Interpretation of Statewide County-to-County Commuter Flow Maps

As part of a Statewide TDM initiative for the North Carolina Department of Transportation, Parsons Brinckerhoff developed a method to show county-to-county commuter flow patterns for the entire state. The resulting map helped define the commuting patterns for metropolitan areas and isolated counties that are more rural in nature. This process will help establish the initial framework for determining the types of TDM strategies that should be considered and what areas should be marketed for those strategies.

County-to-county flow maps for small groups of counties can be generated with details on volume and directional flow. A metropolitan area of six counties would only require 30 county-to-county flow lines, 6 intra-county commute figures, and some method to represent flows into and out of the metropolitan area. A statewide commuter flow map, however, may involve over a hundred counties with thousands of county-to-county flow combinations. At this level of complexity, a more generalized map is warranted.

Exhibit A shows the county-to-county commute patterns for the State of North Carolina. The dots represent the internal county commuting and the lines represent the county-to-county flow. Counties with 50,000 or more internal trips are labeled with the major city in parentheses.

A large dot is an indication that the county has a large total employment base and small dots represent counties with a small overall employment base. Although the county-to-county lines do not explicitly show the direction of flow, it can be generally assumed that the major flow represented by the visible line is in the direction from small dots to large dots. Any hidden lines representing the minor "reverse flow" would typically be from large dots to small dots. The dominant flow between dots of equal size is less obvious and may depend on the location(s) of the employment activity in relation to housing within each locality. There are techniques to offset the lines between counties and use arrows to show both directions of flow, however, this would add significant complexity to a county-to-county commuter flow map at the state level.

Other general conclusions can be inferred by the map results. Counties with small dots that have major flow lines to large dots often represent bedroom communities to a major employment base. Small dots in isolation or that are connected to only a few other small dots tend to represent rural communities with a small residential and employment base. If there is significant internal commuting in two or more adjacent counties (medium to large dots), the county-to-county commute flow tends to have heavy traffic volumes moving in both directions in the AM and PM.

The commuting patterns in some metropolitan areas can be considerably complex. In these cases, more detailed mapping maybe required (ie directional flow lines). **Exhibits B, C, and D** show the commute flows by direction for three metropolitan areas in North Carolina. **Exhibit B** shows a very simple commuting pattern for the Charlotte-Mecklenburg metropolitan area where most of the commute trips are from the

surrounding counties into Mecklenburg County (where the City of Charlotte is located). **Exhibit C** shows a more complex pattern of commuting. Winston-Salem in Forsyth County and Greensboro and High Point in Guilford County all have a large employment base and are in close proximity to each other. **Exhibit D** shows the commuting patterns in the Raleigh (Wake County) – Durham (Durham County) area. There are more commute trips traveling from Wake County to Durham County even though Wake County has a much larger employment base. In this particular case, Wake County serves as both a bedroom community for Durham County and houses many of those who work inside the county. **Exhibits E-I** provided additional examples.

These types of maps can help in defining and analyzing commuting patterns throughout the state or major metropolitan area. Several variations in data sets and level of geography can be used such as multiple state analyses, the use of Traffic Analysis Zones rather than counties, or creating commuter flow maps by means of transportation. The results can be used for marketing, funding of transportation improvements, land-use decisions, and travel forecasting model calibration. A step-by-step process has been developed for ArcView 3.2 and ArcGIS, which will be provided upon request.

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County Daily Commute Trips

Internal

·	748 - 10000
•	10001 - 50000
•	50001 - 100000
●	100001 - 200000
●	200001 - 350000

County to County

——	500 - 1000
——	1001 - 5000
——	5001 - 10000
——	10001 - 50000

Source: 2000 Census

Forsyth Co (Winston-Salem)

Guilford Co (Greensboro)

Durham Co (Durham)

Pitt Co (Greenville)

Buncombe Co (Asheville)

Catawba Co (Hickory)

Wake Co (Raleigh)

Gaston Co (Gastonia)

Mecklenburg Co (Charlotte)

Cumberland Co (Fayetteville)

Onslow Co (Jacksonville)

New Hanover Co (Wilmington)

Labeling for
50,000+ Internal Commute Trips

County
(Major City)

EXHIBIT A – North Carolina County-to-County Commuting

County Daily Commute Trips

Internal		County to County	
•	0 - 10000	←	0 - 2500
•	10001 - 50000	←	2501 - 5000
●	50001 - 100000	←	5001 - 10000
●	100001 - 200000	←	10001 - 200000
●	200001 - 350000	←	200001 - 350000

