. T. SERVICES, INC | N | $42,120 |
| ND | 389002 | HTC | R | $39,816 |
| WY | 519001 | SILVER STAR TEL CO | N | $36,924 |
| IA | 359004 | FOREST CITY TELECOM | R | $33,312 |
| IA | 359009 | COON CREEK TELECOM | R | $29,184 |
| TX | 449002 | XIT TELECOM & TECH | N | $29,016 |
| IA | 359011 | OMNITEL COMMUNICATIONS | R | $26,916 |
| IA | 359007 | F & B COMMUNICATIONS | R | $18,924 |
| IA | 359013 | MANNING MUNICIPAL COMM | R | $12,288 |
| IA | 359018 | LOUISA COMMUNICATIONS | R | $12,060 |
| ND | 389001 | WESTERN WIRELESS | R | $10,703 |
| IA | 359015 | HARLAN MUNICIPAL UTILITIES | R | $10,656 |
| IA | 359003 | COON RAPIDS MUNICIPAL UTIL | R | $10,488 |
| IA | 359012 | LOST NATION-ELWOOD | R | $8,496 |
| IA | 359006 | INDEPENDENT NETWORKS | R | $8,184 |
| IL | 349004 | DIVERSE COMMUNICATIONS | R | $6,744 |
| IA | 359014 | GRUNDY CENTER COMM | R | $6,720 |
| MO | 429002 | FIDELITY COMM SVCS I | R | $5,856 |
| OK | 439002 | SAGE | N | $5,652 |
| IA | 359023 | REINBECK MUNICIPAL UTILITY | R | $4,260 |
| IA | 359022 | TCA | R | $4,176 |
| IL | 349001 | ONEIDA NETWORK SERVICE | R | $3,864 |
| IA | 359002 | LAURENS MUNICIPAL UTIL | N | $0 |
| TX | 449005 | NORTEX TELCOM | N | $0 |
| TX | 449010 | SAGE TELECOM | N | $0 |
| WV | 209001 | STRATUSWAVE | N | $0 |
| | | | | $74,451,119 |

### 3Q02

| ST | SAC | Name | R | Annual |
|---|---|---|---|---|
| MS | 289001 | *CELLULAR SOUTH LICENSE | R | $27,831,228 |
| PR | 639001 | CENTENNIAL PCS OPER | N | $15,089,856 |
| AZ | 459001 | SMITH BAGLEY | R | $7,145,508 |
| WA | 529001 | UNITED STATES CELLULAR | R | $6,082,608 |
| MN | 369002 | *MIDWEST WIRELESS-MN | R | $5,802,012 |
| IA | 359010 | *MIDWEST WIRELESS-IA | R | $2,035,884 |
| CO | 469001 | *NE COLORADO CELLULAR | R | $1,936,552 |
| VA | 199001 | *VIRGINIA CELLULAR | R | $1,739,700 |
| AL | 259001 | *RCC HOLDINGS | R | $1,377,804 |
| MP | 659001 | *GUAM CELLULAR | R | $1,045,188 |
| MI | 319001 | *RFB CELLULAR | R | $945,972 |
| SC | 249001 | *HARGRAY WIRELESS | R | $756,888 |
| NY | 159001 | *MCI METRO | N | $651,096 |
| MT | 489001 | *MID-RIVERS TEL COOP | N | $475,668 |
| TX | 449004 | *CUMBY TEL | N | $470,568 |
| SD | 399001 | *WESTERN WIRELESS | R | $405,516 |
| MN | 369001 | WESTERN WIRELESS | R | $340,668 |
| TN | 299001 | BEN LOMAND COMM | R | $282,864 |
| TX | 449006 | *SANTA ROSA TEL | N | $254,508 |
| AK | 619001 | *GCI | R | $170,052 |
| WV | 209002 | *FIBERNET LLC | N | $145,740 |
| NM | 499001 | *SMITH BAGLEY | R | $141,912 |
| TX | 449003 | WESTERN WIRELESS | R | $127,944 |
| NV | 559001 | WESTERN WIRELESS | R | $125,292 |
| MT | 489002 | *INTERBEL TEL COOP | R | $122,340 |
| MO | 429001 | MARK TWAIN COMM | R | $108,900 |
| IA | 359001 | HAWARDEN MUNICIPAL UTIL | R | $96,720 |
| IA | 359008 | *SOUTH SLOPE COOPERATIVE | R | $96,120 |
| WI | 339001 | CTC COMM | R | $91,500 |
| KS | 419001 | WESTERN WIRELESS | R | $89,136 |
| IA | 359005 | *HEART OF IOWA COMM | R | $56,988 |
| IA | 359004 | *FOREST CITY TELECOM | R | $43,452 |
| IA | 359009 | *COON CREEK TELECOM | R | $35,148 |
| WY | 519001 | *SILVER STAR TEL CO | N | $35,148 |
| IA | 359011 | *OMNITEL COMMUNICATIONS | R | $34,584 |
| TX | 449002 | *XIT TELECOM & TECH | N | $31,584 |
| TX | 449001 | W. T. SERVICES, INC | N | $29,628 |
| AK | 619002 | *ALASKA DIGITEL | R | $25,512 |
| IA | 359007 | *F & B COMMUNICATIONS | R | $21,912 |
| IA | 359013 | *MANNING MUNICIPAL COMM | R | $14,760 |
| IA | 359003 | *COON RAPIDS MUNICIPAL UTIL | R | $13,080 |
| IA | 359006 | *INDEPENDENT NETWORKS | R | $11,004 |
| IA | 359012 | *LOST NATION-ELWOOD | R | $10,056 |
| MO | 429002 | *FIDELITY COMM SVCS I | R | $9,768 |
| IA | 359015 | *HARLAN MUNICIPAL UTILITIES | R | $9,024 |
| ND | 389001 | *WESTERN WIRELESS | R | $7,992 |
| IA | 359014 | *GRUNDY CENTER COMM | R | $6,732 |
| IL | 349001 | *ONEIDA NETWORK SERVICE | R | $3,780 |
| GU | 669001 | GUAM CELLULAR | R | $0 |
| IA | 359002 | LAURENS MUNICIPAL UTIL | N | $0 |
| TX | 449005 | NORTEX TELCOM | N | $0 |
| TX | 449010 | SAGE TELECOM | N | $0 |
| WV | 209001 | STRATUSWAVE | N | $0 |
| | | | | $76,387,896 |

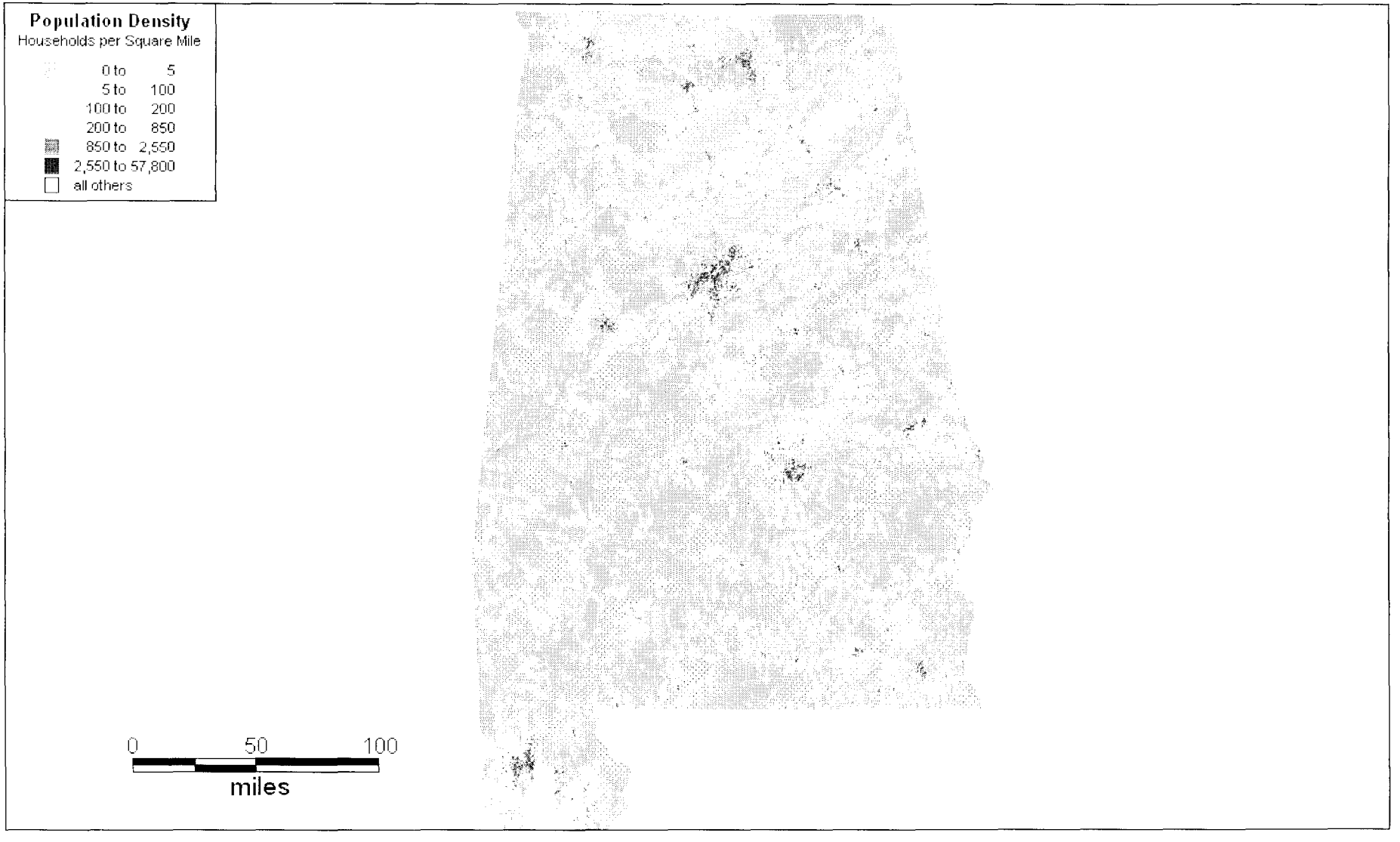
### 2Q02

| ST | SAC | Name | R | Annual |
|---|---|---|---|---|
| PR | 639001 | CENTENNIAL PCS OPER | N | $37,062,840 |
| WA | 529001 | UNITED STATES CELLULAR | R | $8,641,972 |
| AZ | 459001 | SMITH BAGLEY | R | $1,826,400 |
| IA | 359001 | HAWARDEN MUNICIPAL UTIL | R | $83,448 |
| WI | 339001 | CTC COMM | R | $82,584 |
| MN | 369001 | WESTERN WIRELESS | R | $78,576 |
| TX | 449001 | W. T. SERVICES, INC | R | $54,360 |
| NV | 559001 | WESTERN WIRELESS | R | $41,268 |
| TN | 299001 | BEN LOMAND COMM | R | $16,344 |
| MO | 429001 | MARK TWAIN COMM | R | $11,604 |
| TX | 449003 | WESTERN WIRELESS | R | $10,788 |
| KS | 419001 | WESTERN WIRELESS | R | $804 |
| IA | 359003 | COON RAPIDS MUNICIPAL UTIL | R | $0 |
| TX | 449004 | CUMBY TEL | N | $0 |
| IA | 359004 | FOREST CITY TELECOM | R | $0 |
| IA | 359005 | HEART OF IOWA COMM | R | $0 |
| NY | 159001 | MCI METRO | N | $0 |
| MT | 489001 | MID-RIVERS TEL COOP | N | $0 |
| TX | 449005 | NORTEX TELCOM | N | $0 |
| TX | 449006 | SANTA ROSA TEL | N | $0 |
| WY | 519001 | SILVER STAR TEL CO | N | $0 |
| NM | 499001 | SMITH BAGLEY | R | $0 |
| TX | 449002 | XIT TELECOM & TECH | N | $0 |
| | | | | $47,910,988 |

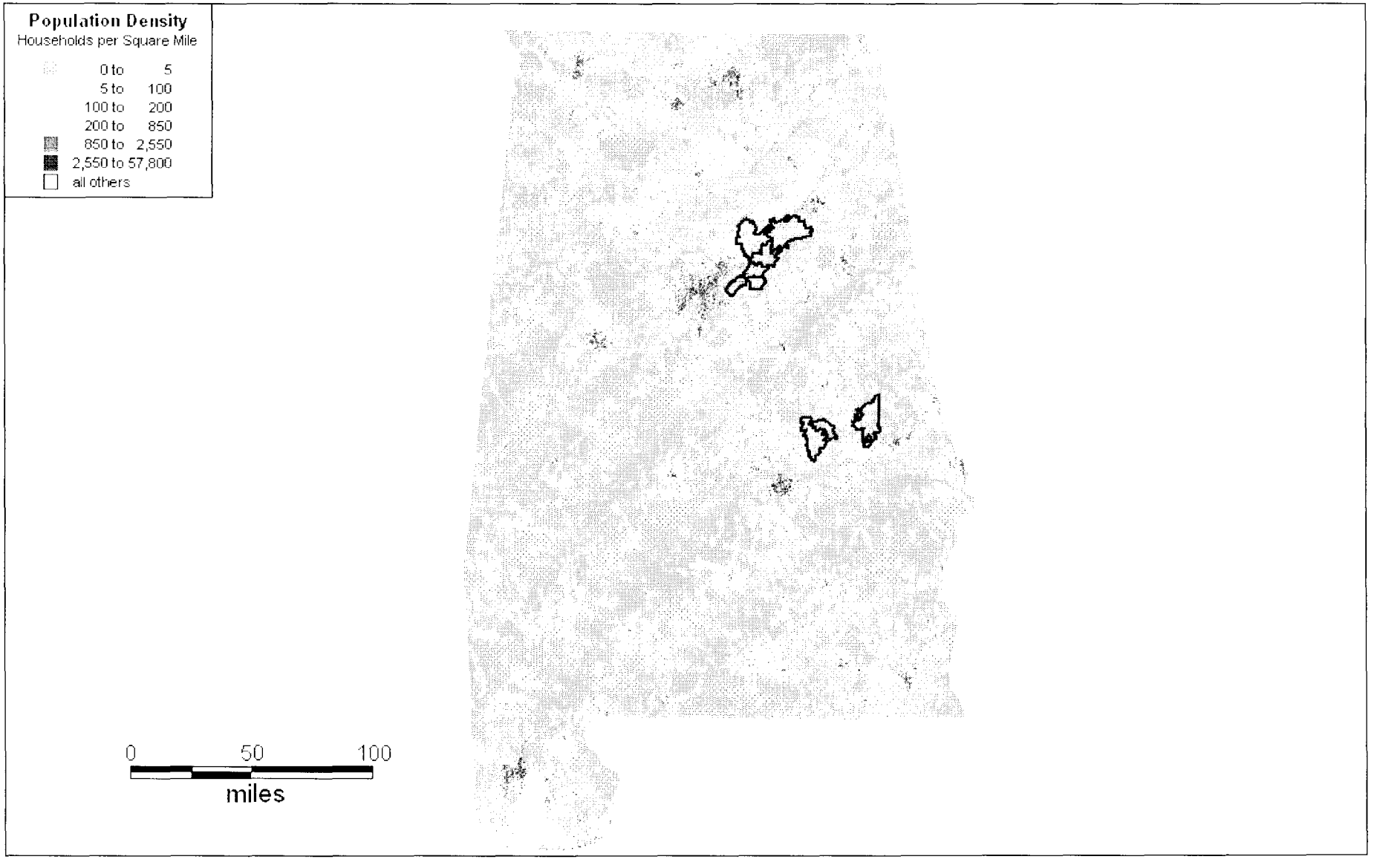
### 1Q02

| ST | SAC | Name | R | Annual |
|---|---|---|---|---|
| PR | 639001 | CENTENNIAL PCS OPER | N | $7,801,092 |
| WI | 339001 | CTC COMM | R | $160,296 |
| AZ | 459001 | SMITH BAGLEY | R | $149,208 |
| TN | 299001 | BEN LOMAND COMM | R | $123,792 |
| IA | 359001 | HAWARDEN MUNICIPAL UTIL | R | $33,768 |
| MN | 369001 | WESTERN WIRELESS | R | $23,448 |
| IA | 359003 | COON RAPIDS MUNICIPAL UTIL | R | $14,952 |
| NM | 499001 | SMITH BAGLEY | R | $9,720 |
| NV | 559001 | WESTERN WIRELESS | R | $5,040 |
| IA | 359004 | FOREST CITY TELECOM | R | $0 |
| IA | 359005 | HEART OF IOWA COMM | R | $0 |
| KS | 419001 | WESTERN WIRELESS | N | $0 |
| MO | 429001 | MARK TWAIN COMM | N | $0 |
| MT | 489001 | MID-RIVERS TEL COOP | N | $0 |
| NY | 159001 | MCI METRO | N | $0 |
| TX | 449001 | W. T. SERVICES, INC | N | $0 |
| TX | 449002 | XIT TELECOM & TECH | N | $0 |
| TX | 449003 | WESTERN WIRELESS | N | $0 |
| TX | 449004 | CUMBY TEL | N | $0 |
| TX | 449005 | NORTEX TELCOM | N | $0 |
| TX | 449006 | SANTA ROSA TEL | N | $0 |
| WA | 529001 | UNITED STATES CELLULAR | R | $0 |
| WY | 519001 | SILVER STAR TEL CO | N | $0 |
| | | | | $8,321,316 |

