THE RURAL-URBAN FRINGE OF EAU CLAIRE-CHIPPEWA FALLS

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I. Introduction

A. Rural/Urbn Fringe

- Simple Definitions
  - The transition zone between built-up urban area and the agricultural, rural countryside
  - Not still rural, not yet urban
    - mixture of land uses

- Importance of Fringe
  - The fringe is important in analyzing population patterns and growth for cities and the reduction or rural lands as a result
  - It shows how urban sprawl changes the landscape and helps us to identify how the pattern may change in the future
Introduction (cont.)

B. Purpose of Paper
- To define the urban/rural fringe between Eau Claire, WI and Chippewa Falls, WI

- Methods
  - ArcMap GIS 9.3 Maps and graphs
    - Roads, highways, and water map (Figure 4)
    - Intersections and water map (Figure 5)
    - Kriging Intersection/Sq. Mi map (Figure 6)
  - Landform map (Figure 7)
  - Intersections Per Sq. Mi./Distance graph (Figure 8)

- Study Area
  - Eau Claire and Chippewa Falls, Wisconsin

- Results
  - Results show the urban/rural fringe between Eau Claire and Chippewa Falls, Wisconsin based on the Kriging distribution map of intersections per square mile (Figure 6). 0-10 intersection/square mile is defined as rural, 10-30 is defined as fringe, and more than 30 is considered urban. The resulting map shows the fringe area in orange (Figure 6).
II. Ideal Pattern

A. The Thunen Model (Figure 1)
   - Function of distance
   - Zones with sharp, distinct boundaries
   - CBD is the central business district and is located in the center
   - The next ring outward is urban area
   - The following ring in the urban rural fringe
   - The remaining area outside is rural area

B. Isotropic Surface
   - Mathematically flat plane
   - Same basic environment
   - People move in all directions equally

C. Ideal Pattern (Figure 1)
   - The ideal pattern has no anomalies
   - Doesn’t take into account highways, bodies of water, etc.
   - Hardly ever matches the real world due to the changes in physical landscape
Figure 1: Ideal pattern of the Rural-Urban Continuum
III. Possible Anomalies (Figure 2)

A. Barrier Effects
   - Physical Features
     - Water (Rivers, lakes, oceans)
     - Access to bodies of water increase population
     - Mountains
     - Prevent centralized growth but lead to sprawl from surrounding cities
     - Climates (Desert versus temperate)
   - Human Barriers
     - Highways
     - No highways, no population growth
     - Roads
     - The less accessible roads, the less people in general

B. "Pull" Effects
   - Transportation Corridors
     - The bigger the corridor, the more people

   - Residential Amenities
     - The more that are offered, the more people there will be
Figure 2: Ideal pattern with possible modifications
IV. Defining the Rural/Urban Fringe

A. Conventional Measures
   - Measurement Problems
     - Cost of analyzing population, power connections, telephone hookups, building permits is expensive, takes time, and a lot of effort
     - Census done every 10 years, so not necessarily accurate
       - Cost, time, effort all outweigh benefits of research
   - Political Problems
     - City boundaries are defined politically but may not include all those using city resources
       - Boundaries drawn using distinct lines and not zones
       - Boundaries tend to be static, not dynamic

B. The Street Intersection Method
   - Method Defined
     - TIGER Intersection Extraction (Figures 3, 4, 5)
       - Electronic street map of the U.S.A.
       - 3 or more points with the same coordinates become an intersection
       - Measures intersections per square mile because urbanization follows roads
       - Measures the intermediate areas between urban and rural
   - Method Efficiency
     - Efficient when data is part of a GIS database

C. Theoretical Considerations
   - Important to consider what physical and human barriers may change the urban/rural fringe and what may pull more people in
Figure 3: TIGER Intersection Extraction

TIGER Intersection Extraction:
3 or more points with the same coordinates = an intersection
Figure 4: Eau Claire-Chippewa Falls Roads, Highways, and Water
TIGER Results

-Using the TIGER Intersection Extraction and the roads file from the pre-existing database (Figure 4) in Arc Map GIS 9.3 allows us to pull out the intersections in the Eau Claire and Chippewa Falls area (Figure 5)

-Water is in place to show how similarities begin to appear between the Chippwa Falls/Eau Claire area (Figure 5) and the ideal pattern with anomalies (Figure 2)
Figure 5: Eau Claire-Chippewa Falls Intersections and Water
V. Eau Claire/Chippewa Falls Rural/Urban Fringe

A. Theoretical Ideal (Figures 2 and 6)
   - The theoretical ideal says there should be two perfect concentric circles, one around Eau Claire and one around Chippewa Falls with a perfect corridor of fringe connecting the two.

B. Anomalies (Figures 6 and 8)
   - Anomalies exist because of US Highway 53 connecting the two urban areas and because of the physical barriers
   - The graph (Fig. 8) shows while the highest number of intersections are closest to the center of Eau Claire, anomalies exist due to physical barriers, transportation corridors, and residential amenities

C. Physical Barriers (Figure 7)
   - The Chippewa River, Lake Wissota, Eau Claire River, and subsequent fluvial landforms change where people built and where populations were concentrated

D. Pull Effects (Figure 6)
   - Transportation Corridors
     - U.S. Highway 53 connects the cities of Eau Claire and Chippewa Falls and that is the path the fringe follows
     - One of the reasons there are more people in the Eau Claire area is because Interstate 94 runs just south of the city and allows easy access entrances and exists for local residents
   - Residential Amenities
     - City sewer, water, and gas allows for residents to gain easy access to necessary amenities within city limits, concentrating growth and resulting in more concentrated roads
Figure 6: Eau Claire-Chippewa Falls Intersections/Sq. Mi.
Figure 7: Landform Map of Eau Claire, WI
Figure 8

Intersection Per Square Mile/Distance
VI. Conclusions

The ideal pattern for defining a rural/urban fringe helps to understand the transition zone and how it works. However, many different factors affect the real-life fringe. In defining the rural/urban fringe between Eau Claire and Chippewa Falls, Wisconsin, it is important to look at different physical barriers and “pull” factors that change the human landscape and define the urban, rural, and fringe areas.

The Chippewa River, Eau Claire River, and resulting fluvial terraces and bluffs influenced road building in lower-lying areas. Lake Wissota attracted industry early in history due to the dam and the resulting power it created. Building growth and population growth naturally followed the roads. When highways began being built, namely U.S. 53 and Interstate 94, it allowed for an even greater influx of people who liked the amenities Eau Claire and Chippewa Falls had to offer. They may work in other places but the highways give easy access to communities not too far off the highway and within a reasonable driving distance from homes.

The TIGER intersection extraction method is effective in showing road intersections and therefore the locations of people between Eau Claire and Chippewa Falls. The urban areas are shown sprawling out from the center and the fringe is a definite transition zone connecting the two cities and showing how the urban area is separated from the rural area by this rural/urban fringe (Figure 6). The pattern is distinct and correlates well with Figure 2.
Bibliography