Source :2000 Census
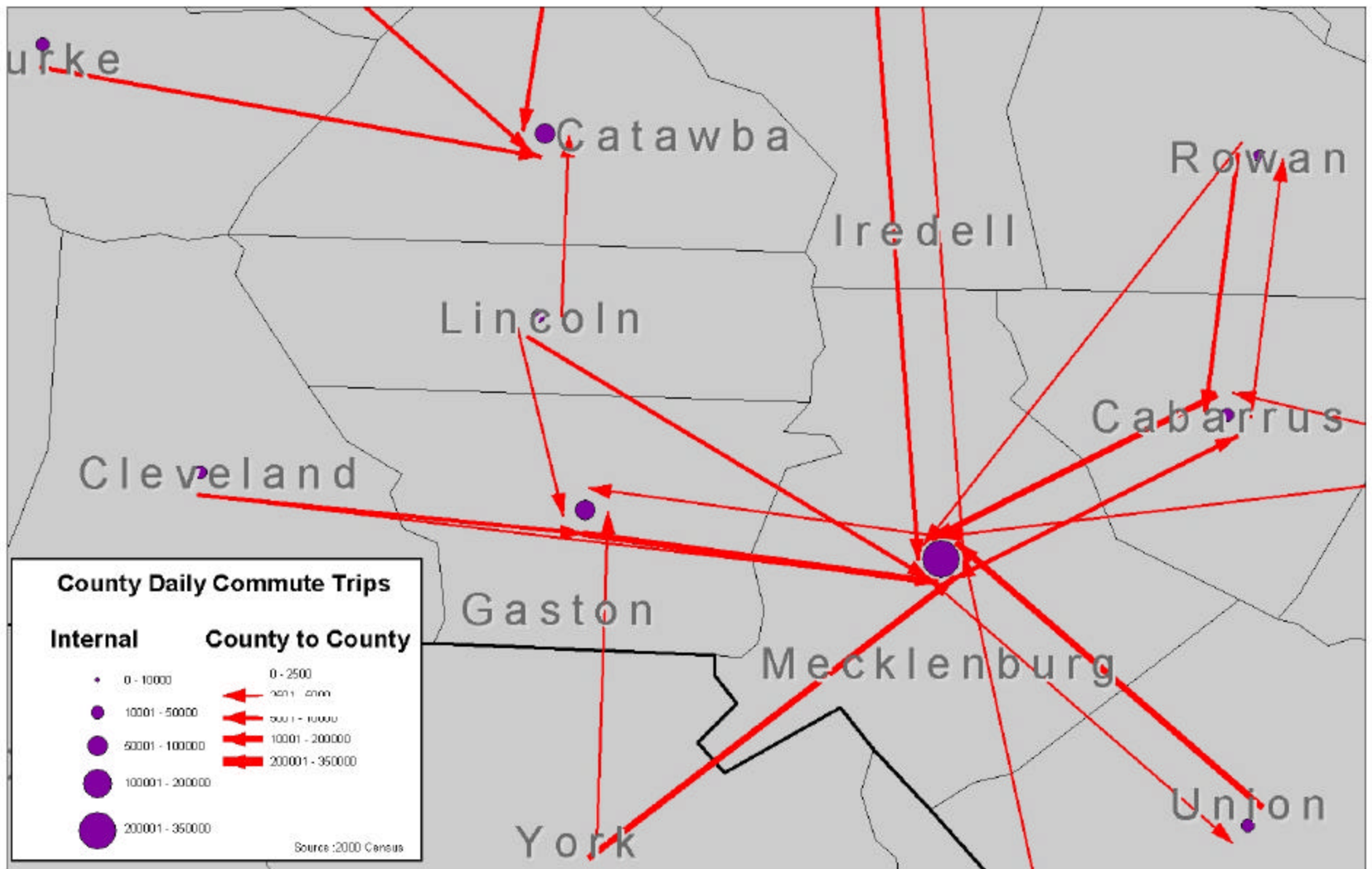
EXHIBIT B – Mecklenburg County (Charlotte Area) Commuting

County Daily Commute Trips

Internal | **County to County**

Internal:
- 0 - 10000
- 10001 - 50000
- 50001 - 100000
- 100001 - 200000
- 200001 - 350000

County to County:
- 0 - 2500
- 2501 - 5000
- 5001 - 10000
- 10001 - 200000
- 200001 - 350000