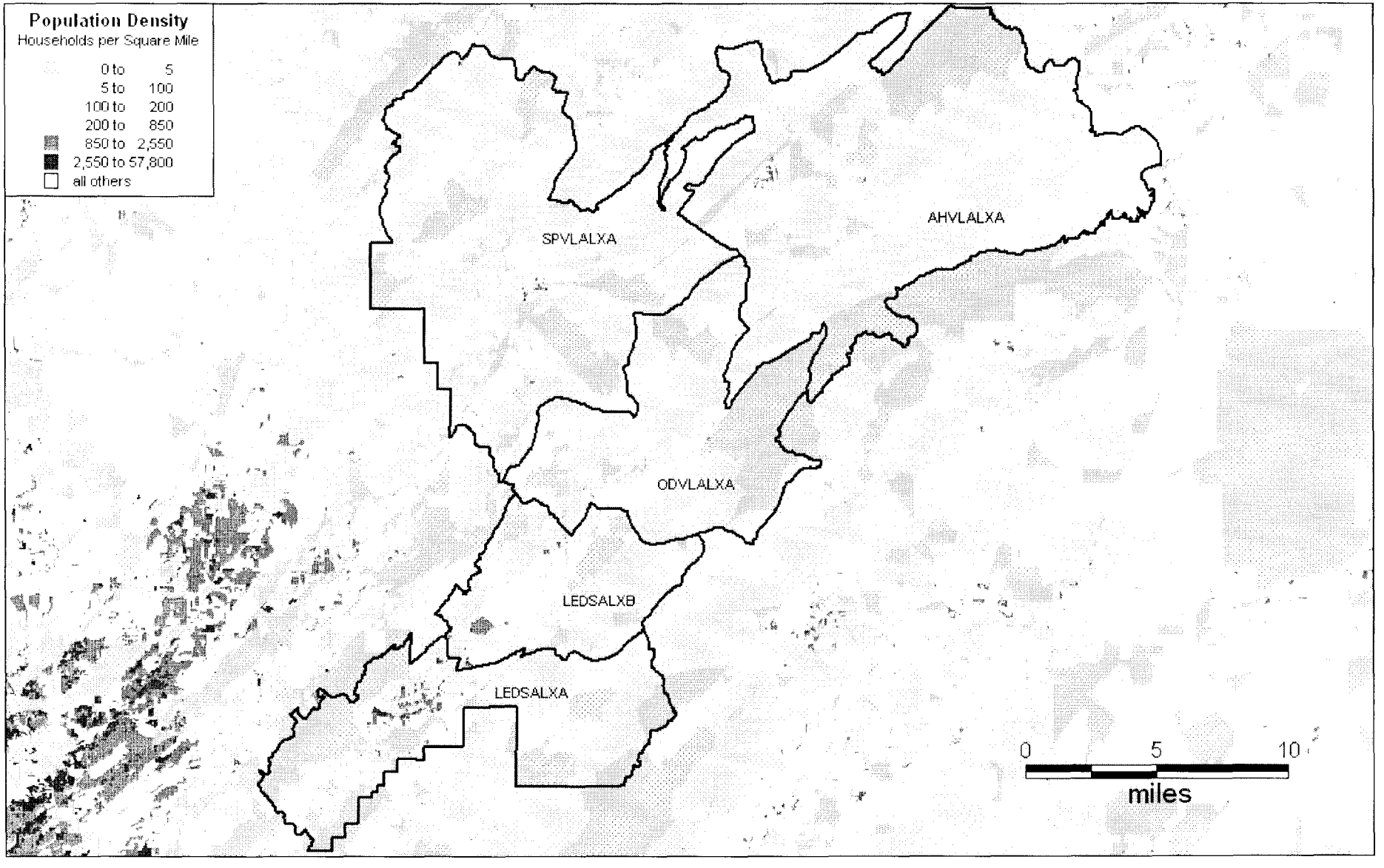
# Alabama


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

# Alltel


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

# Alltel (North)



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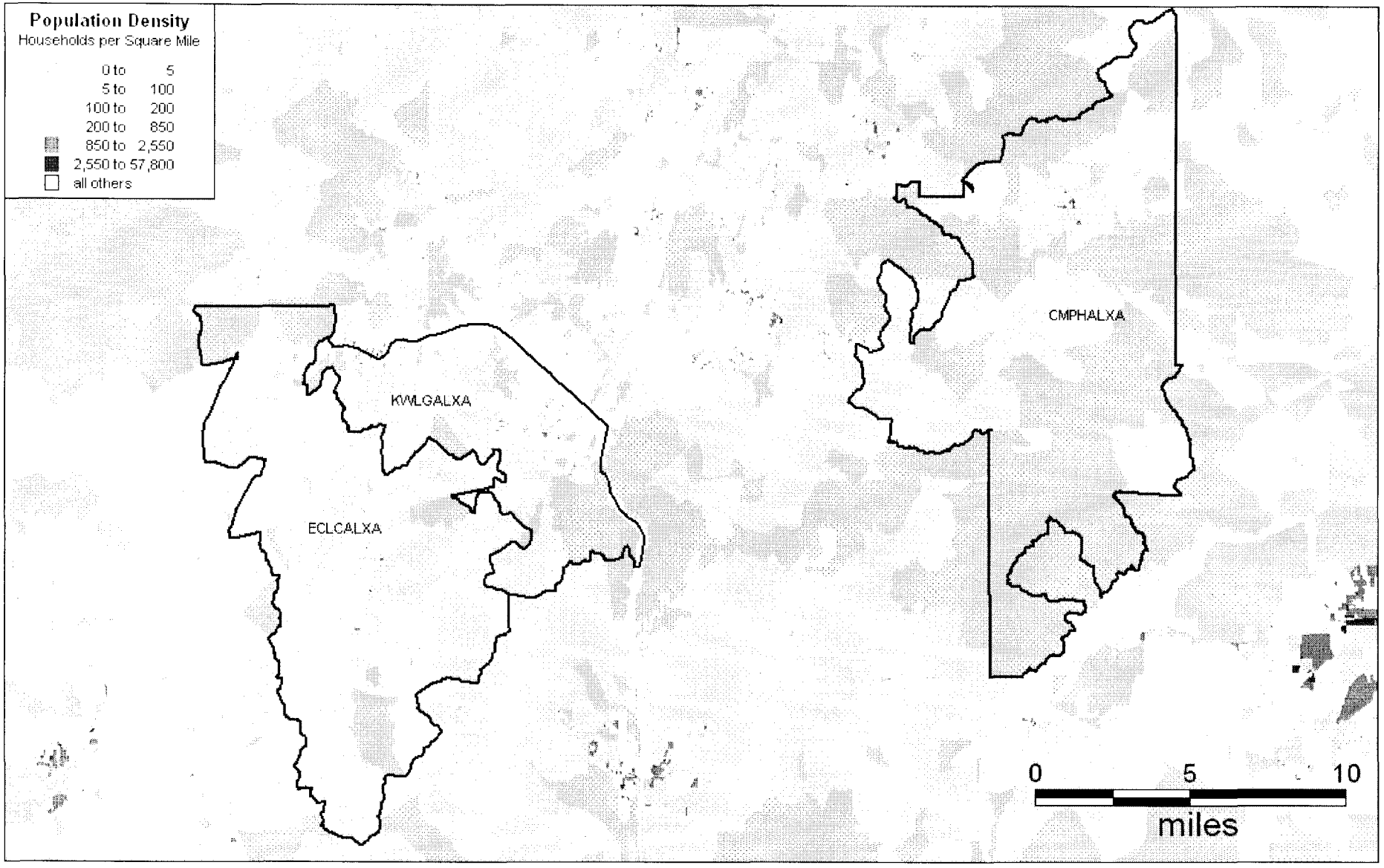
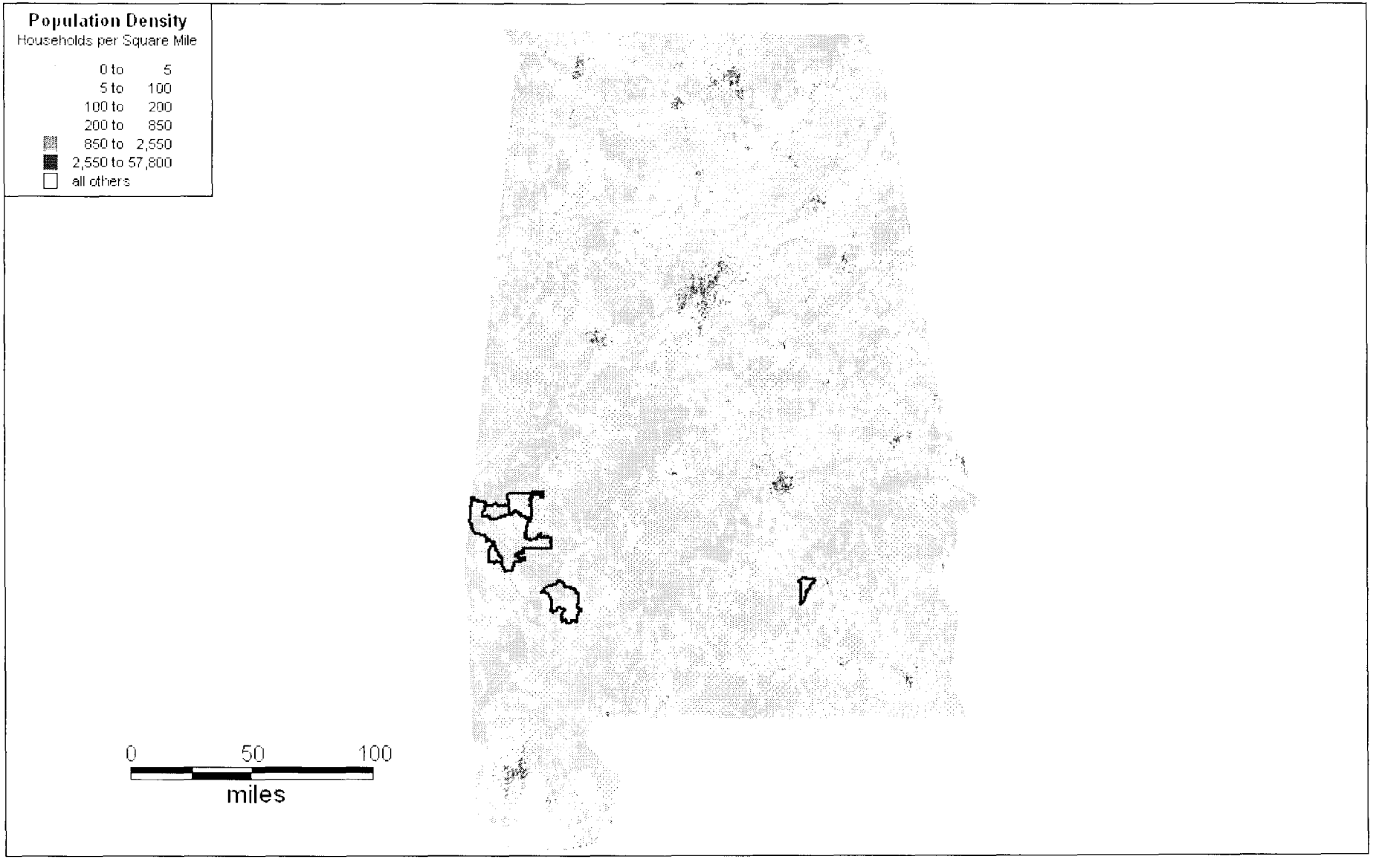
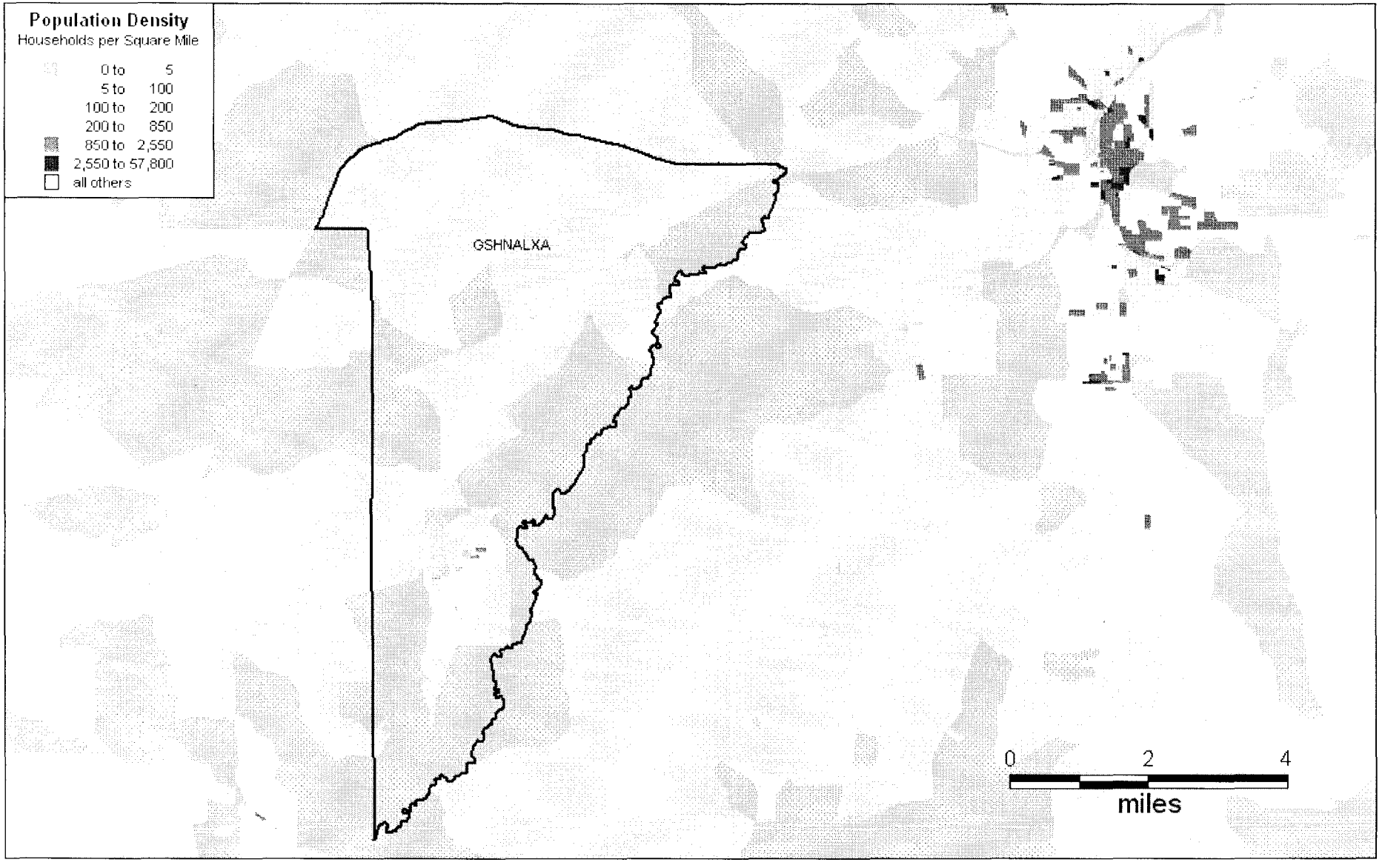


