

## **Establishing a Historical Model for Suburban Growth in San Antonio, Texas 1890-2010**

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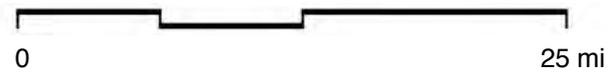
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**Figure 1.** Bexar County 2010





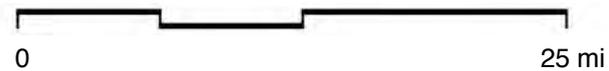
## Metropolitan Growth

SA pop of 1.47M = 7<sup>th</sup> Largest U.S. City

SA will add 500K jobs by 2040

SA will add 500k units of housing by 2040

**Figure 1.** Bexar County 2010





## Metropolitan Growth

SA pop of 1.47M = 7<sup>th</sup> Largest U.S. City

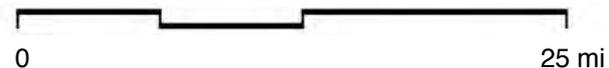
SA will add 500K jobs by 2040

SA will add 500k units of housing by 2040

Current footprint covers 467 square miles

Could expand to over 1,000 square miles

**Figure 1.** Bexar County 2010



### 3 Questions

How did the *form* of suburban growth shift within Bexar County?

Has the *location* of suburban growth shifted within Bexar County?

Has the *type* of suburban growth shifted within Bexar County?

# Methods

2015 parcel shapefile for San Antonio from the Bexar County Property Appraiser providing property ownership, year first building was constructed on the lot, the assessed value of building(s) and lot, land use, and the total acreage for the parcel.

Shapefile with San Antonio building footprints from the Texas Sustainable Energy Research Institute

Spatial join of the parcel shapefile and building footprints, assigning all of the attributes from the Bexar County Property Appraiser dataset to the buildings

Sample size of 609,006 buildings and 475,127 parcel

Converted the polygon building footprint shapefiles for each decade into point shapefiles in ArcGIS. Used the kernel density spatial analyst tool on the point building footprint shapefiles to calculate the concentration of buildings within an area.

This created a development surface for each time period.

The team utilized total building coverage as a weight in the population field of the kernel density function in order to account for the size of each completed building.

creating maps from the results and classifying them using the equal interval method. The team then compared the kernel density maps across decades to determine how the concentration of development changed in San Antonio over time.

Using ArcGIS near tool to calculate the distance from the center of each building in the data set to the center of downtown's Main Plaza

### 3 Results

How did the *form* of suburban growth shift within Bexar County?

**Concentric growth until late late twentieth century, now polycentric configuration**

Has the *location* of suburban growth shifted within Bexar County?

**Patterns of centrifugal expansion began to accelerate dramatically in 2000.**

Has the *type* of suburban growth shifted within Bexar County?

**The relative import of multifamily completions increased in five of last six decades.**

## **Rise of the suburbs, decline of the central city**

1950-1990 : % of **people in central cities declines** from 1/2 to 1/3

1950-1990 : % of **jobs in central cities declines** from 70% to 45%

Mieszkowski and Mills (1993) Wheeler (2008) Farris (2001)

**These shifts mobilize a critique, today known as New Urbanism or Smart Growth**

Blake (1964)

Calthorpe (1993, 2001)

Duany, Plater-Zyberg, Speck (2000)

Duany, Speck, Lydon (2010)

## **New Suburbanism accepts inherent form and logic of suburban landscapes**

Robert Bruegman (2005)

Joel Kotkin (2005)

Judith De Jong (2014)