Source : 2000 Census
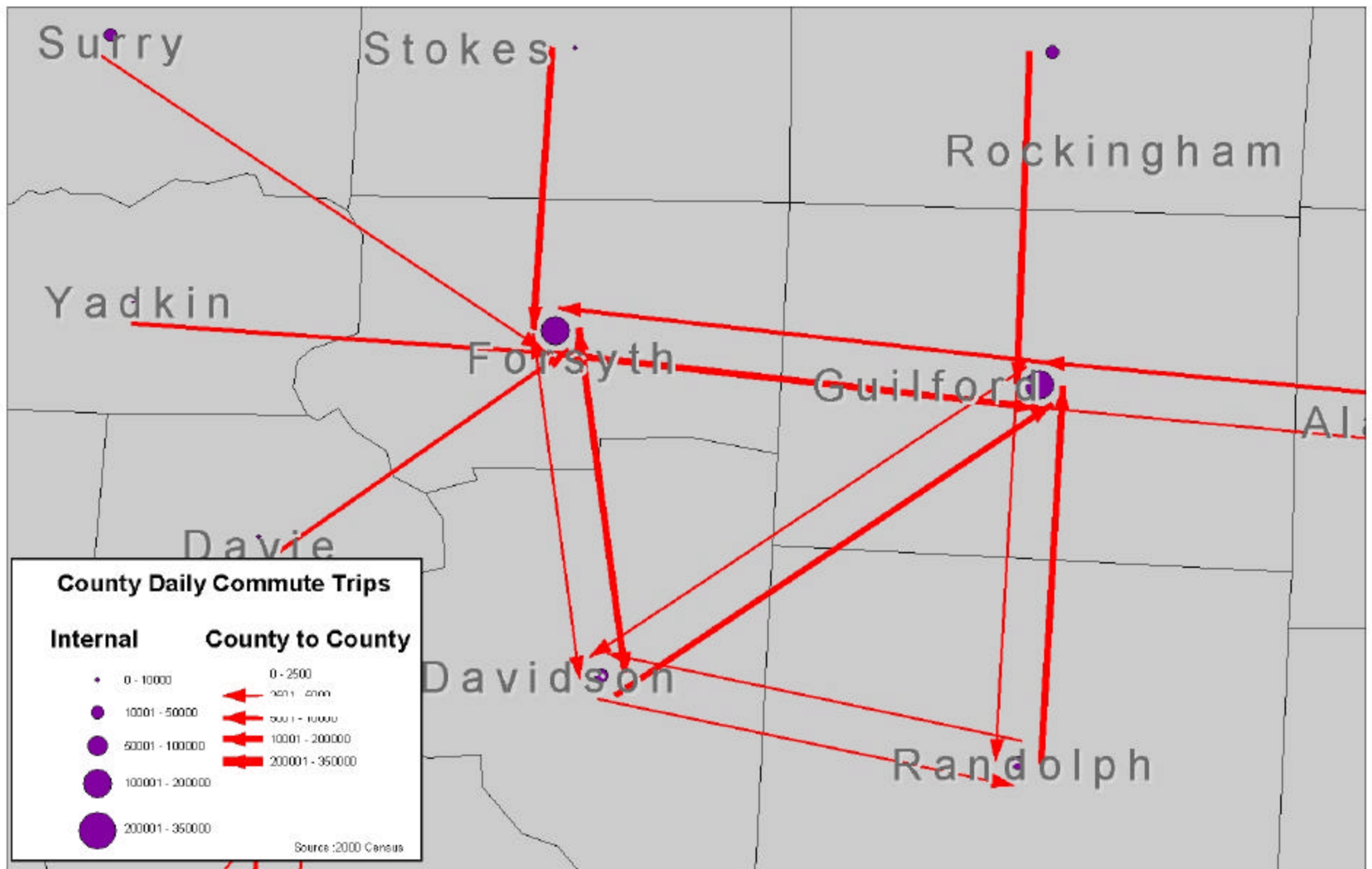
EXHIBIT C – Forsyth/Guilford County (Winston-Salem, High Point, Greensboro Area) Commuting