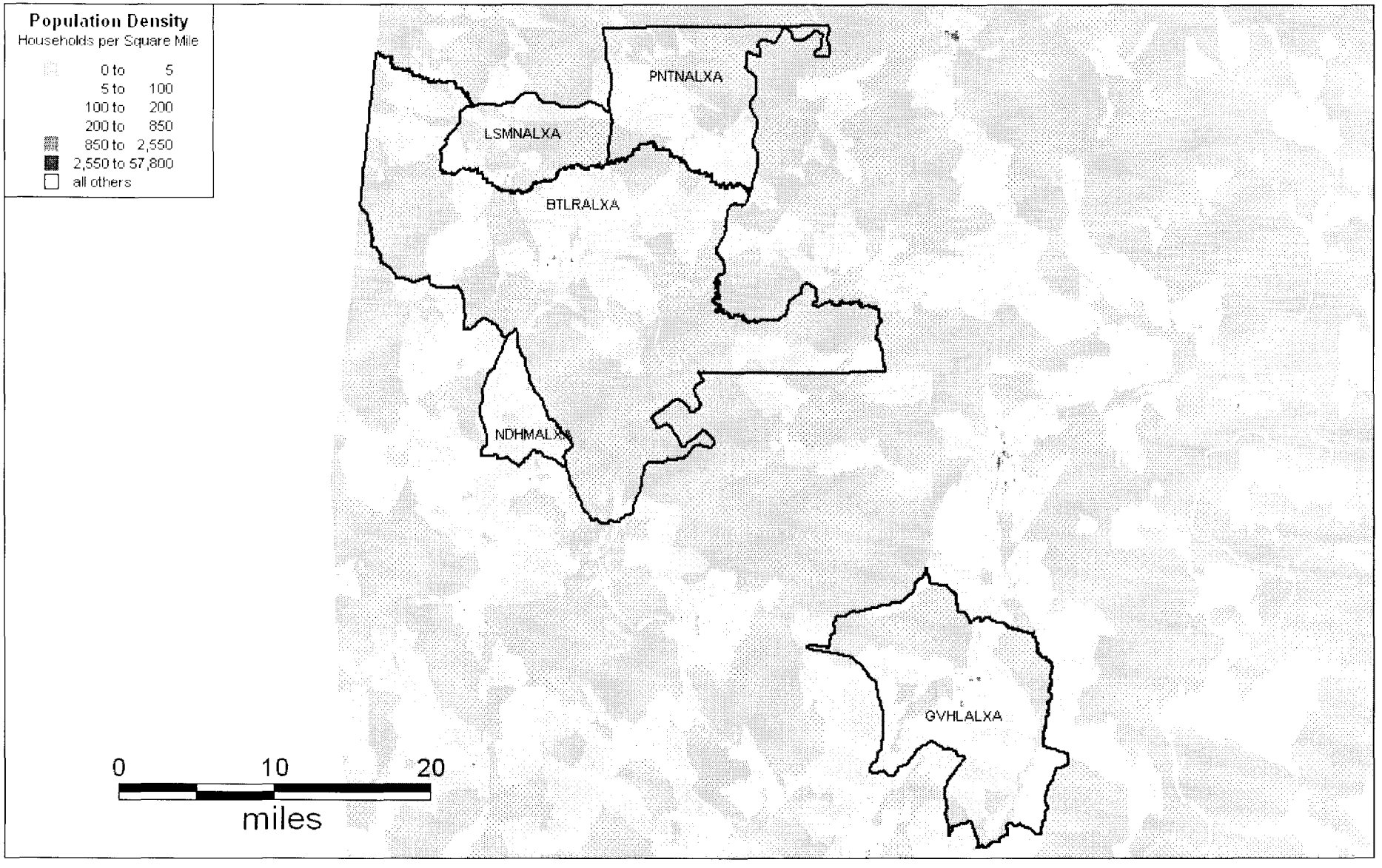
# Butler


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

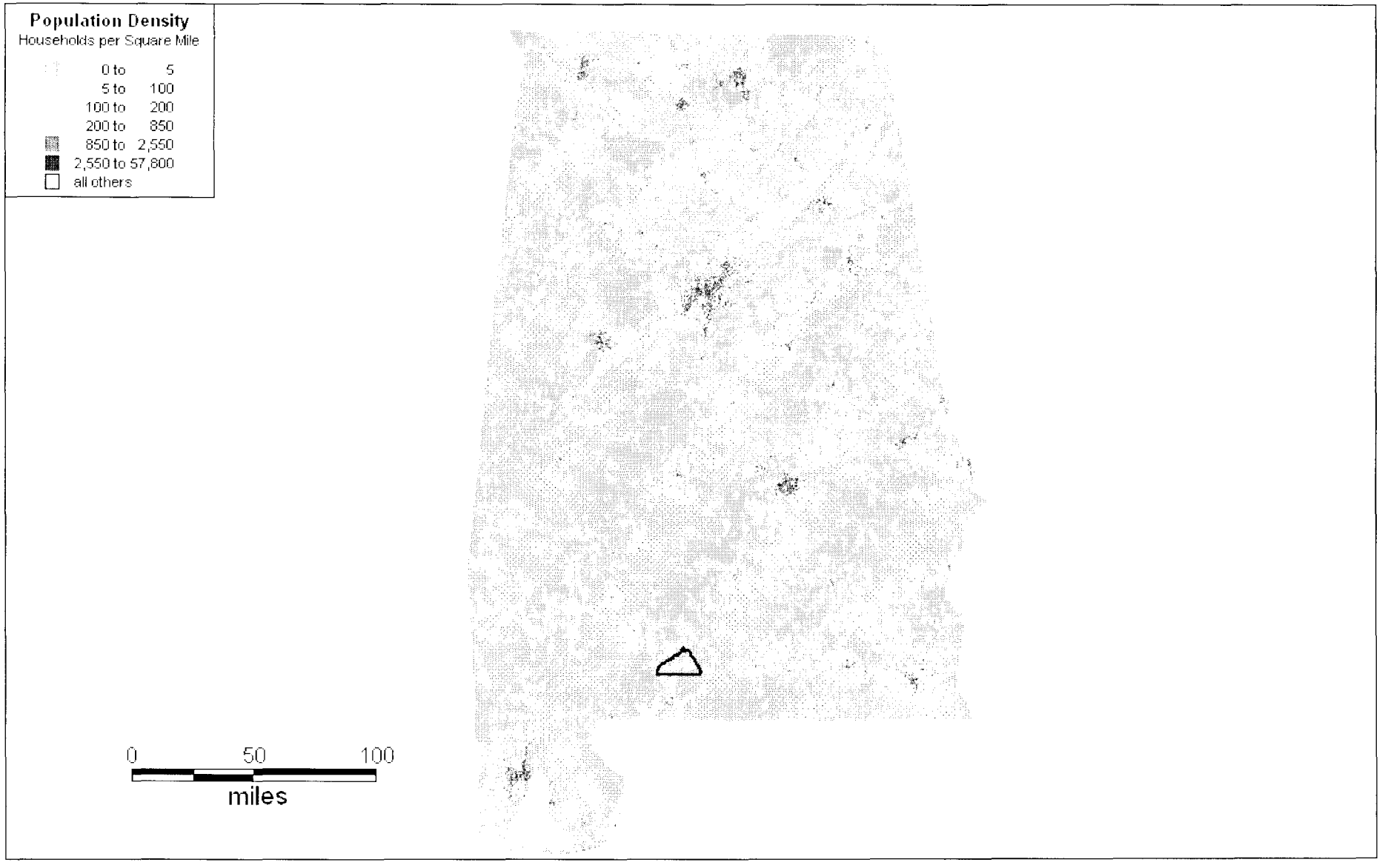
# Butler (East)


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
GSHNALXA
0
2
4
miles

# Butler (West)


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
PNTNALXA
LSMNALXA
BTLRALXA
NDHMALXA
GVHLALXA
0
10
20
miles

# Castleberry



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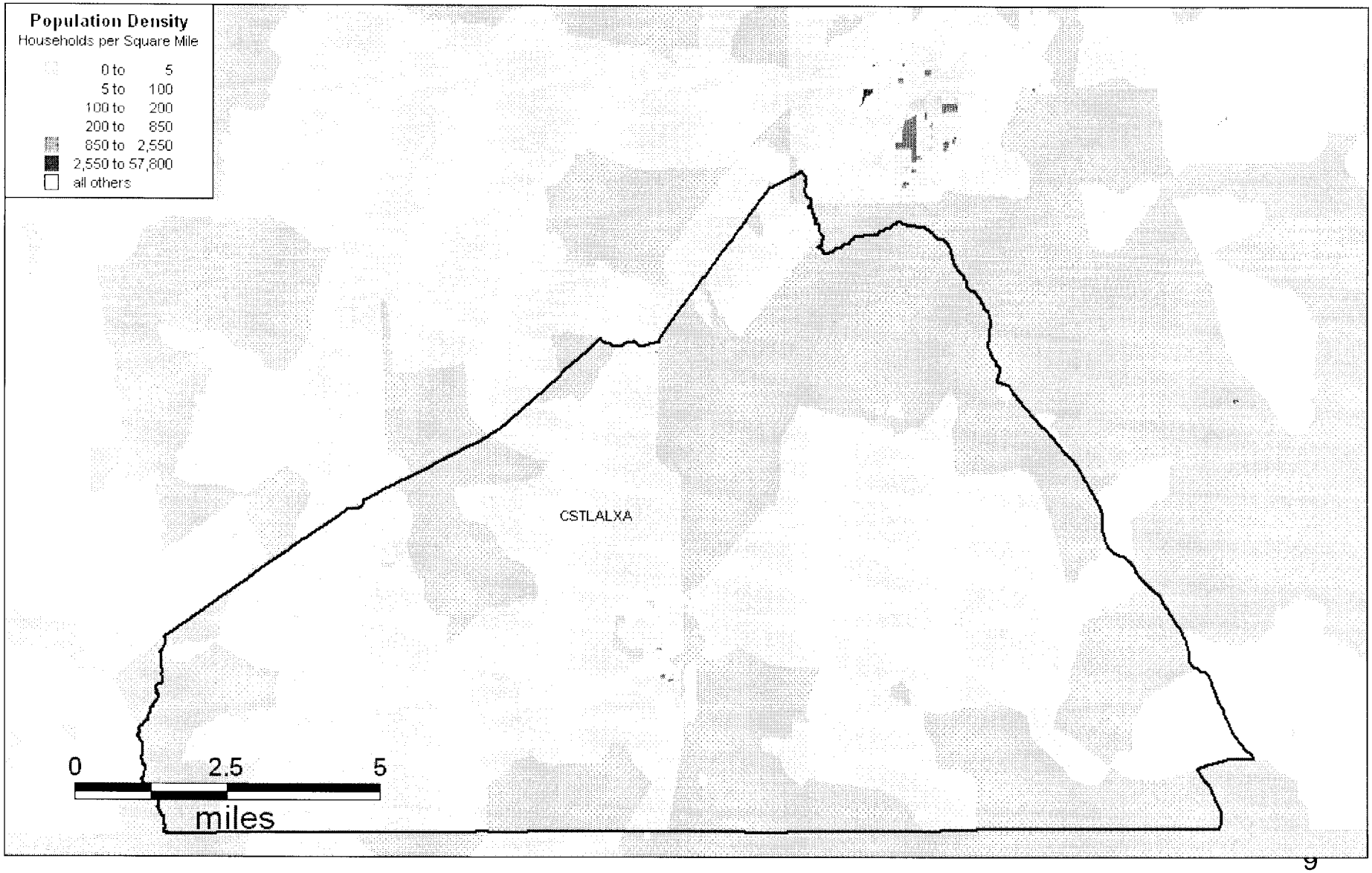
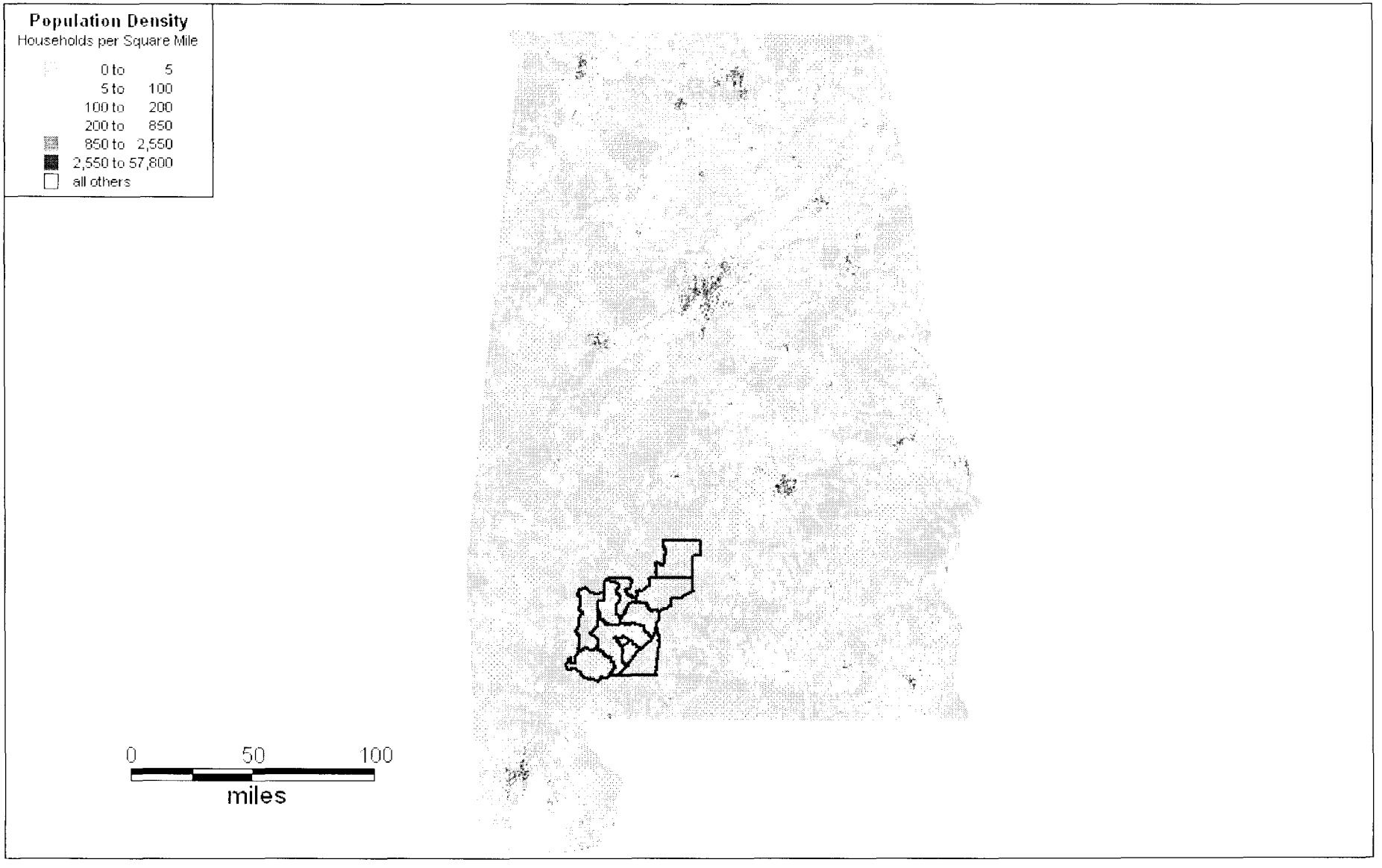
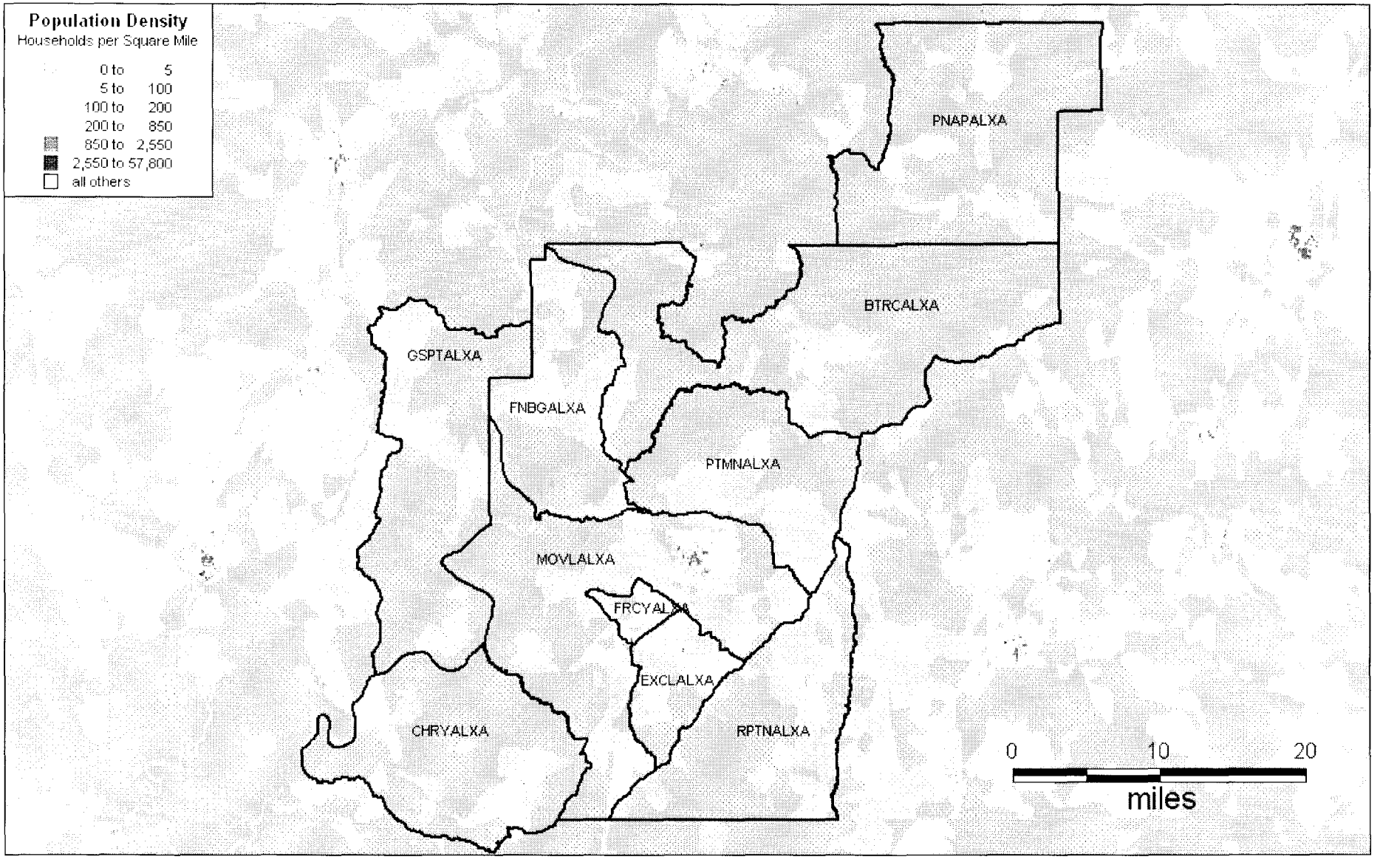