## **New Suburbanism might help San Antonio confront population boom in 3 ways**

Allows metropolitan area to absorb population, even if core doesn't fill out

Recognizes political climate in Texas, which is strongly pro-development

Focuses on inherent possibilities of suburban infill

## **Question 1**

**How did the *form* of suburban growth shift within Bexar County?**

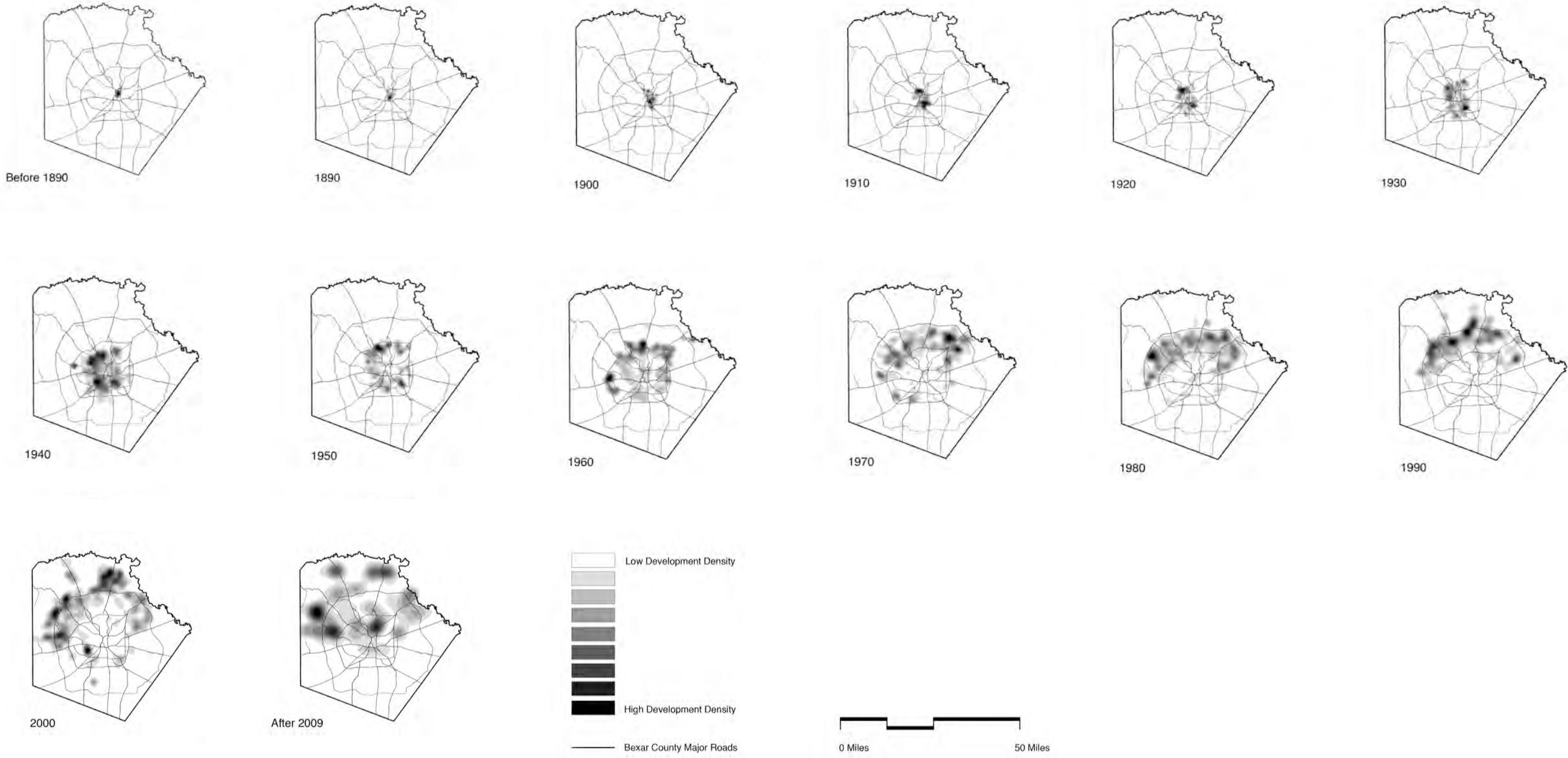
Concentric growth until late late twentieth century, now polycentric configuration

### **Method**

Kernel Density Analysis classifies growth by decade, at the scale of Bexar County

### **Precedent**

Delmelle, Zhou, and Thill (2014)



**Figure 2.** Kernel Density Analysis for Construction in Bexar County 1890-2010

## **Question 2**

**Has the *location* of suburban growth shifted within Bexar County?**

Patterns of centrifugal expansion began to accelerate dramatically in 2000.