County Daily Commute Trips

Internal

- 0 - 10000
- 10001 - 50000
- 50001 - 100000
- 100001 - 200000
- 200001 - 350000

County to County

- 0 - 2500
- 2501 - 5000
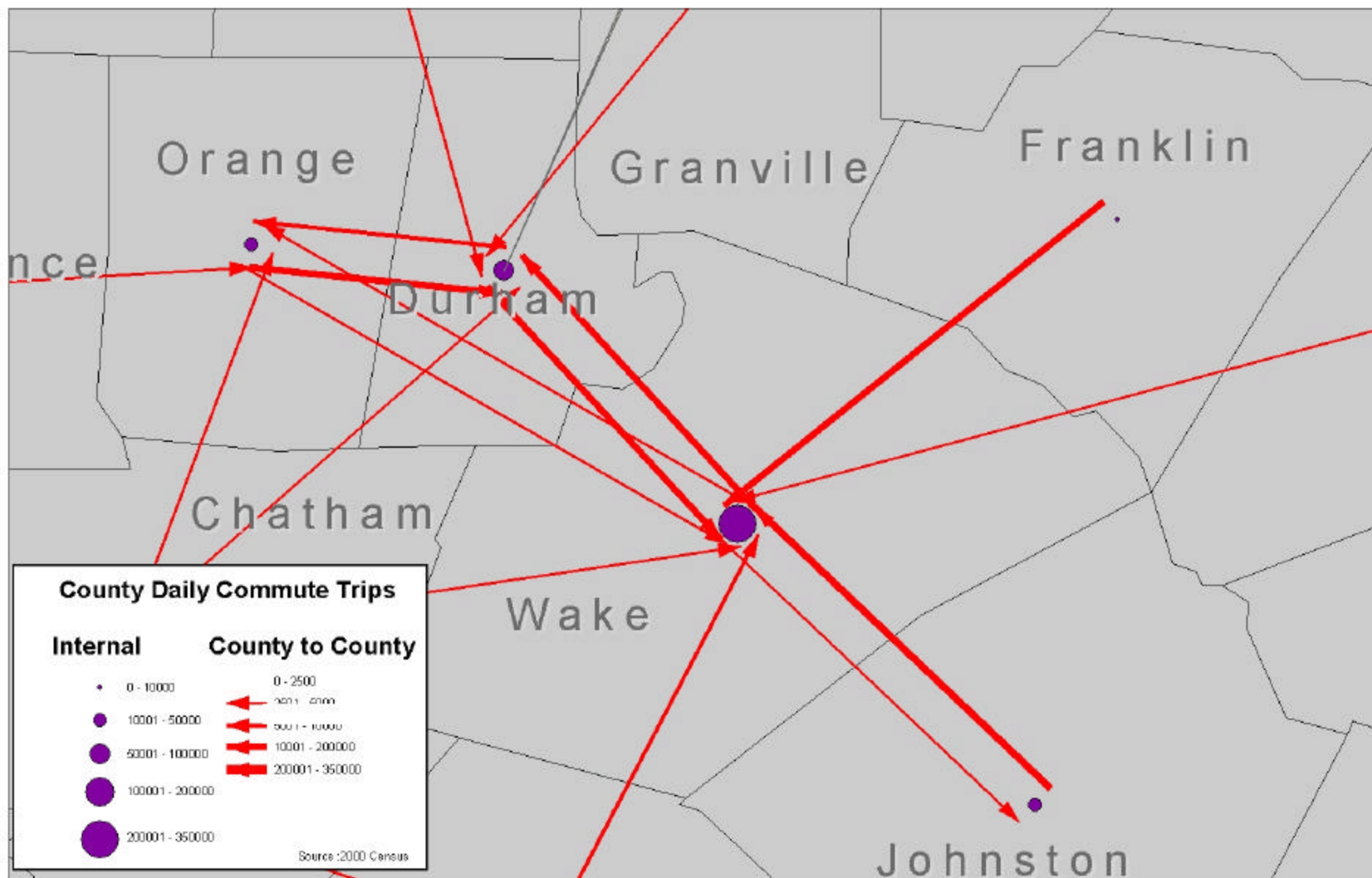- 5001 - 10000
- 10001 - 200000
- 200001 - 350000