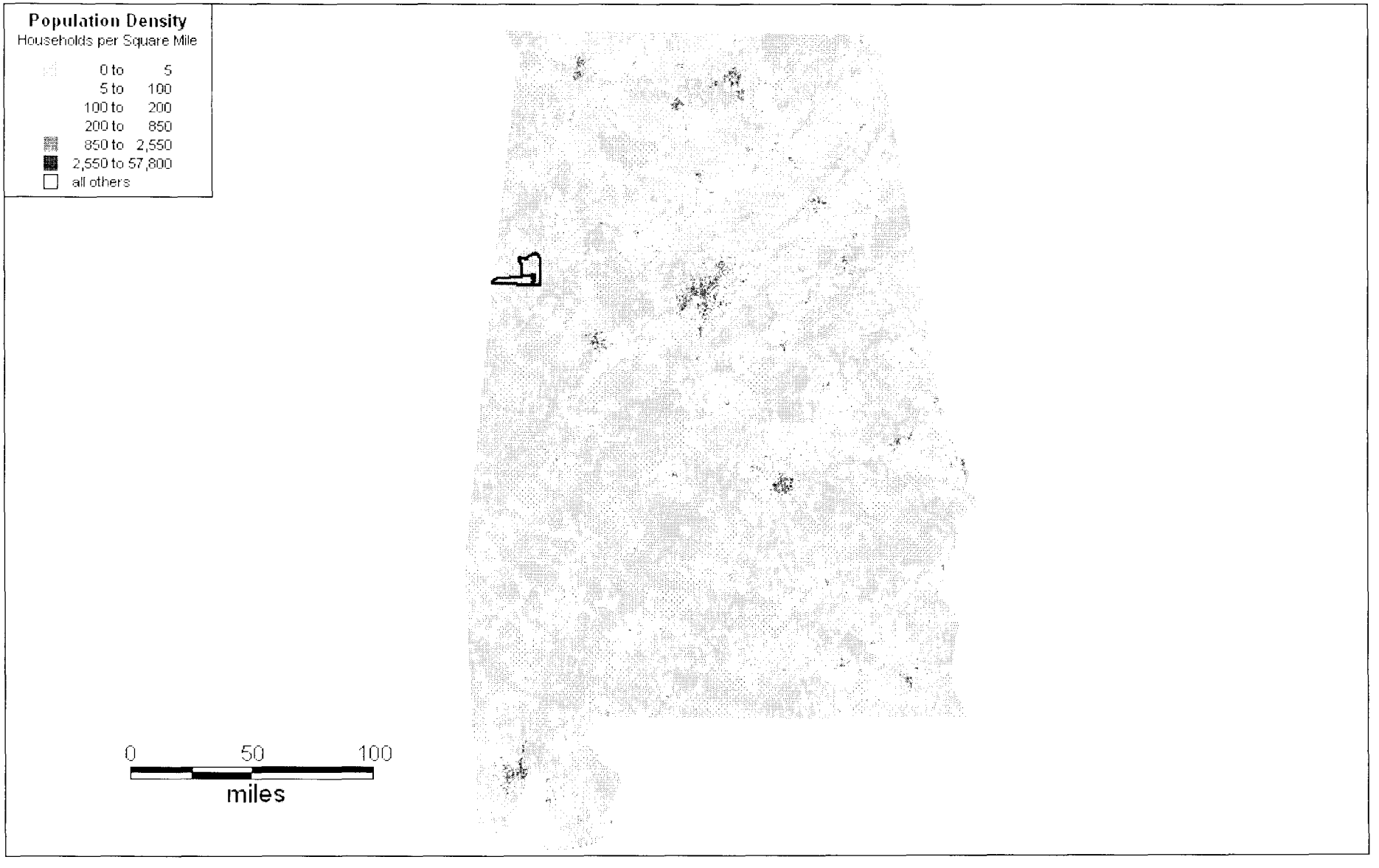
# Frontier - Alabama



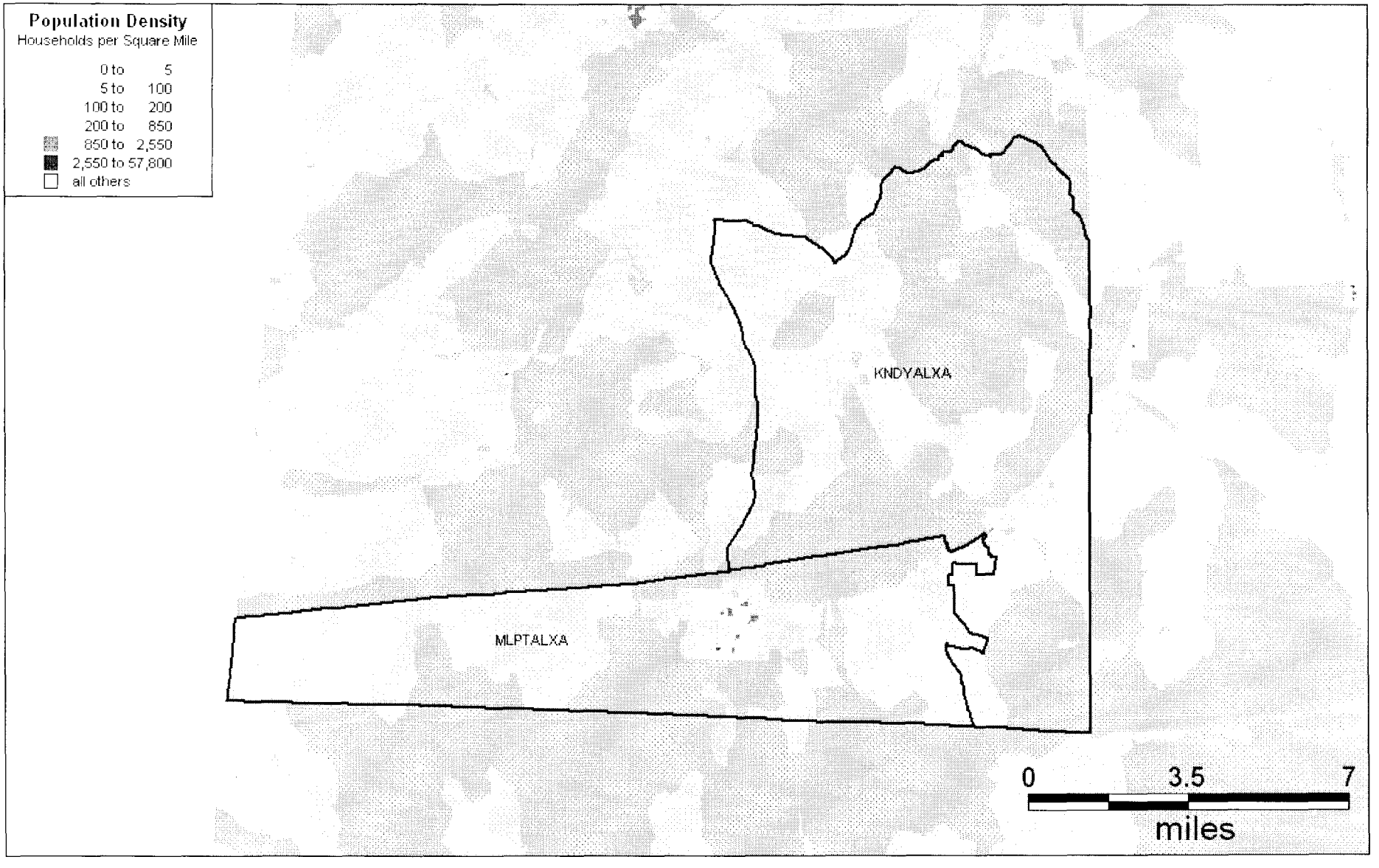
# Frontier - Alabama



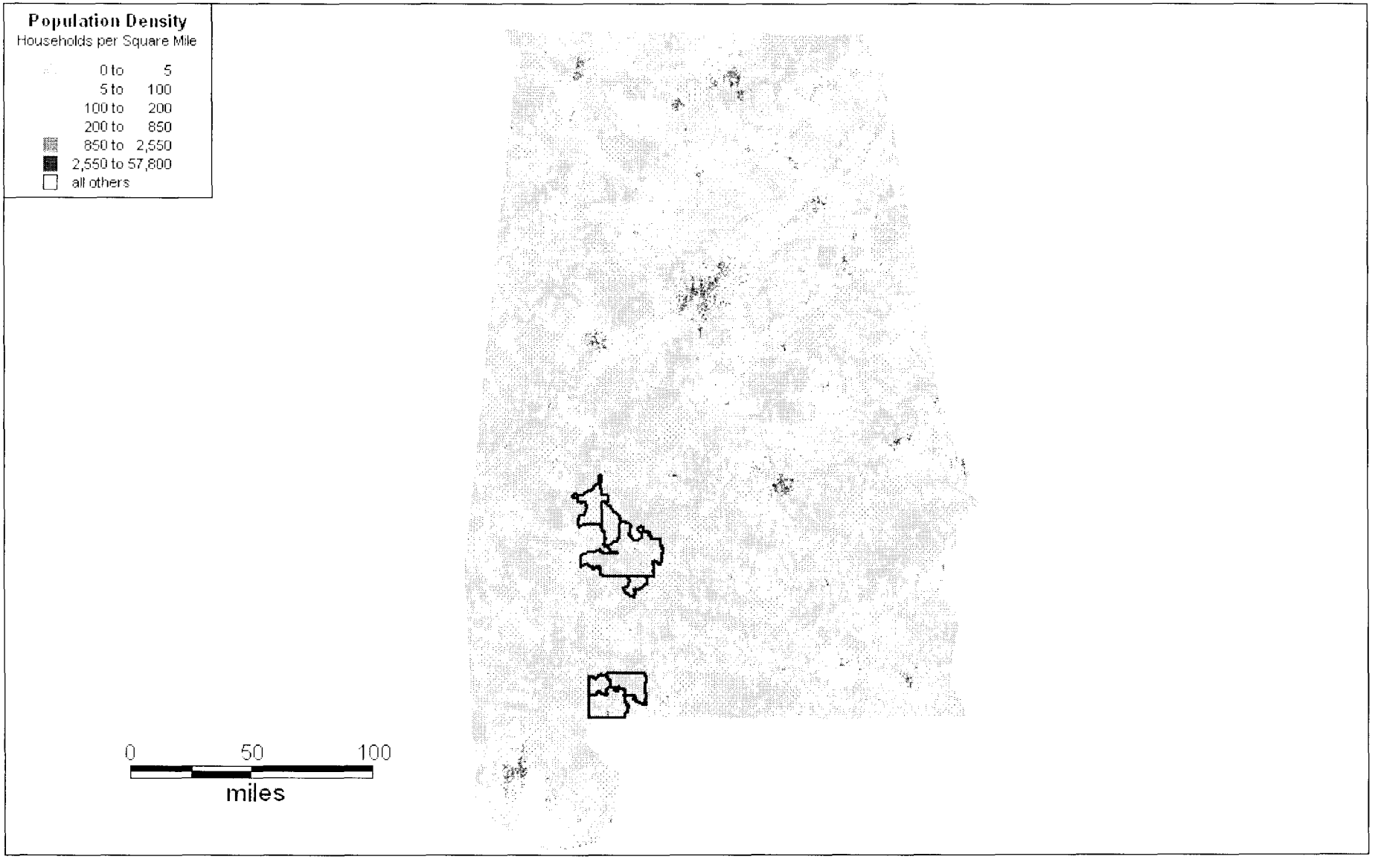
# Frontier – Lamar County



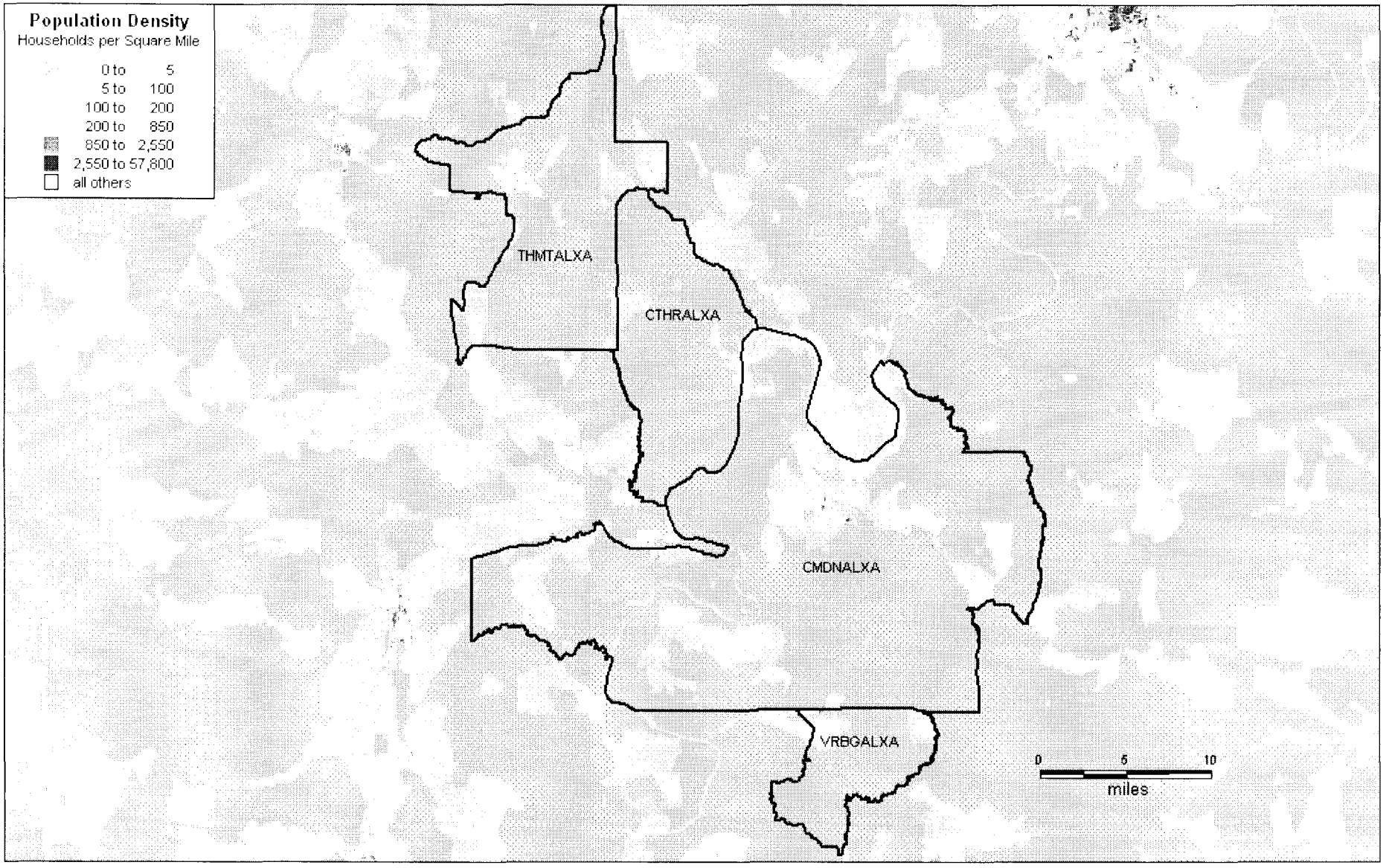