### **Method**

Examine construction permits by year built and distance from center

### **Precedent**

Blumenfeld (1954)

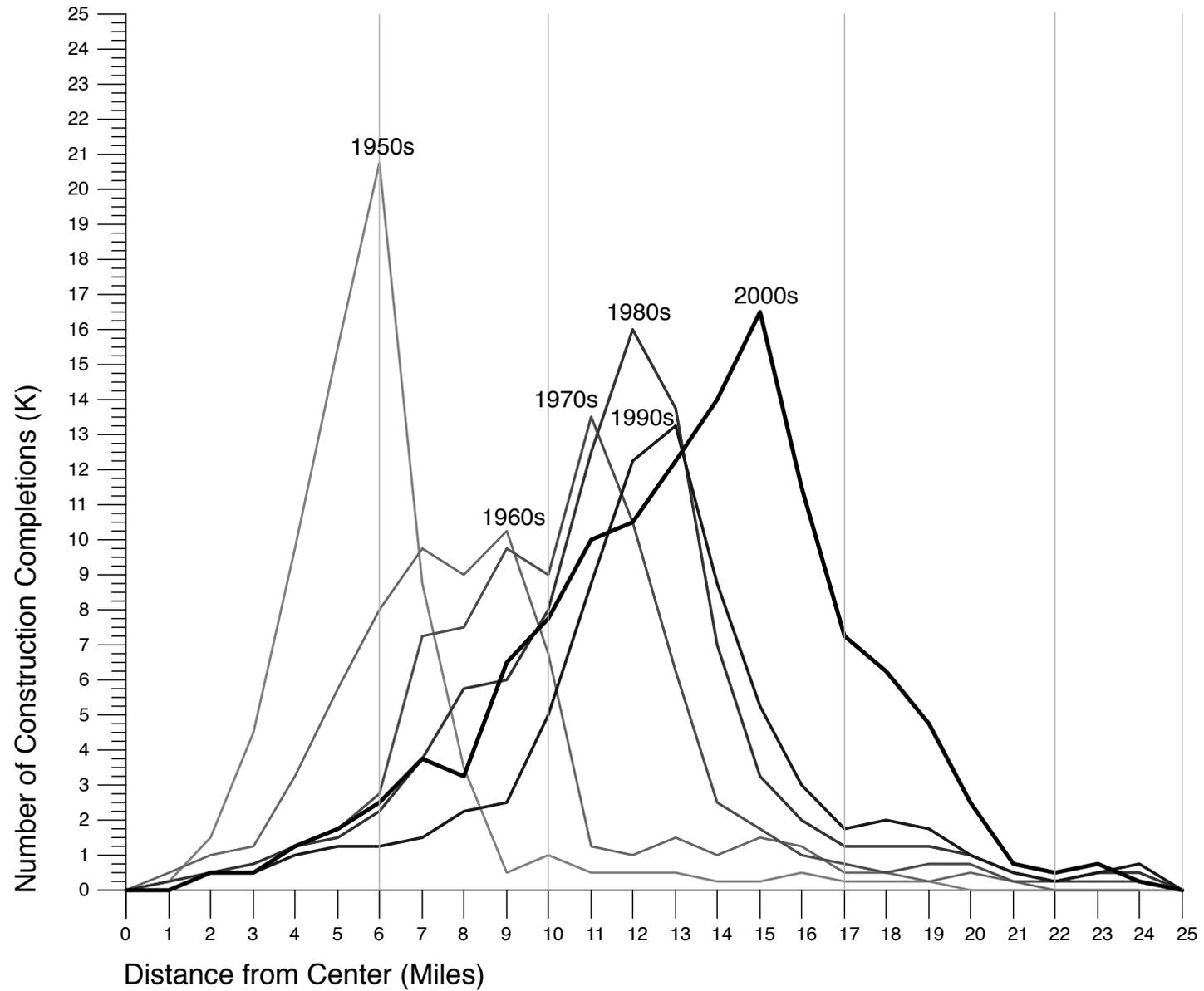
Hart (1991) and Pond

Yeates (1993, 1994)

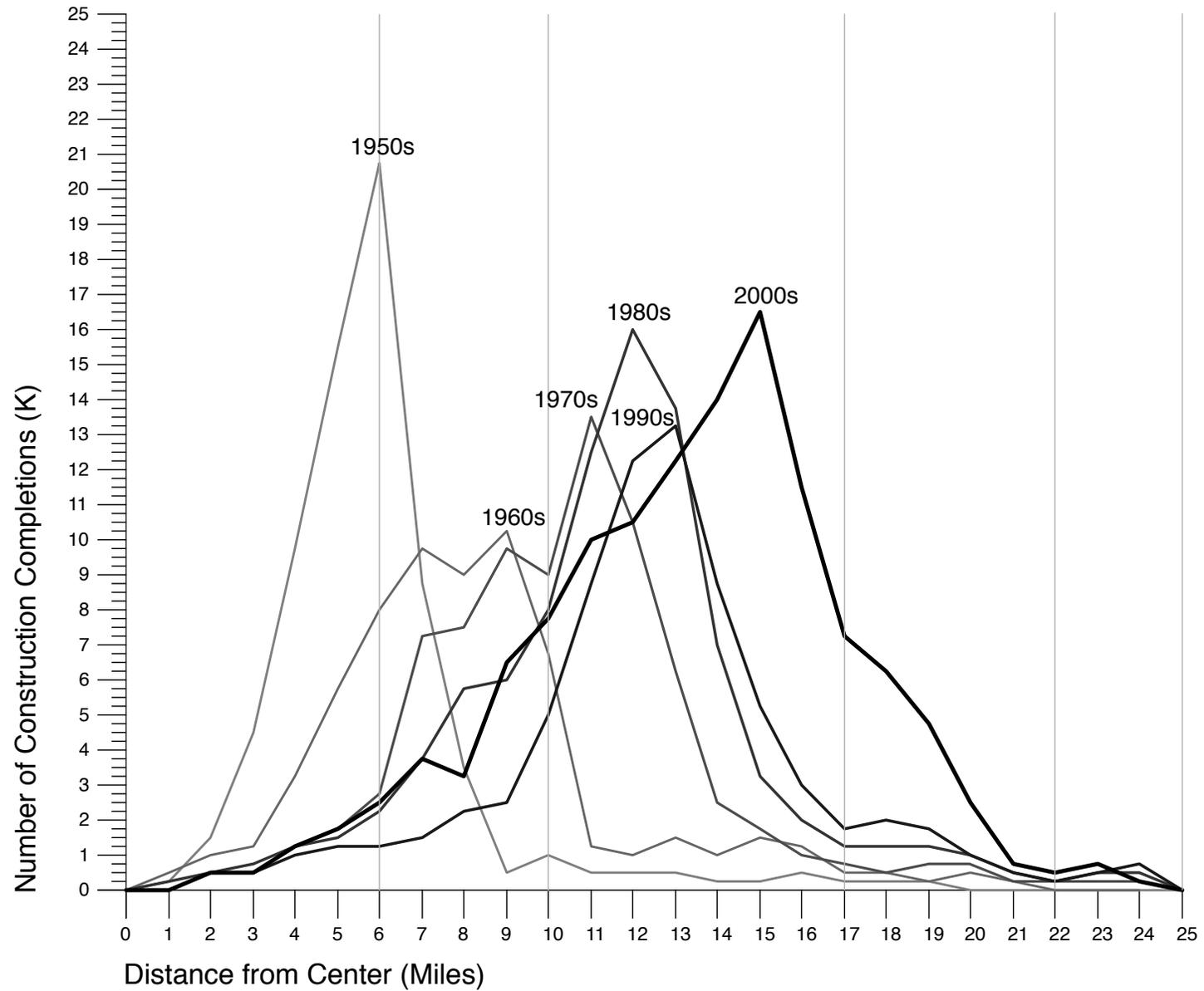
Gober and Burns (2002)