Source : 2000 Census

EXHIBIT D – Durham/Wake County (Durham, Raleigh Area) Commuting
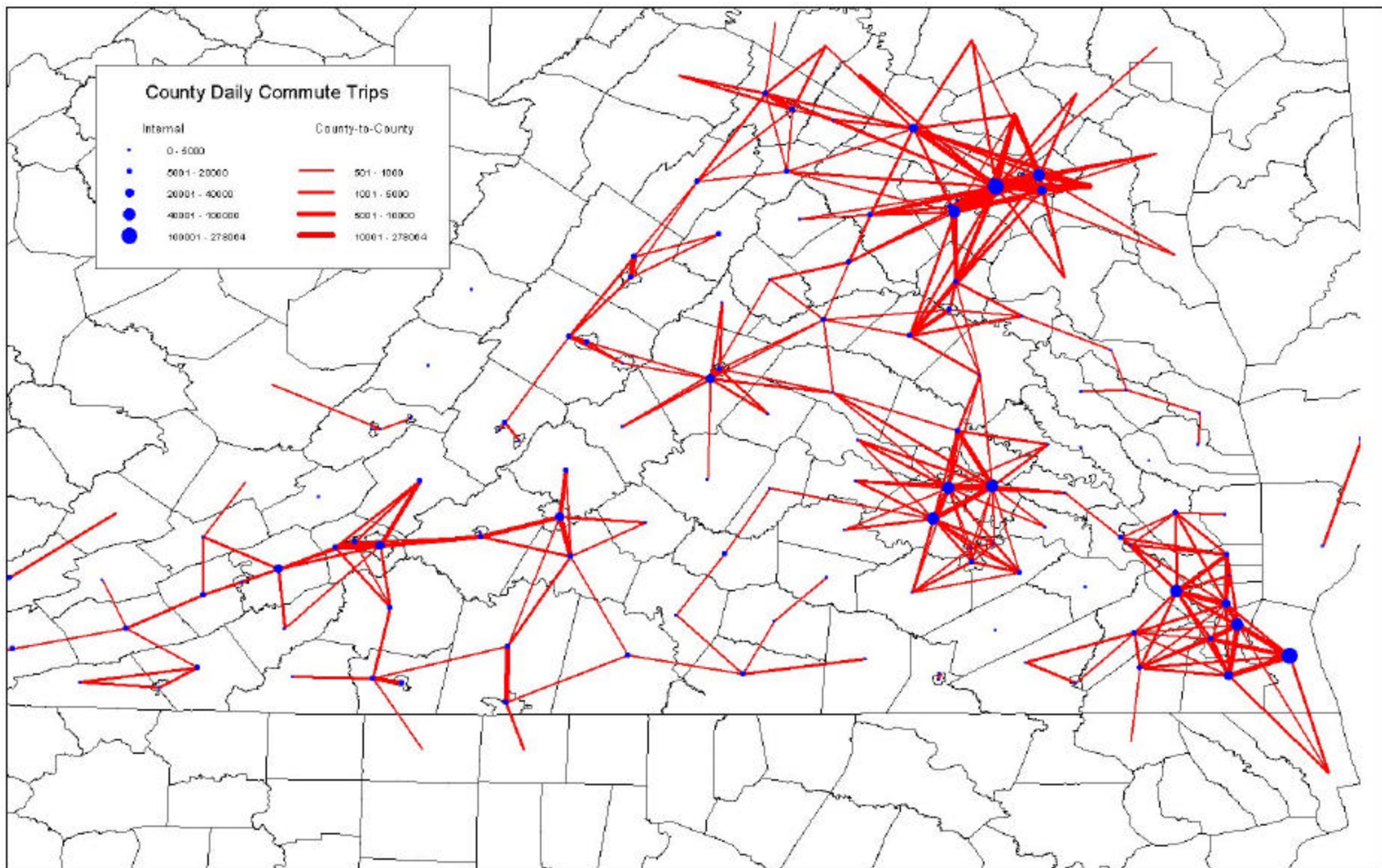
EXHIBIT E – Virginia County-to-County Commuting

Maryland County Daily Commute Trips