# Frontier – Lamar County



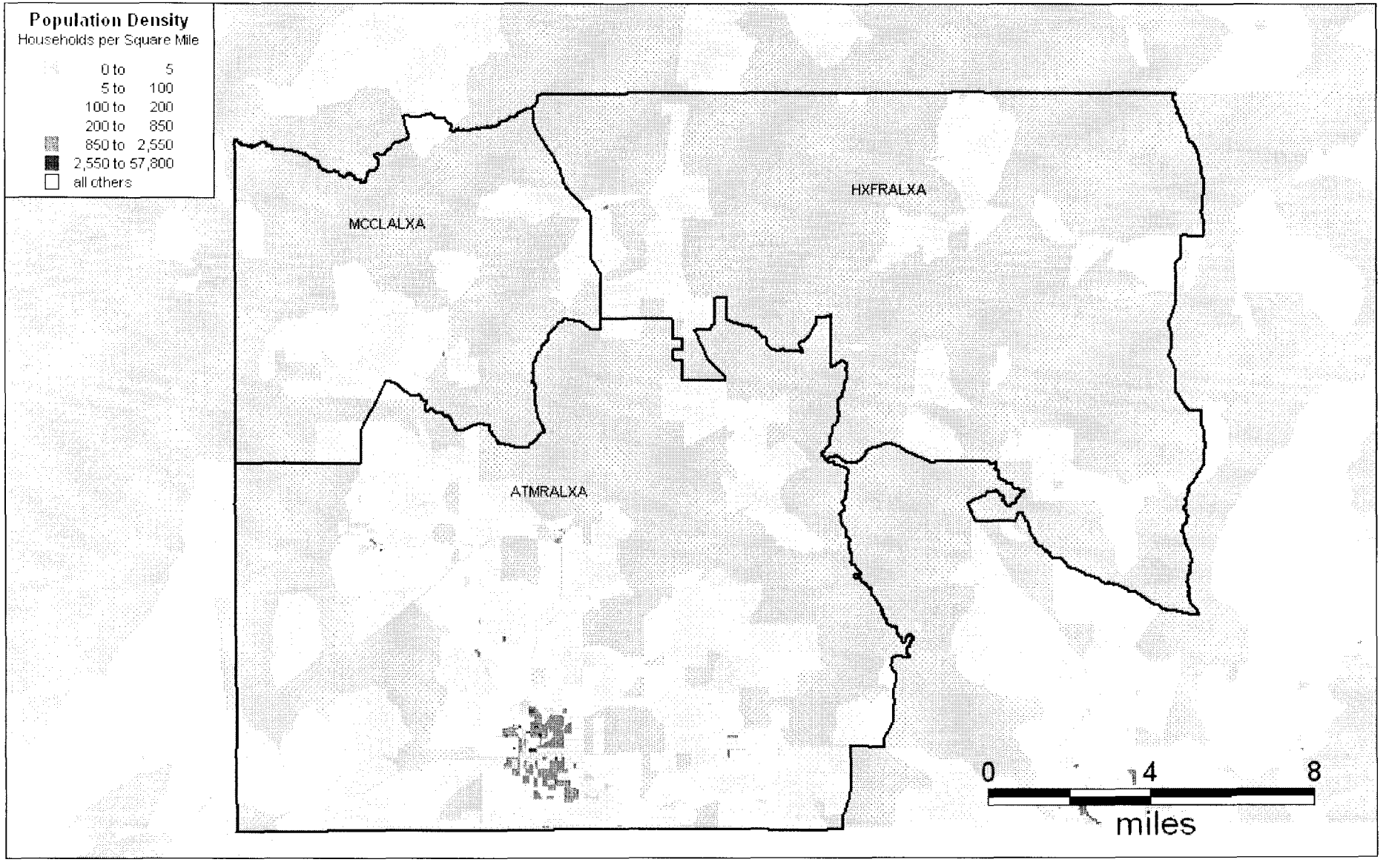
# Frontier – South



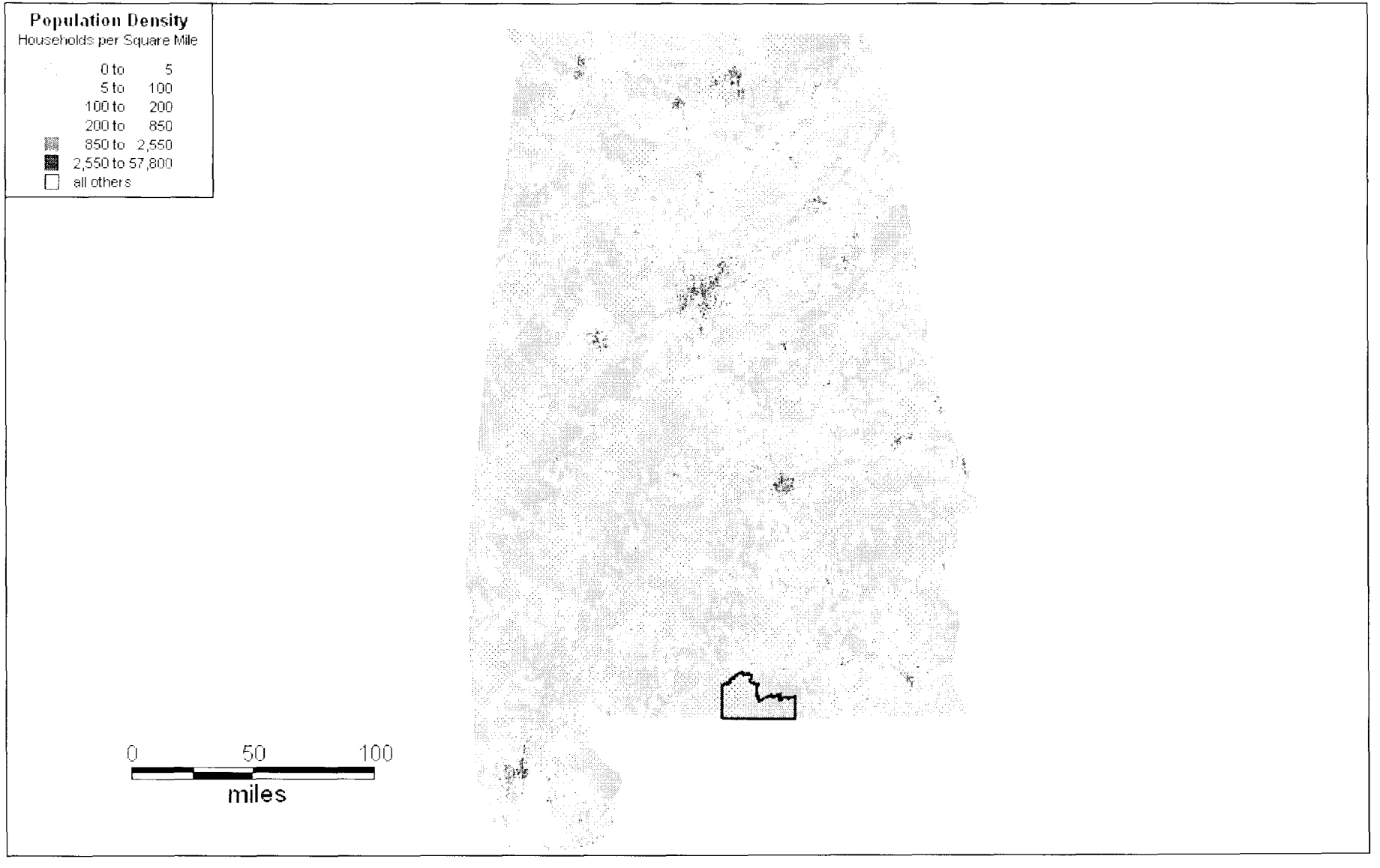
# Frontier – South (North)



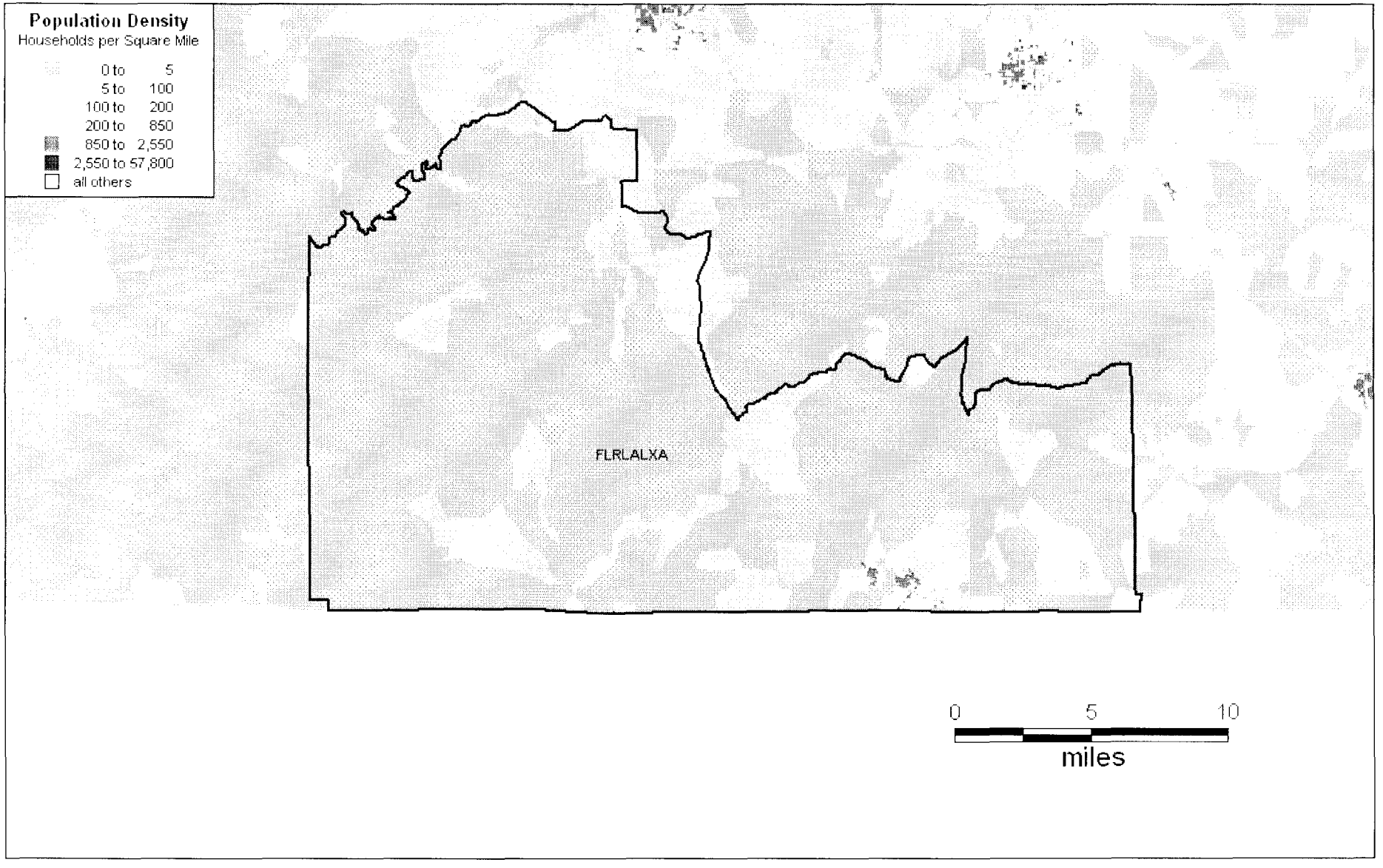
# Frontier – South (South)