| Miles        | 1890s      | 1900s       | 1910s       | 1920s         | 1930s         | 1940s         | 1950s         | 1960s         | 1970s         | 1980s         | 1990s         | 2000s          |
|--------------|------------|-------------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| 1            | 105        | 336         | 257         | 406           | 239           | 268           | 225           | 226           | 116           | 220           | 121           | 94             |
| 2            | 216        | 1031        | 2019        | 4504          | 3257          | 2805          | 1428          | 939           | 459           | 614           | 435           | 524            |
| 3            | 53         | 641         | 1970        | 8361          | 5558          | 10,442        | 4491          | 1221          | 419           | 758           | 546           | 620            |
| 4            | 16         | 113         | 431         | 3740          | 4875          | 14,897        | 9733          | 3326          | 1199          | 1179          | 923           | 1237           |
| 5            | 4          | 38          | 207         | 1381          | 2798          | 10,826        | 15,406        | 5694          | 1869          | 1580          | 1154          | 1801           |
| 6            | 2          | 18          | 83          | 418           | 755           | 4039          | 20,801        | 8124          | 2850          | 2327          | 1256          | 2427           |
| 7            | 0          | 38          | 16          | 116           | 238           | 1194          | 8734          | 9776          | 7324          | 3871          | 1449          | 3766           |
| 8            | 0          | 12          | 6           | 62            | 135           | 976           | 3610          | 9114          | 7529          | 5727          | 2384          | 3240           |
| 9            | 0          | 13          | 10          | 7             | 82            | 154           | 522           | 10,366        | 9816          | 5987          | 2648          | 6480           |
| 10           | 7          | 9           | 32          | 65            | 73            | 272           | 958           | 6732          | 9022          | 7931          | 5112          | 7783           |
| 11           | 6          | 4           | 14          | 37            | 61            | 210           | 607           | 1149          | 13,552        | 12,505        | 8708          | 9915           |
| 12           | 0          | 14          | 13          | 14            | 56            | 209           | 618           | 914           | 10,468        | 16,008        | 12,247        | 10,959         |
| 13           | 0          | 18          | 13          | 32            | 83            | 205           | 547           | 1551          | 6251          | 13,795        | 13,347        | 12,278         |
| 14           | 2          | 15          | 9           | 25            | 87            | 182           | 294           | 1019          | 2513          | 6903          | 8722          | 13,984         |
| 15           | 2          | 19          | 1           | 18            | 79            | 187           | 307           | 1552          | 1881          | 3206          | 5237          | 16,379         |
| 16           | 3          | 13          | 21          | 43            | 132           | 249           | 414           | 1243          | 903           | 2014          | 3355          | 11,517         |
| 17           | 10         | 24          | 3           | 37            | 90            | 225           | 363           | 498           | 822           | 1308          | 1765          | 7312           |
| 18           | 3          | 14          | 27          | 54            | 91            | 202           | 259           | 420           | 587           | 1228          | 2087          | 6275           |
| 19           | 5          | 7           | 7           | 23            | 58            | 120           | 146           | 338           | 677           | 1214          | 1725          | 4682           |
| 20           | 4          | 9           | 1           | 25            | 33            | 70            | 122           | 449           | 760           | 1089          | 1081          | 2524           |
| 21           |            | 0           | 6           | 9             | 27            | 43            | 63            | 150           | 257           | 621           | 674           | 840            |
| 22           |            | 2           | 0           | 1             | 12            | 22            | 30            | 39            | 252           | 332           | 295           | 547            |
| 23           |            | 0           | 0           | 1             | 5             | 6             | 16            | 33            | 278           | 480           | 626           | 801            |
| 24           |            | 5           | 2           | 9             | 5             | 21            | 10            | 14            | 202           | 430           | 737           | 332            |
| 25           |            |             |             | 4             | 1             |               | 5             |               | 54            | 16            | 93            | 104            |
| 26           |            |             |             |               |               |               |               |               | 2             |               |               |                |
| <b>Total</b> | <b>438</b> | <b>2393</b> | <b>5148</b> | <b>19,392</b> | <b>18,830</b> | <b>47,824</b> | <b>69,709</b> | <b>64,887</b> | <b>80,062</b> | <b>91,343</b> | <b>76,727</b> | <b>126,421</b> |

