

**Measuring Urban Form: A Comparative Analysis of
South East Queensland and South Florida**

Assoc. Professor Neil Sipe
School of Environment
Griffith University
Brisbane, Queensland 4111
E: n.sipe@griffith.edu.au

Dr Severine Mayere-Donohue
Faculty of Built Environment and Engineering
Queensland University of Technology
Brisbane, Queensland 4001
Severine.mayere@qut.edu.au

Dr Aysin Dedekorkut-Howes
School of Environment
Griffith University
Gold Coast, Queensland 4222
a.dedekorkut@griffith.edu.au

Measuring Urban Form: A Comparative Analysis of South East Queensland and South Florida

ABSTRACT: *At first glance the built environments of South Florida and South East Queensland appear very similar, particularly along the highly urbanized coast. However this apparent similarity belies some fundamental differences between the two regions in terms of context and the approach to regulating development. This paper describes some of these key differences, but focuses on two research questions: 1) do these differences affect the built environment; and 2) if so, how does the built form differ?*

There has been considerable research on how to best measure urban form, particularly as it relates to measuring urban sprawl (Schwarz 2010; Clifton et al. 2008). Some of the key questions identified by this research include: what are the best variables to use?; what scale should be used?; and what time period to use? We will assimilate this research in order to develop a methodology for measuring urban form and apply it to both case study regions.

There are several potential outcomes from this research -- one is that the built form between the two regions is quite different; and the second is that it is similar. The first outcome is what might be expected given the differences in context and development regulation. However how might the second outcome be explained – major differences in context and development regulation resulting in minor differences in key measures of urban form? One explanation is that differences in the way development is regulated are not as important in determining the built form as are private market forces.

Keywords: *urban form, comparative analysis, South Florida, South East Queensland*

Introduction

Many scholars (Faludi and Hamnett 1975; Masotti and Walton 1976; Masser 1984a; Bourne 1986; Dear 2005) have argued for more international comparative urban research. For planners, international comparative research has two roles: to improve practice through the transfer of experiences from one country to another; and to advance theory (Faludi and Hamnett 1975; Masser 1984a). Scholars including Nijman (2007), McFarlane (2010) and Ward (2008; 2010) have noted that international comparative urban and social science research is re-emerging after a two-decade interlude.

International comparative urban research has long presented challenges with many studies criticized for: not being truly comparative (Masser 1984b; Bourne 1986) or systematic (Harloe 1981); being descriptive with no explicit basis of comparison (Faludi and Hamnett 1975); and not examining contextual issues (Masser 1984a).

The aim of this paper is to: present a framework for examining contextual issues and to use it to compare South Florida (U.S.) and South East Queensland (Australia) from a planning perspective; provide a method for comparing the built form between two regions or

cities; use this method to compare the urban form of Ft. Lauderdale, Florida and Gold Coast City, Queensland.

Why South Florida and South East Queensland?

There are a number of reasons why the analysis focuses on these two regions. First, all of the authors have spent time in both regions and are familiar with the built form and key contextual issues. Second, the two regions are visually very similar – in some areas it would be difficult to know which region you were in. Third, underlying the visual similarities are many other similarities including:

- Fastest growing parts of their respective countries
- Infrastructure backlogs due to rapid population growth
- Subject to sun-belt migration due to favourable climates
- Economy based on mining, agriculture, tourism and construction
- Comprehensive planning -- 1985 in Florida and 1998 in Qld
- Large amount of coastal areas for development
- Key location of major theme parks
- Changes after WWII – rising personal incomes, air conditioning, air travel and motor cars – resulted in rapid growth and development
- Both known as the “Sunshine State”
- Master planned communities built around golf courses, canal estates and marinas
- Similar place names – Gold Coast, Florida Keys, Miami, Palm Beach
- Florida known as the “sleepy south”; Queensland the “Deep North”
- Ft Lauderdale and Gold Coast are sister cities
- Prime locations for retirement (active adult-only) communities
- Dichotomies between coastal and inland (rural) areas
- Fragile coastal ecosystems under threat from development

For more discussion on the similarities between Florida and Queensland see Mayere, et al. (2010).