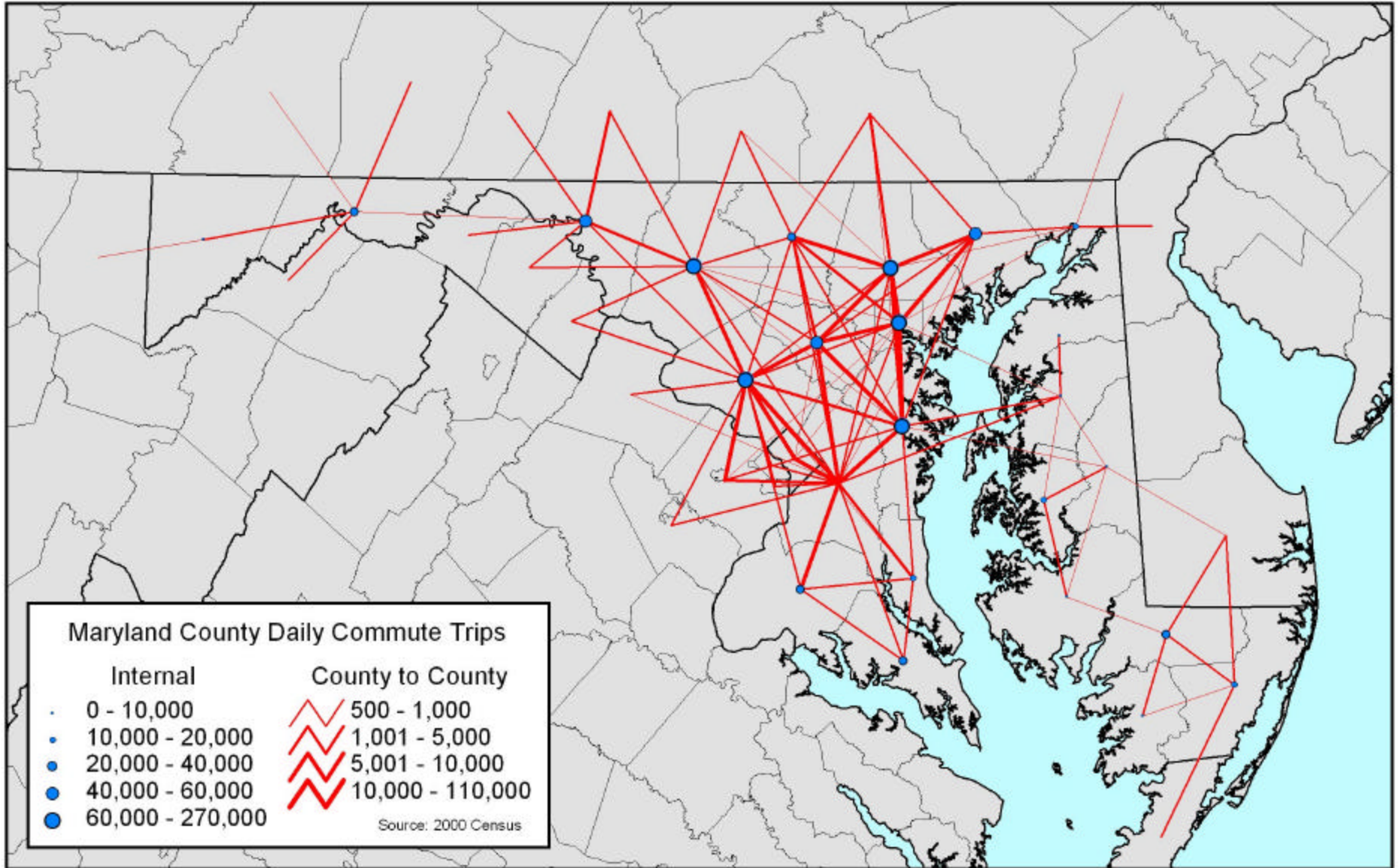
Internal		County to County	
0 - 10,000		500 - 1,000	
10,000 - 20,000		1,001 - 5,000	
20,000 - 40,000		5,001 - 10,000	
40,000 - 60,000		10,000 - 110,000	
60,000 - 270,000		Source: 2000 Census	