# GTC


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

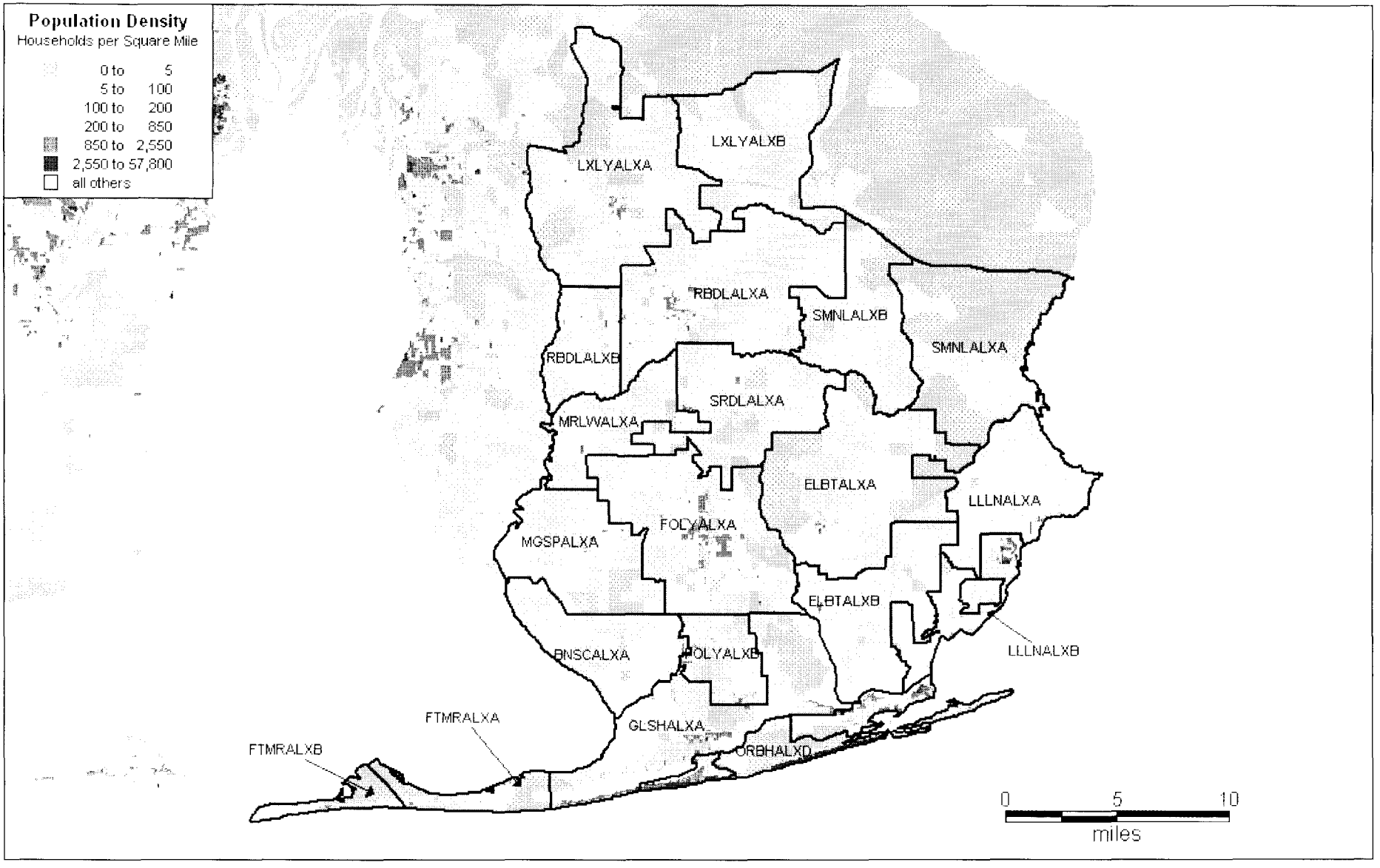
# GTC


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
FLRLALXA
0
5
10
miles

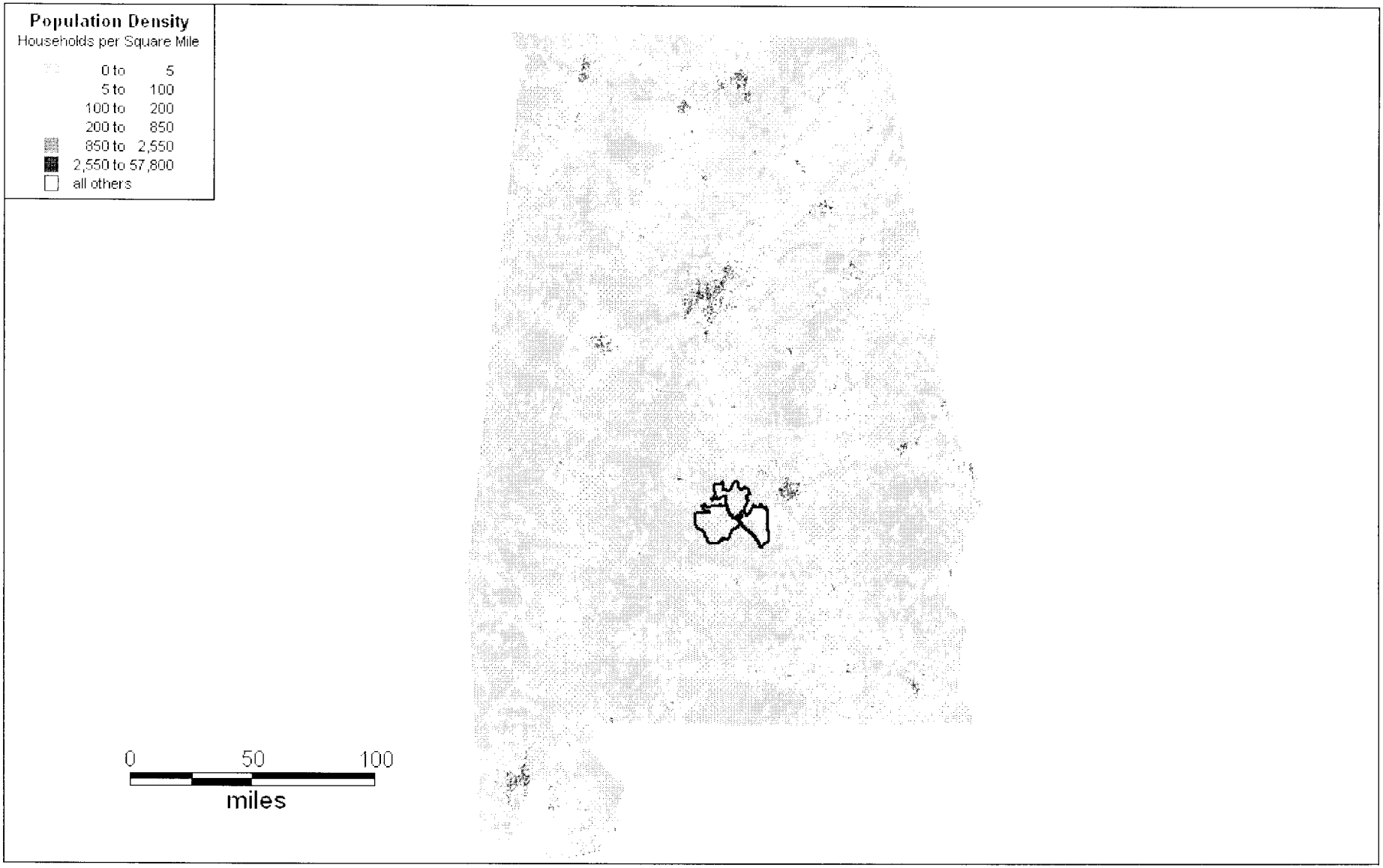
# Gulf

Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

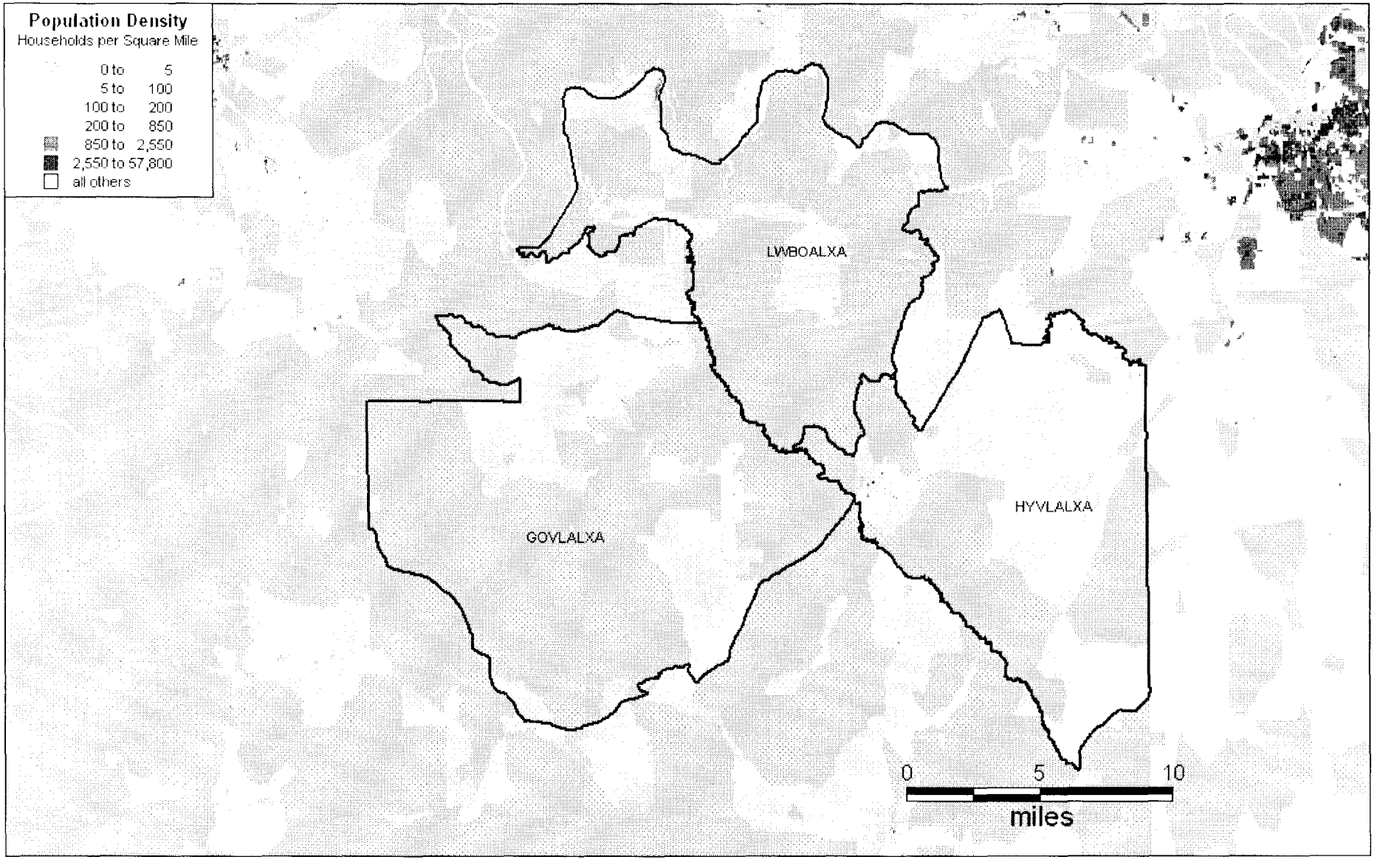
# Gulf


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
LXLYALXB
LXLYALXA
RBDLALXA
SMNLALXB
SMNLALXA
RBDLALXB
SRDLALXA
MRLWALXA
ELBTALXA
LLLNALXA
FOLYALXA
MGSPALXA
ELBTALXB
LLLNALXB
BNSCALXA
POLYALXB
FTMRALXA
GLSHALXA
FTMRALXB
ORBHALXD
0
5
10
miles

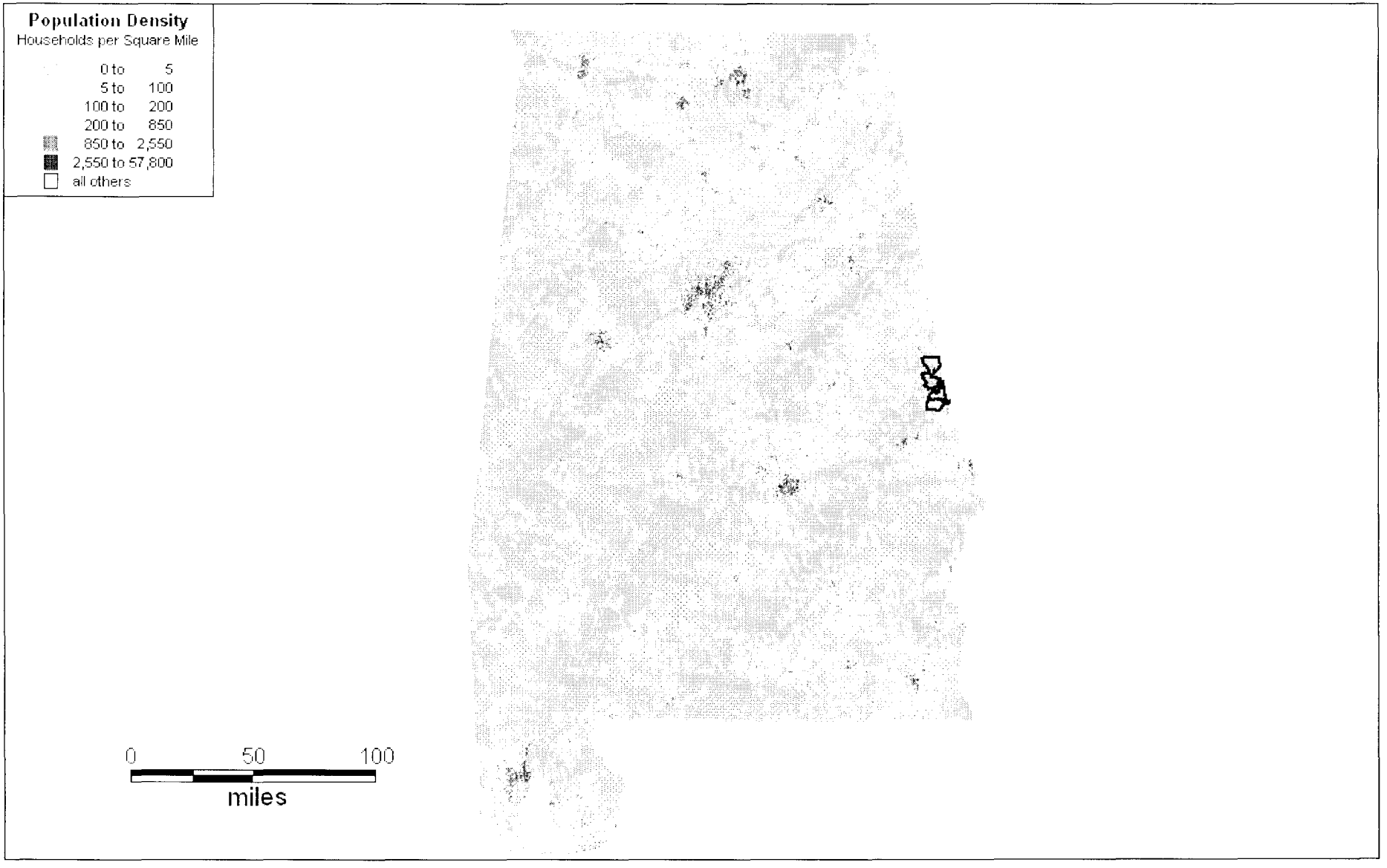
# Hayneville


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

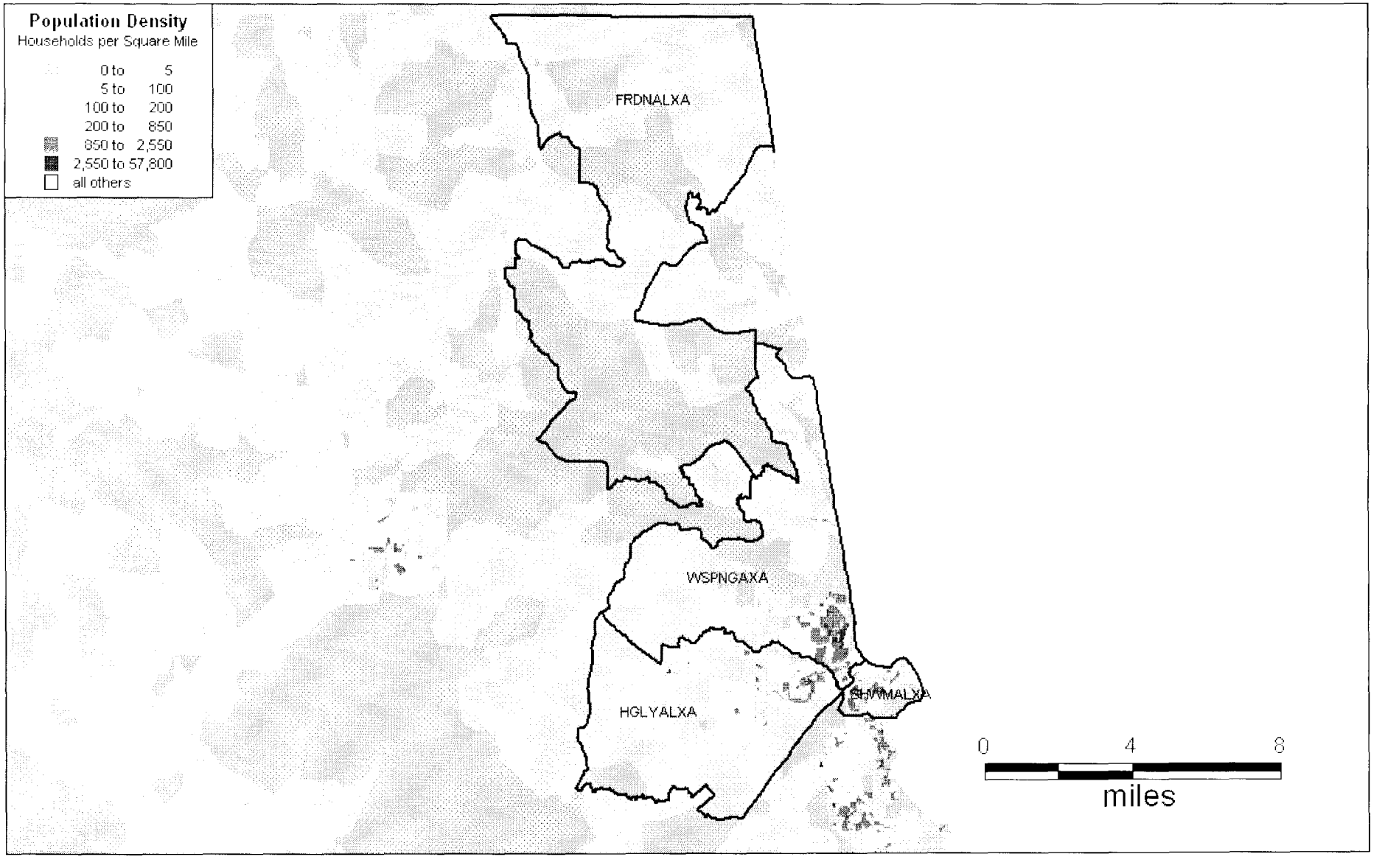
# Hayneville


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
LWBOALXA
GOVLALXA
HYVLALXA
0
5
10
miles