**Table 2.** Number of Construction Completions by Distance from Center in Bexar County 1890-2009



**Figure 3.** Number of Construction Completions by Distance from Center in Bexar County 1950-2009



**Figure 3.** Number of Construction Completions by Distance from Center in Bexar County 1950-2009

### **Question 3**

**Has the *type* of suburban growth shifted within Bexar County?**

The relative import of multifamily completions increased in five of last six decades.

#### **Method**

Examine location and quantity of single- and multi-family housing types

#### **Precedent**

Atkinson-Palombo (2010)

| Time Period | Residential Single-Family |                                   | Residential Multi Family |                                   | Commercial        |                                   | Industrial        |                                   | Total Buildings   |                                   |
|-------------|---------------------------|-----------------------------------|--------------------------|-----------------------------------|-------------------|-----------------------------------|-------------------|-----------------------------------|-------------------|-----------------------------------|
|             | Buildings (Count)         | Avg. Distance from Center (Miles) | Buildings (Count)        | Avg. Distance from Center (Miles) | Buildings (Count) | Avg. Distance from Center (Miles) | Buildings (Count) | Avg. Distance from Center (Miles) | Buildings (Count) | Avg. Distance from Center (Miles) |
| 1890s       | 369                       | 3.1                               | 39                       | 1.7                               | 30                | 1.1                               | 0                 | NA                                | 438               | 2.8                               |
| 1900s       | 1925                      | 3.0                               | 226                      | 1.7                               | 200               | 1.8                               | 42                | 2.7                               | 2393              | 2.8                               |
| 1910s       | 4574                      | 2.6                               | 407                      | 2.0                               | 161               | 1.9                               | 6                 | 0.9                               | 5148              | 2.6                               |
| 1920s       | 17,722                    | 3.0                               | 1215                     | 2.4                               | 408               | 2.4                               | 47                | 1.1                               | 19,392            | 2.9                               |
| 1930s       | 17,110                    | 3.7                               | 1052                     | 2.7                               | 637               | 3.5                               | 31                | 1.9                               | 18,830            | 3.7                               |
| 1940s       | 43,963                    | 4.2                               | 1926                     | 3.4                               | 1884              | 5.2                               | 51                | 4.0                               | 47,824            | 4.2                               |
| 1950s       | 64,872                    | 5.5                               | 1361                     | 4.1                               | 3255              | 5.0                               | 221               | 4.3                               | 69,709            | 5.5                               |
| 1960s       | 55,836                    | 8.0                               | 3352                     | 6.3                               | 4861              | 5.9                               | 838               | 5.2                               | 64,887            | 7.8                               |
| 1970s       | 67,381                    | 10.3                              | 4997                     | 7.4                               | 7202              | 7.9                               | 482               | 7.7                               | 80,062            | 9.9                               |
| 1980s       | 72,319                    | 11.6                              | 8067                     | 8.8                               | 10,458            | 9.1                               | 499               | 8.6                               | 91,343            | 11.0                              |
| 1990s       | 67,523                    | 12.5                              | 2202                     | 9.7                               | 6691              | 10.1                              | 311               | 9.6                               | 76,727            | 12.2                              |
| 2000s       | 110,633                   | 13.1                              | 5332                     | 10.6                              | 9765              | 10.4                              | 691               | 10.0                              | 126,421           | 12.8                              |