EXHIBIT F – Maryland County-to-County Commuting

Iowa County Daily Commute Trips

County-to-County
- 101 - 500
- 501 - 1000
- 1001 - 5000
- 5001 - 15000

Internal
- 0 - 10000
- 10001 - 20000
- 20001 - 50000
- 50001 - 100000
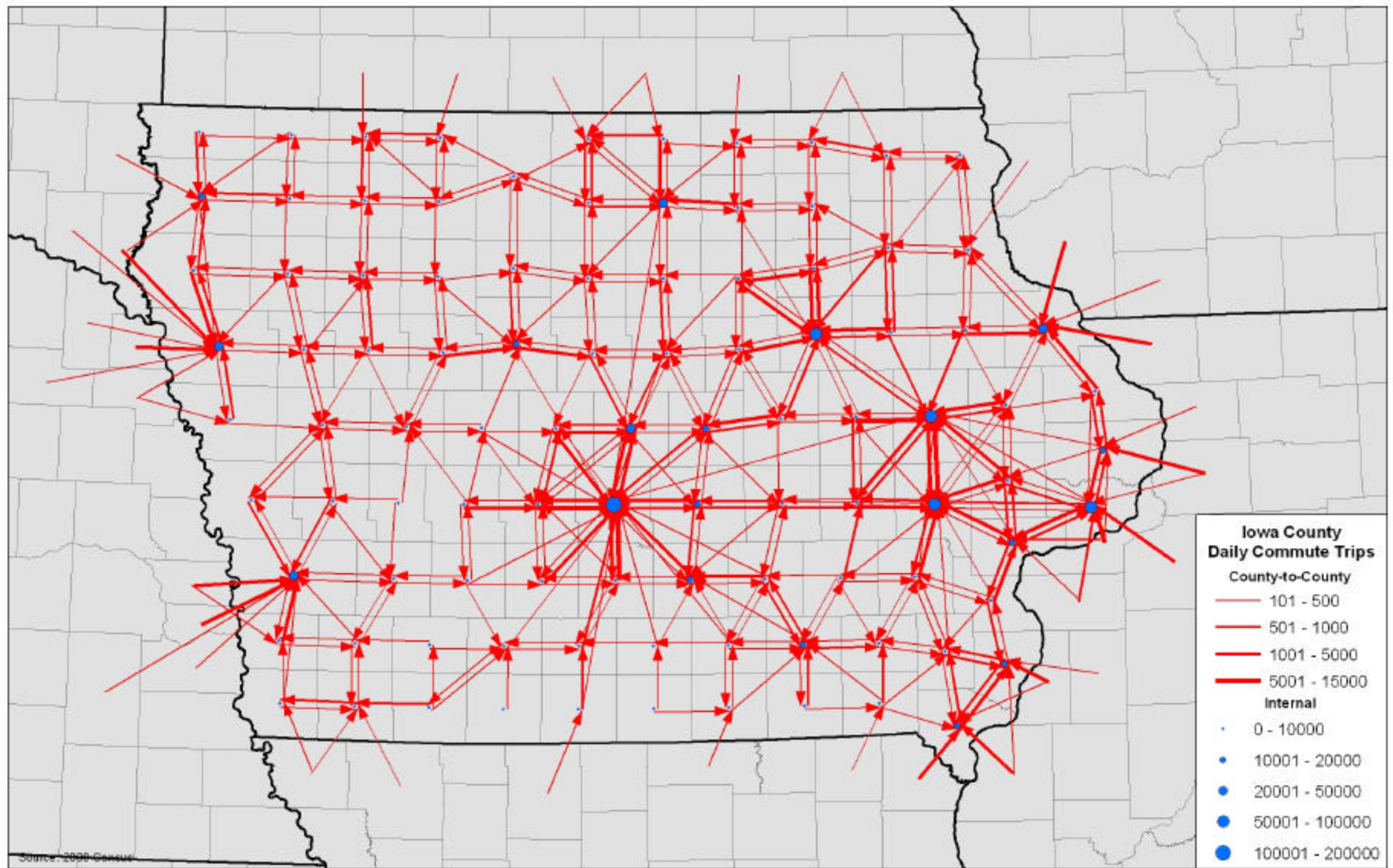- 100001 - 200000