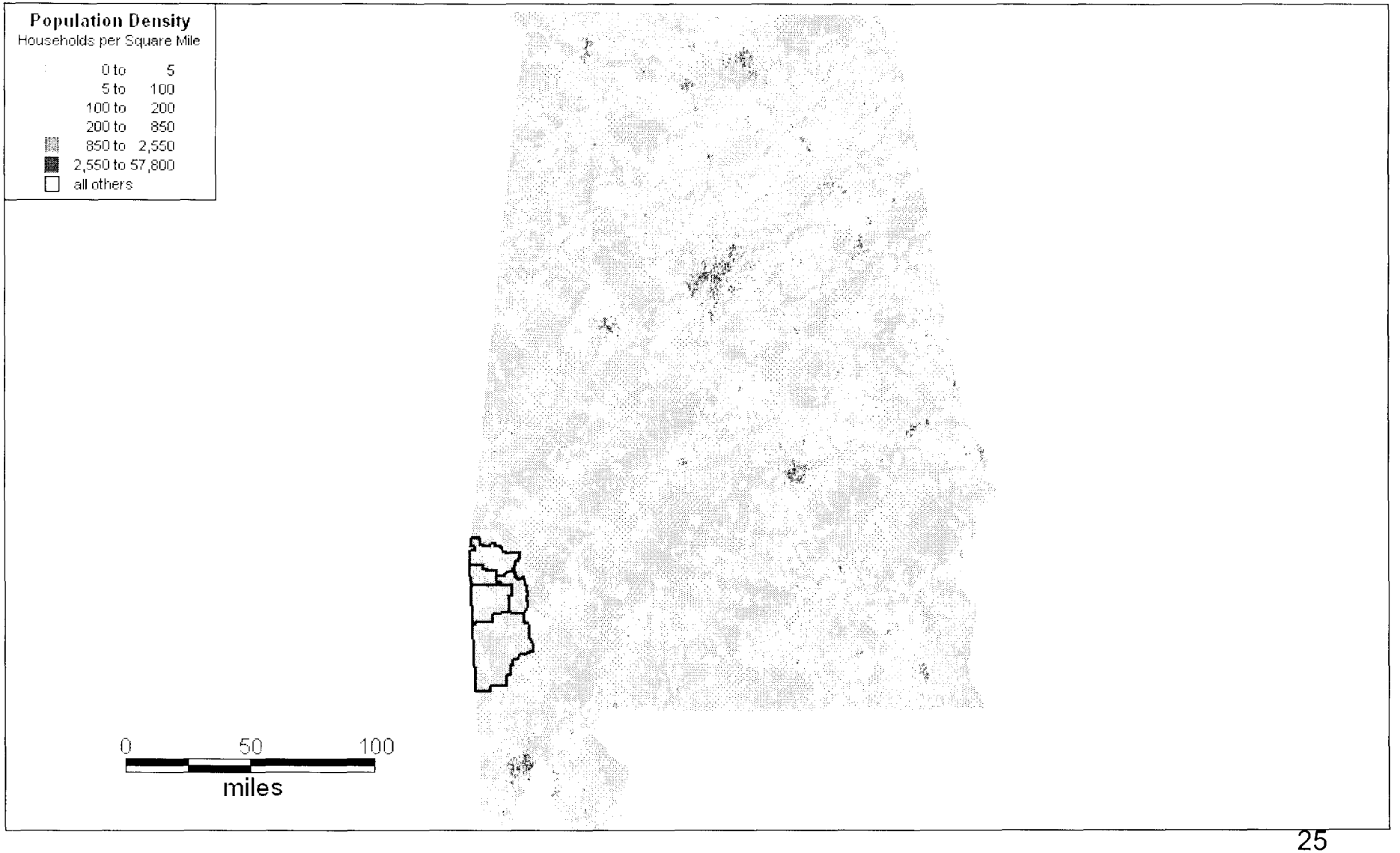
# Interstate


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

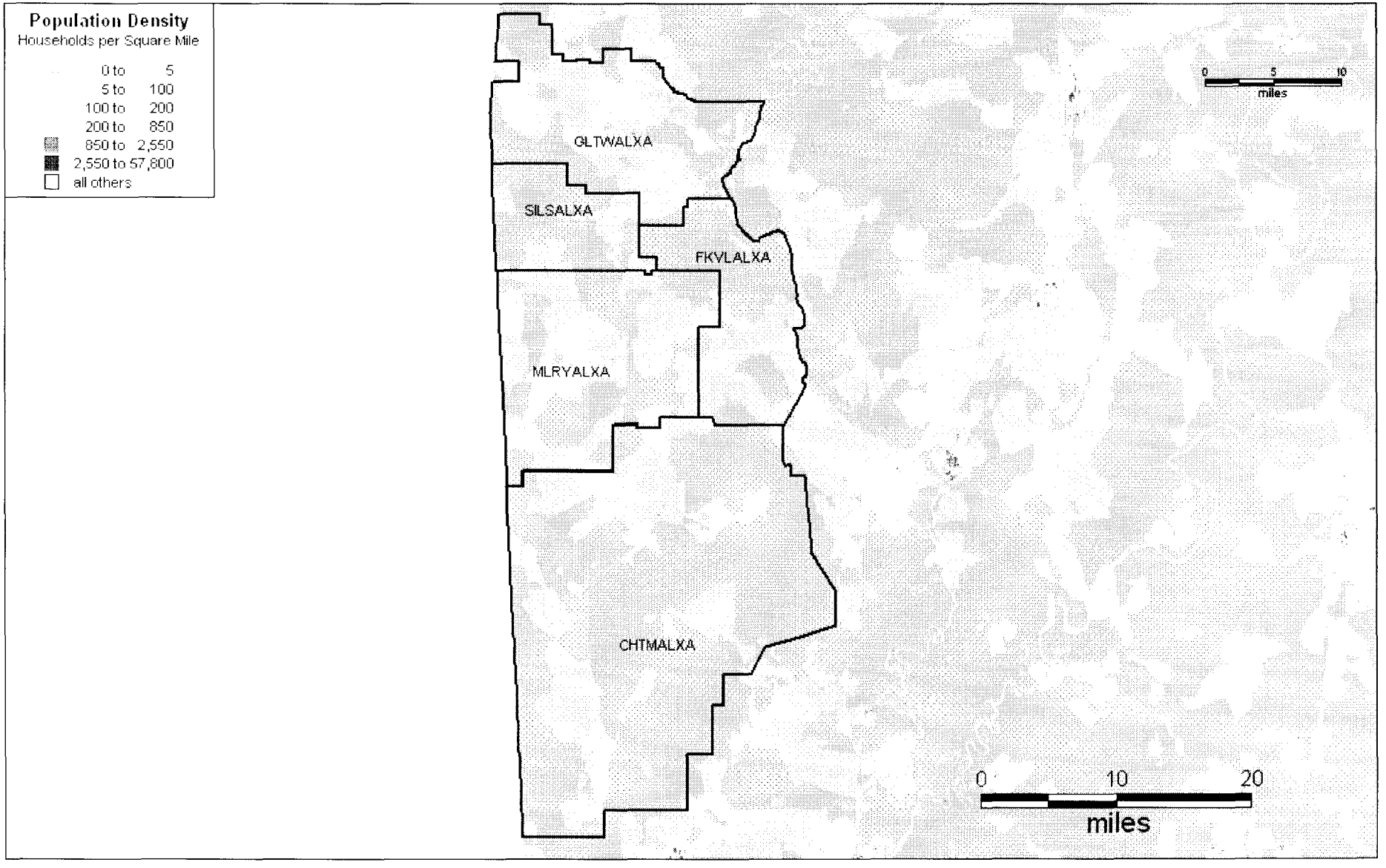
# Interstate


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
FRDNALXA
WSPNGAXA
HGLYALXA
SHMMALXA
0
4
8
miles

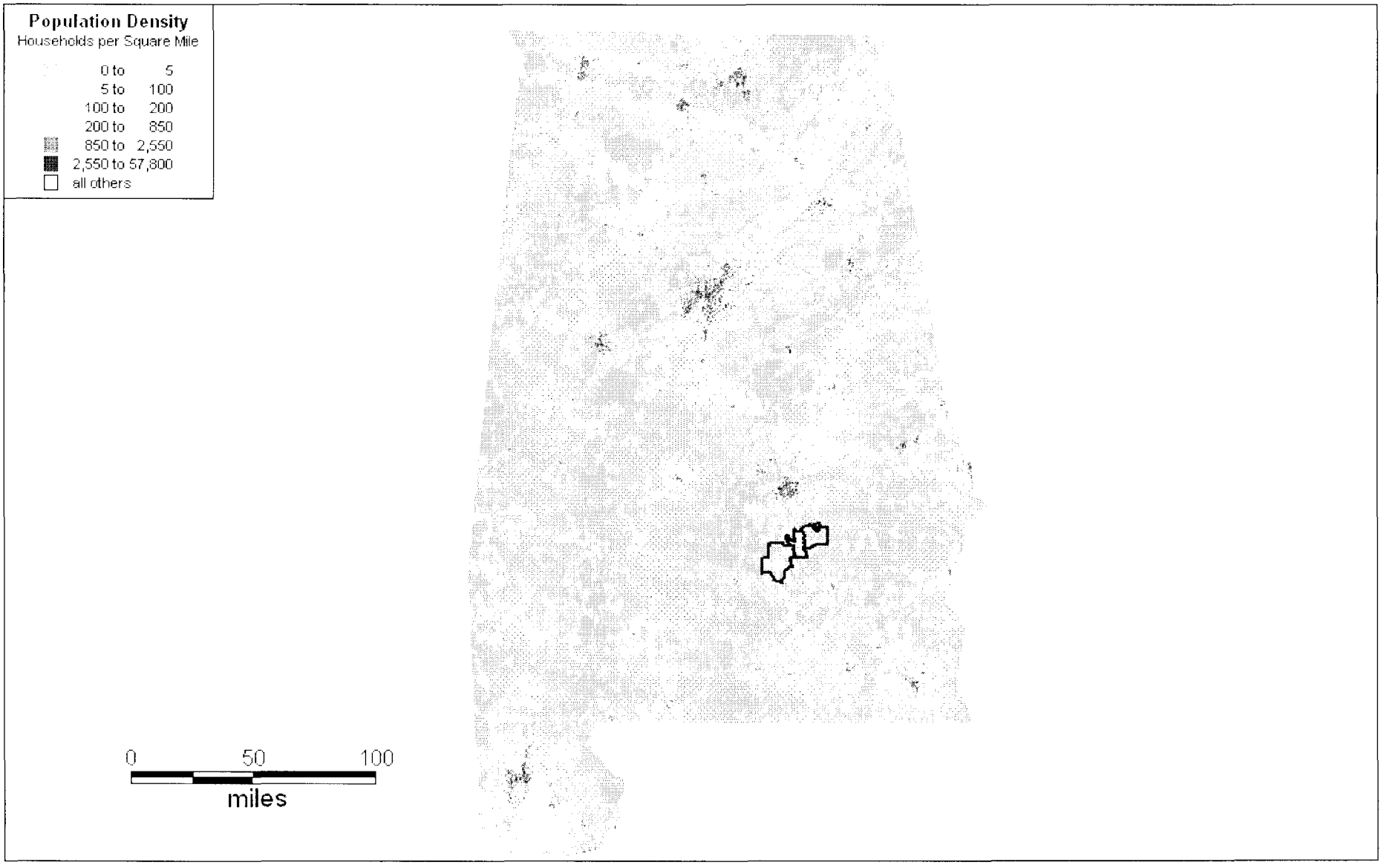
# Millry Telephone Company



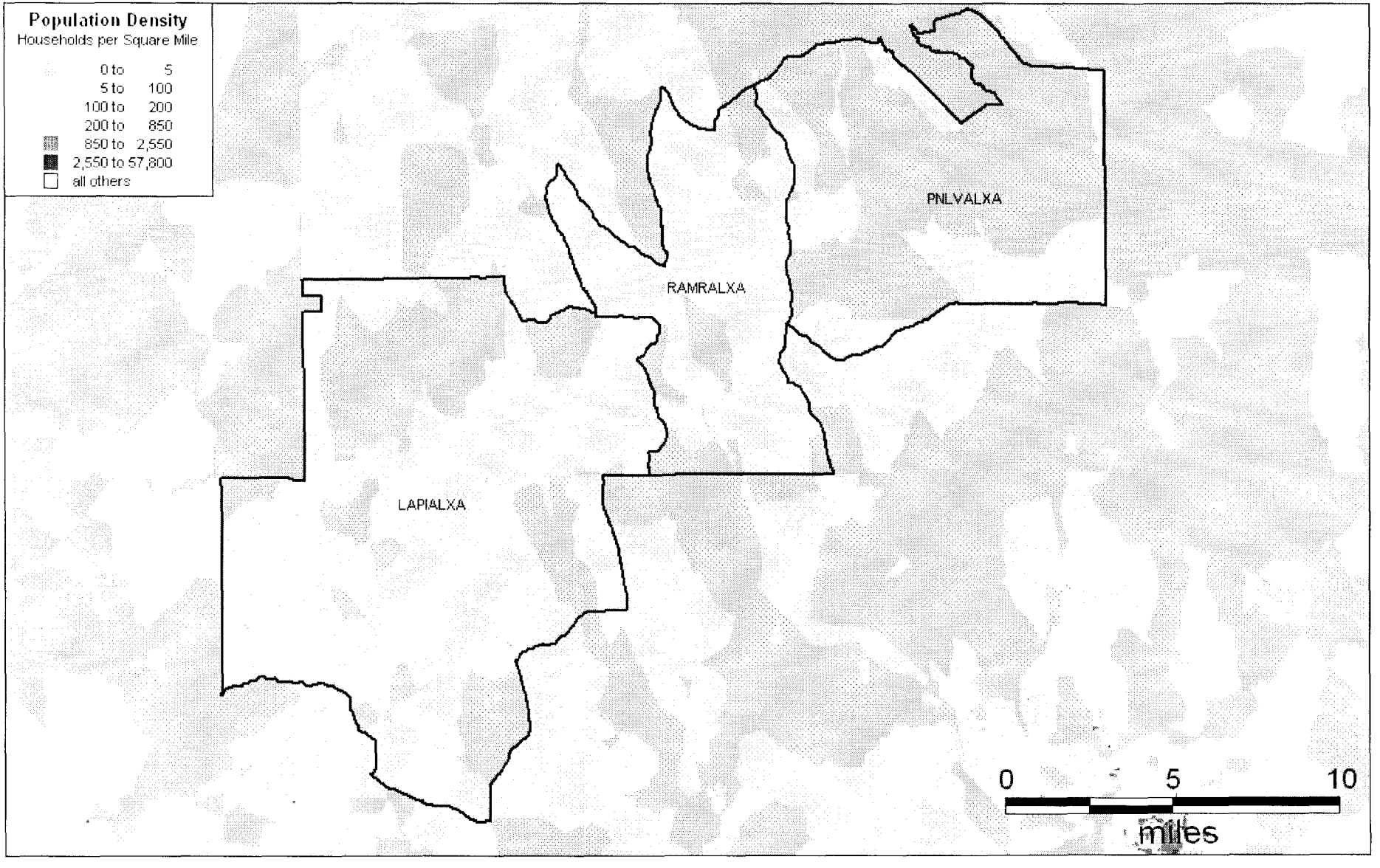
# Millry


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
GLTWALXA
SILSALXA
FKYLALXA
MLRYALXA
CHTMALXA
0 5 10
miles
0 10 20
miles