**Table 3.** Average Distance from the City Center of Single-Family, Multifamily, Commercial and Industrial Construction Completions in Bexar County 1890-2009

| Time Period | Residential Single-Family |                                   | Residential Multi Family |                                   | Commercial        |                                   | Industrial        |                                   | Total Buildings   |                                   |
|-------------|---------------------------|-----------------------------------|--------------------------|-----------------------------------|-------------------|-----------------------------------|-------------------|-----------------------------------|-------------------|-----------------------------------|
|             | Buildings (Count)         | Avg. Distance from Center (Miles) | Buildings (Count)        | Avg. Distance from Center (Miles) | Buildings (Count) | Avg. Distance from Center (Miles) | Buildings (Count) | Avg. Distance from Center (Miles) | Buildings (Count) | Avg. Distance from Center (Miles) |
| 1890s       | 369                       | 3.1                               | 39                       | 1.7                               | 30                | 1.1                               | 0                 | NA                                | 438               | 2.8                               |
| 1900s       | 1925                      | 3.0                               | 226                      | 1.7                               | 200               | 1.8                               | 42                | 2.7                               | 2393              | 2.8                               |
| 1910s       | 4574                      | 2.6                               | 407                      | 2.0                               | 161               | 1.9                               | 6                 | 0.9                               | 5148              | 2.6                               |
| 1920s       | 17,722                    | 3.0                               | 1215                     | 2.4                               | 408               | 2.4                               | 47                | 1.1                               | 19,392            | 2.9                               |
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| 1940s       | 43,963                    | 4.2                               | 1926                     | 3.4                               | 1884              | 5.2                               | 51                | 4.0                               | 47,824            | 4.2                               |
| 1950s       | 64,872                    | 5.5                               | 1361                     | 4.1                               | 3255              | 5.0                               | 221               | 4.3                               | 69,709            | 5.5                               |
| 1960s       | 55,836                    | 8.0                               | 3352                     | 6.3                               | 4861              | 5.9                               | 838               | 5.2                               | 64,887            | 7.8                               |
| 1970s       | 67,381                    | 10.3                              | 4997                     | 7.4                               | 7202              | 7.9                               | 482               | 7.7                               | 80,062            | 9.9                               |
| 1980s       | 72,319                    | 11.6                              | 8067                     | 8.8                               | 10,458            | 9.1                               | 499               | 8.6                               | 91,343            | 11.0                              |
| 1990s       | 67,523                    | 12.5                              | 2202                     | 9.7                               | 6691              | 10.1                              | 311               | 9.6                               | 76,727            | 12.2                              |
| 2000s       | 110,633                   | 13.1                              | 5332                     | 10.6                              | 9765              | 10.4                              | 691               | 10.0                              | 126,421           | 12.8                              |
| 2009 -      |                           |                                   |                          |                                   |                   | 9.0                               |                   |                                   |                   |                                   |

**Table 4.** Average Distance from the City Center of Single-Family, Multifamily, Commercial and Industrial Construction Completions in Bexar County 1890-present

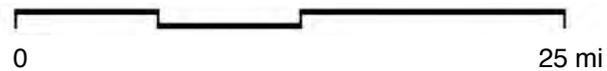


## Decade of Downtown?

Avg Multi-family is 9 miles from downtown

Avg Single-Family is 1 miles from downtown

Figure 1. Bexar County 2010





## San Antonio

rapidly expanding

rapidly decentralizing

will resist geographic containment

increasingly suburban

**Figure 1.** Bexar County 2010