Source: 2000 Census

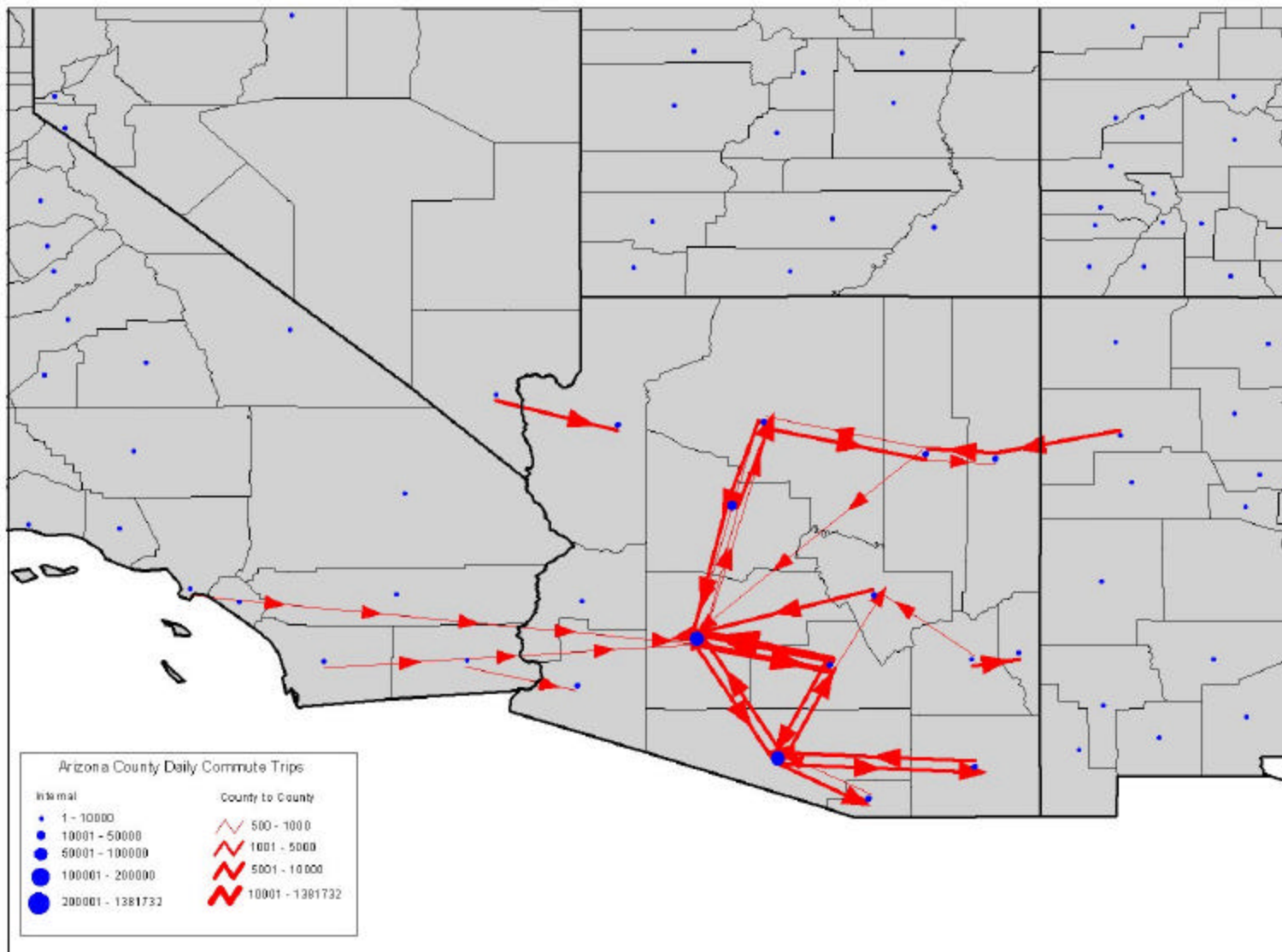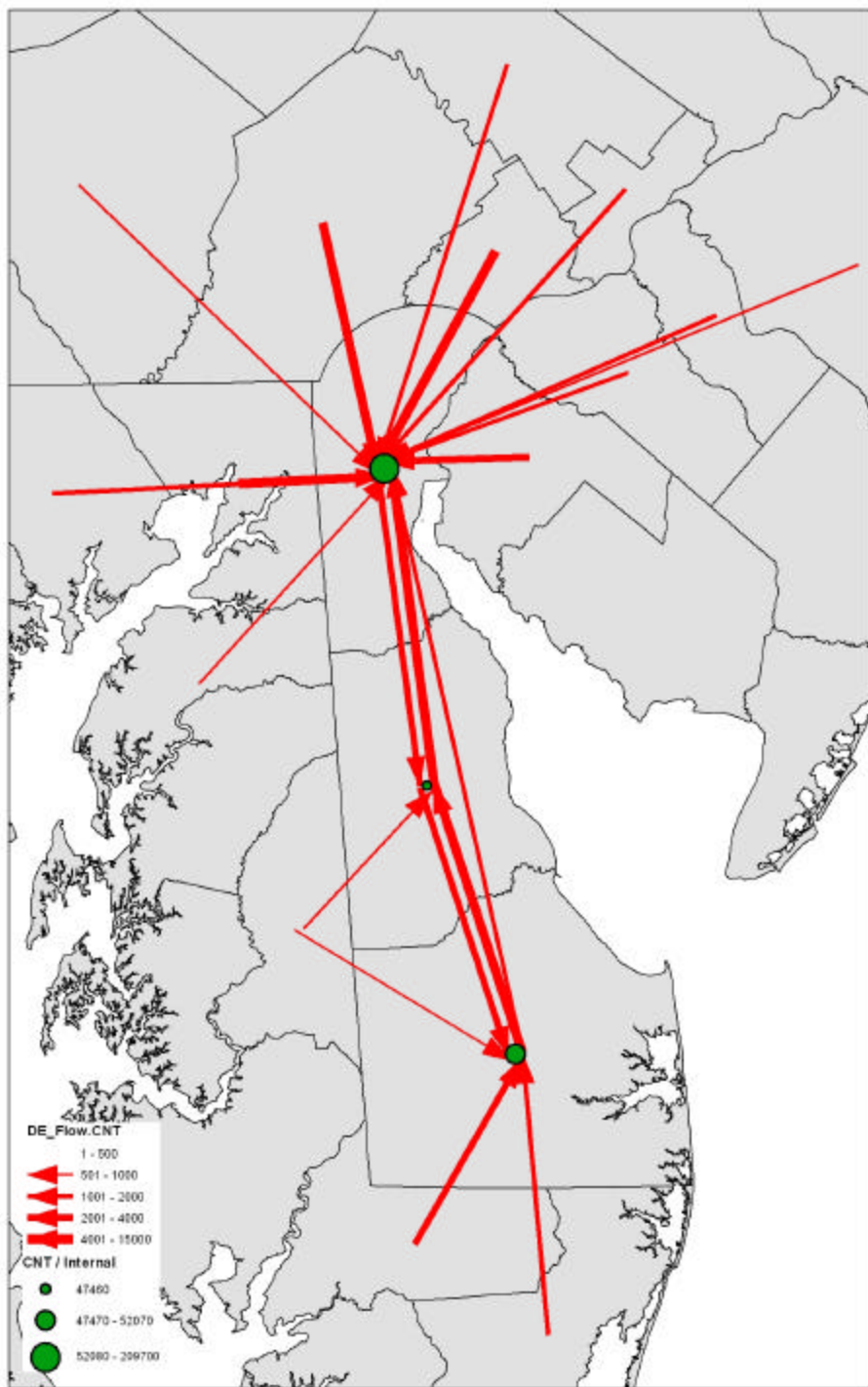EXHIBIT G – Iowa County-to-County Commuting

EXHIBIT H – Arizona County-to-County Commuting

EXHIBIT I – Delaware County-to-County Commuting