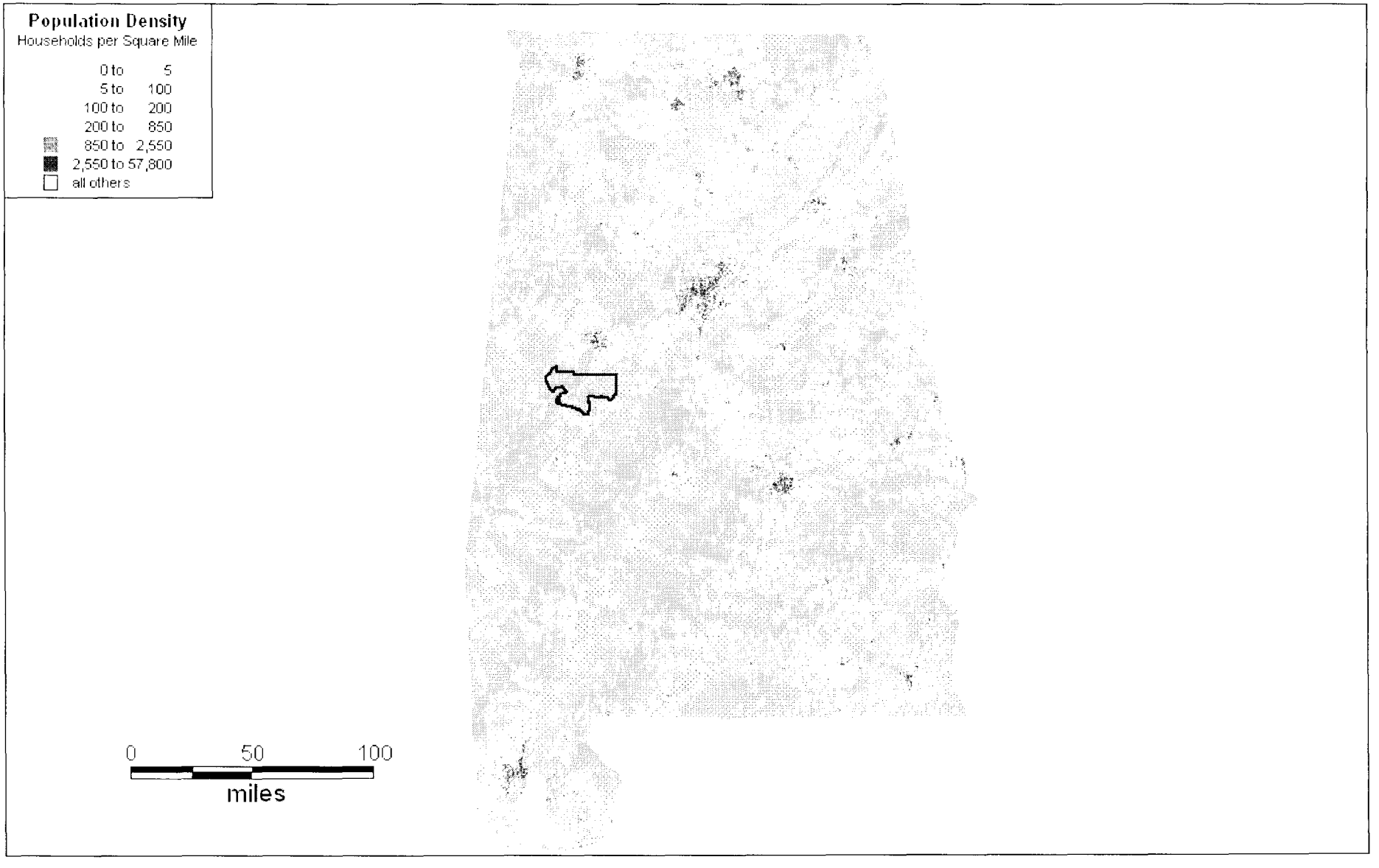
# Mon - Cre


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

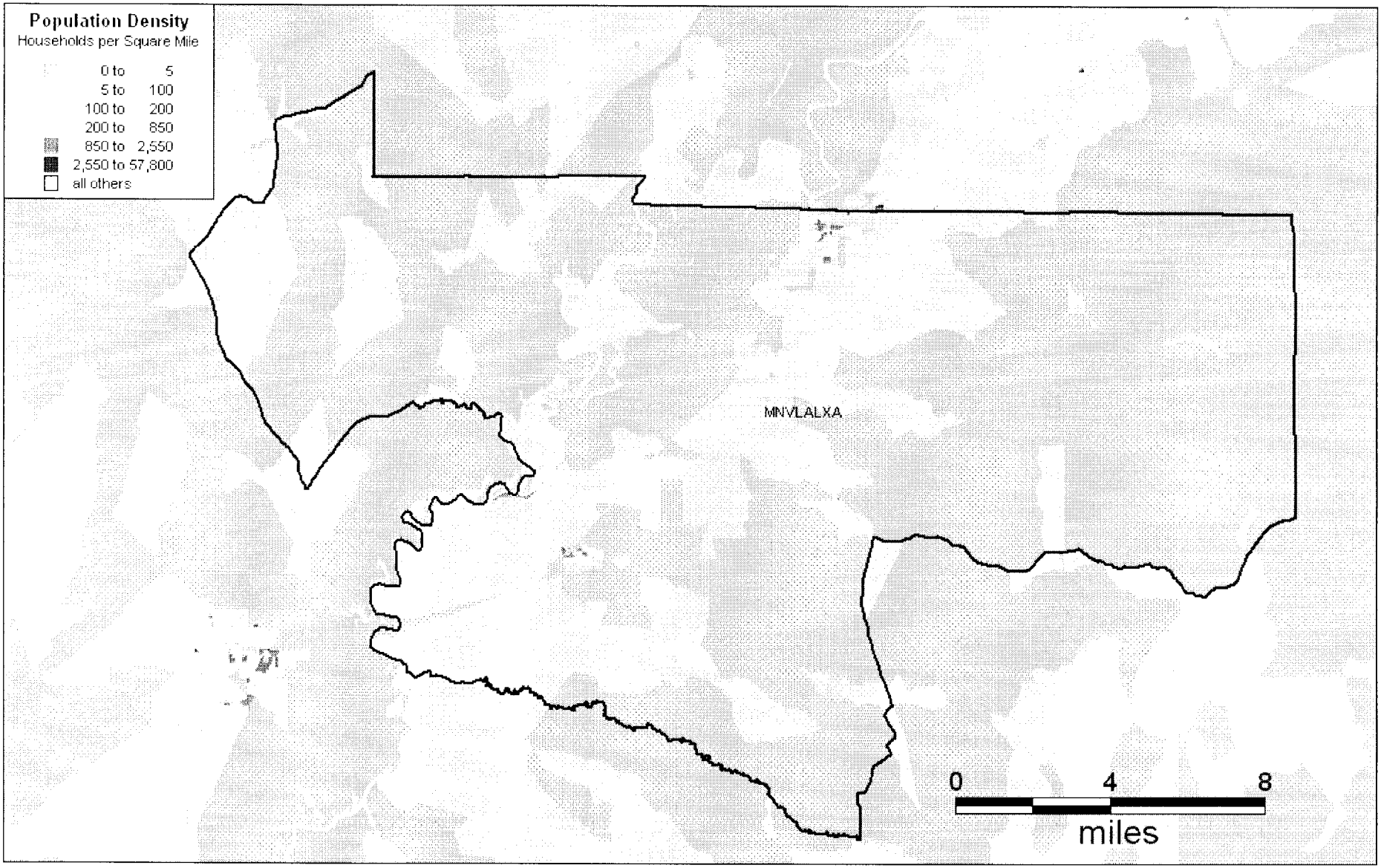
# Mon - Cre


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
PNLVALXA
RAMRALXA
LAPIALXA
0
5
10
miles

# Moundville


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

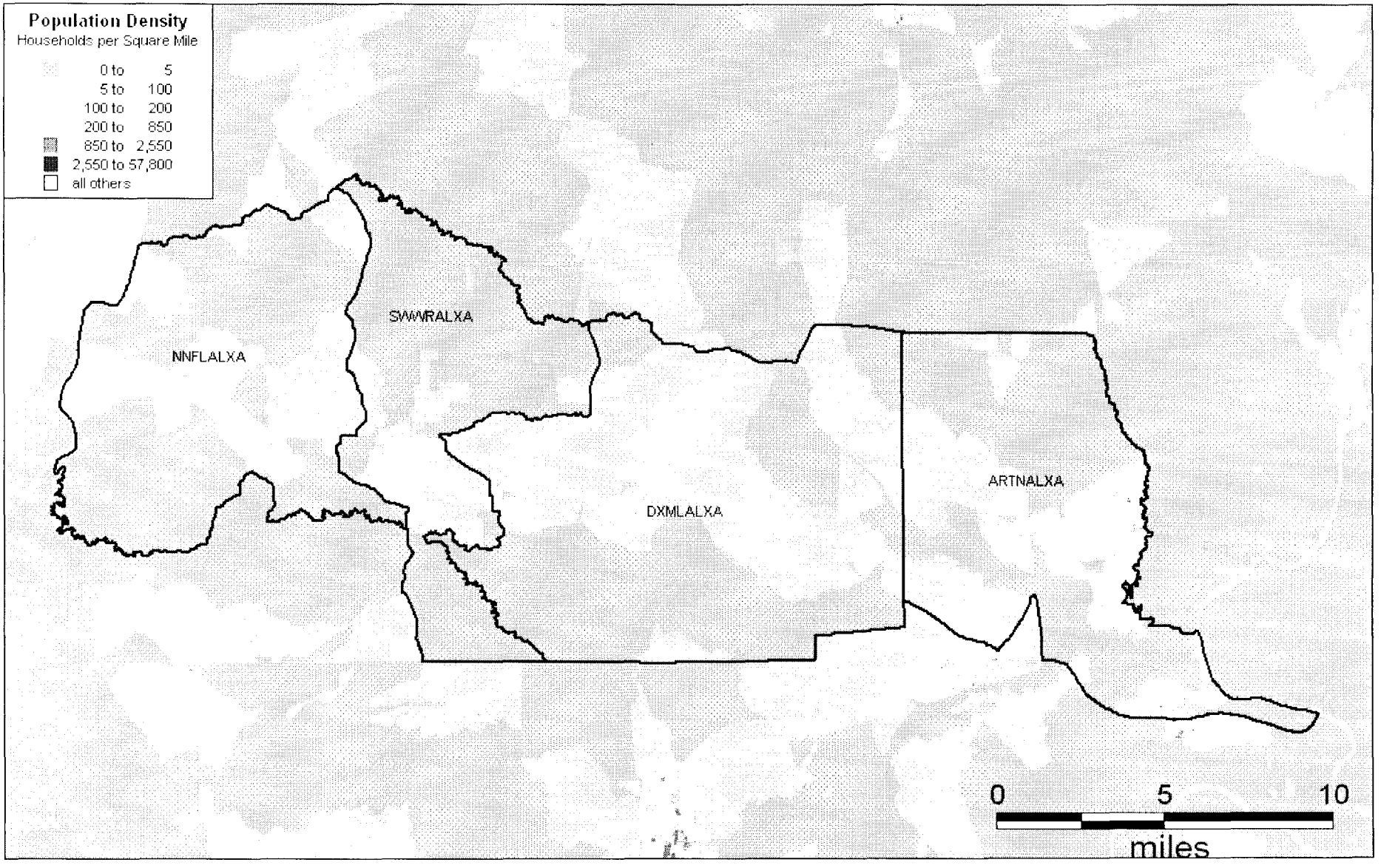
# Moundville


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
MNVLALXA
0
4
8
miles

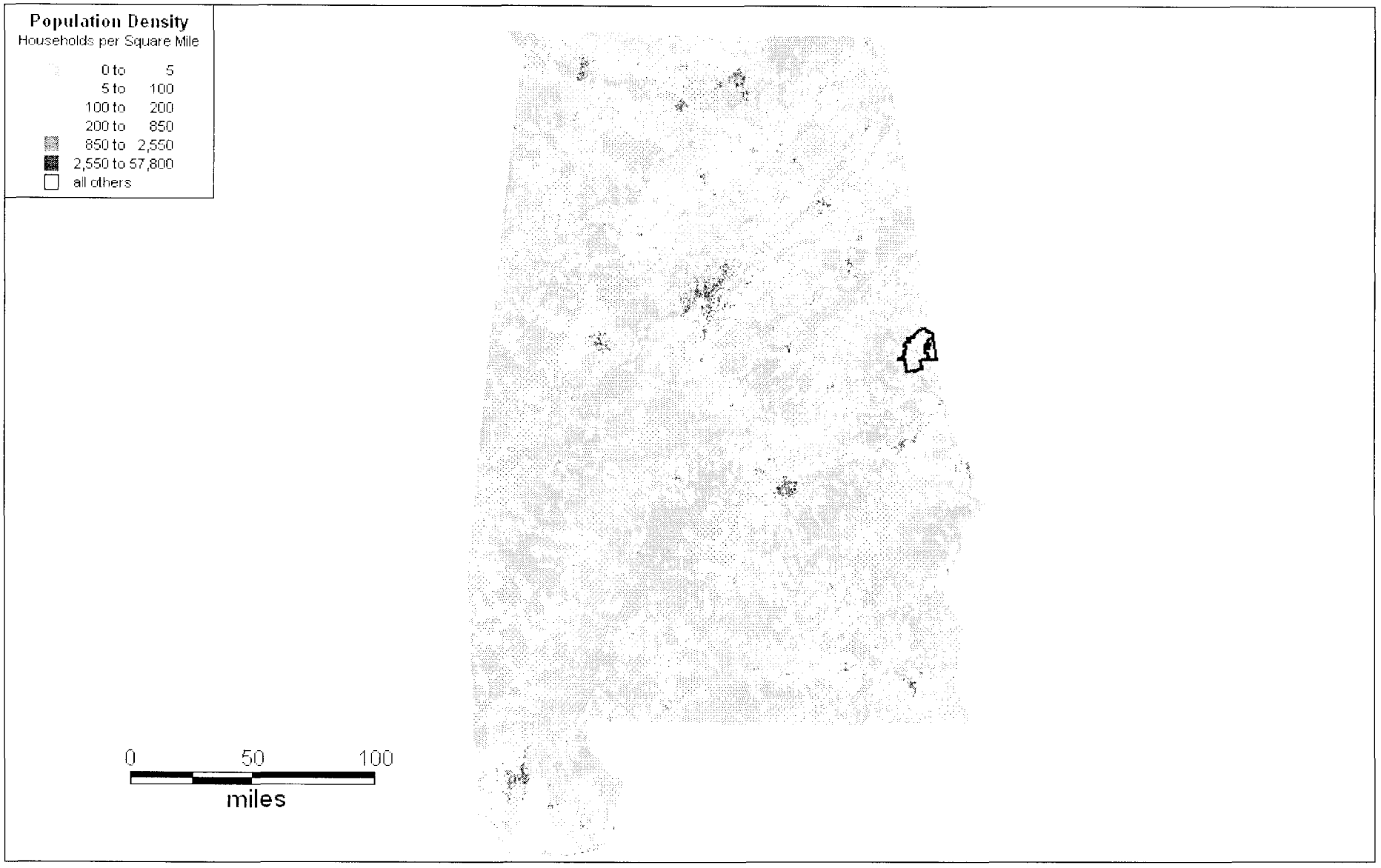
# Pine Belt

Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

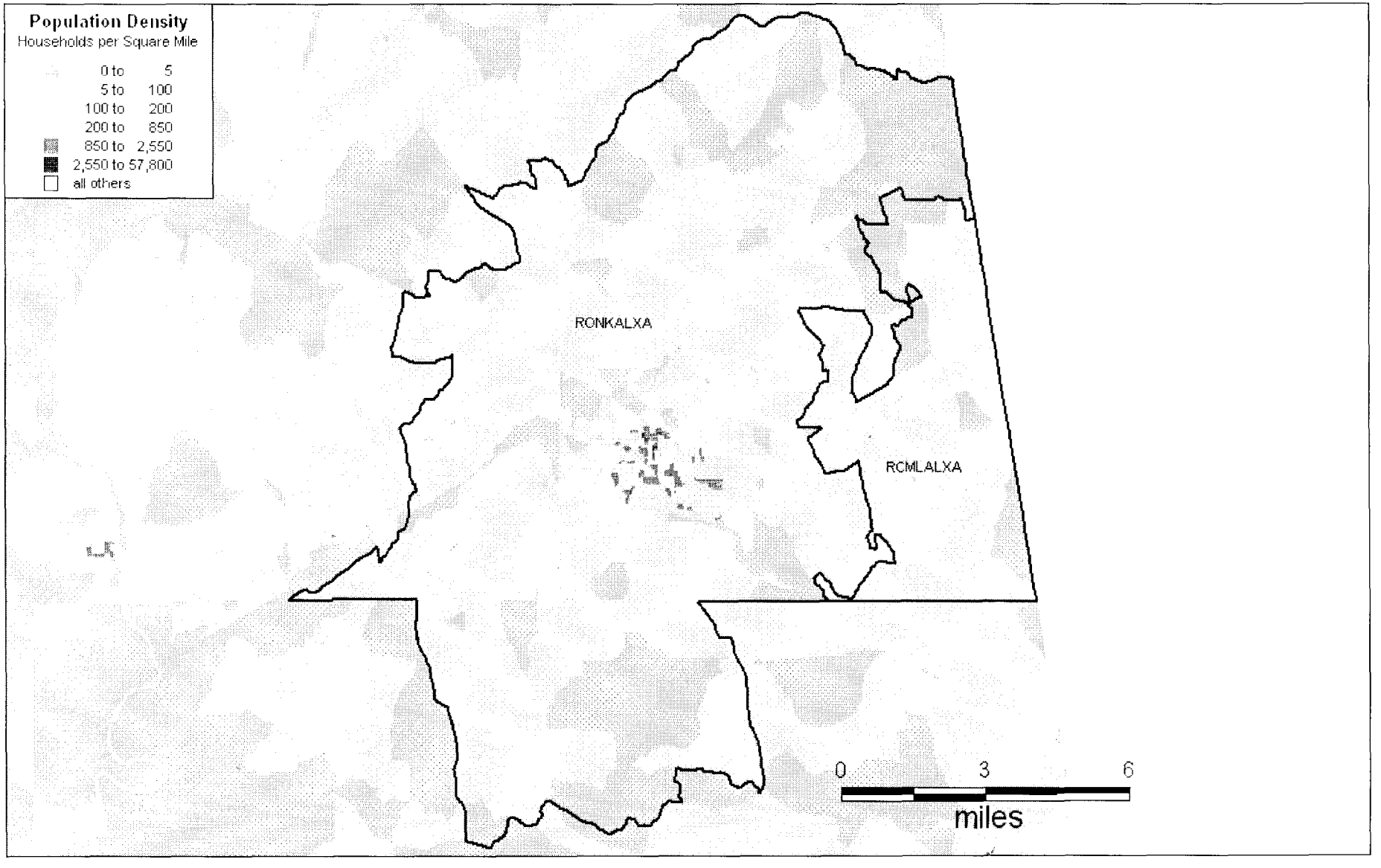
# Pine Belt


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
NNFLALXA
SWWRALXA
DXMLALXA
ARTNALXA
0
5
10
miles

# Roanoke


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
0
50
100
miles

# Roanoke


Population Density
Households per Square Mile
0 to 5
5 to 100
100 to 200
200 to 850
850 to 2,550
2,550 to 57,800
all others
RONKALXA
RCMLALXA
0
3
6
miles