This list should not imply that there aren't differences. There are some fundamental differences between the two regions that need to be acknowledged. To systematically conduct a comparative analysis, a framework is needed.

A Framework for Comparative Analysis

The framework used in this analysis is based on the work of Cullingworth (1993) and Booth (1996). The framework examines key contextual considerations and has four parts: demography; governance; role of law; and regulatory philosophy. The indicators for each of these framework components are described in Tables 1-4. These tables also provide an

evaluation of how South Florida and South East Queensland rate on each of the indicators. For a more detailed description of this framework see Dedekorkut et al. (2011).

Table 1. A Framework for Comparative Analysis: Demography

Indicator	South Florida	South East Queensland
Population (millions)	5.56	2.97
Growth rate (millions)	1.51 (1990-2010)	1.12 (1991-2008)
Population Density (persons/km ²)	349	129

Table 2. A Framework for Comparative Analysis: Governance

Indicator	South Florida	South East Queensland
System of local government	3 counties and 104 municipalities	11 local governments
Governmental service provision arrangement	Most services provided by local governments	Share responsibility between state (police, fire, ambulance) and local government (water, wastewater, solid waste, recreation)
Property taxation	Taxes assessed on both land and improvements	Rates are only assessed on the land (assuming highest and best use per local planning regulations)
Planning administration	State administered with plans at regional and local levels	State administered with plans at regional (some) and local levels

Table 3. A Framework for Comparative Analysis: The Law

Indicator	South Florida	South East Queensland
Property rights	Very important – influences how local plans are drafted and implemented	Somewhat important – however far less influence on drafting and implementation of local plans
Role of law/lawyers in planning	Law/lawyers involved in plan drafting and plan implementation	Reduced role of the law/lawyers – often limited to review and comment

Table 4. A Framework for Comparative Analysis: Regulatory Philosophy

Indicator	South Florida	South East Queensland
Regulatory—Discretionary continuum	Regulatory due to litigation surrounding the planning process	Regulatory – however leaning towards the middle of the continuum
What is regulated through planning controls	Only larger projects – small projects like fences, shed, renovations are handled by the building department	Most types of development activity must get planning approval – although this is beginning to change in some councils
Certainty—Flexibility continuum	Tending towards certainty due to the prescriptive nature of local government regulations	Towards the flexibility end of the continuum because most local plans use performance-based regulations

What conclusions can be made from this contextual analysis? It should be clear from an examination of Tables 1-4 that there are significant contextual differences between South Florida and South East Queensland that influence the way in which development is regulated. While this is an interesting conclusion and is valuable for the reasons that were noted earlier in this paper, it begs a larger question – do these differences affect urban form?

Comparing Built Form

There has been considerable research comparing the built form, particularly as it relates to identifying urban sprawl (Schwarz 2010; Clifton et al. 2008). In particular there are a number of key questions that must be answered before beginning such an analysis. These include: what is the appropriate timeframe?; what is the appropriate scale?; and what are the important variables?

Time Period. There are two broad options – a fixed time period or a single year. Another issue related to the time period is finding an appropriate time (or time period) that is comparable with the two study sites.

Scale. This is a difficult issue for several reasons. First as argued by Knaap, variables to measure urban form change with the scale of analysis. Thus variables appropriate at the regional scale will not work at the local scale and the reverse is also true. Second political and/or administrative boundaries are rarely adequate for measuring urban form. Finally, finding a scale that is comparable between South Florida and South East Queensland is difficult.

In order to reduce the complexity of the analysis, the scale of the comparison was reduced to one “urban area” from each of the respective regions: Ft. Lauderdale for South Florida and Gold Coast for South East Queensland. However, the contextual differences in how local governments are organised between Florida and Queensland created challenges in comparing these two selected study sites. Administrative boundaries in this case were not appropriate as the Gold Coast Council boundaries are more comparable to a Florida county than to a city like Ft. Lauderdale. To solve this problem, we decided to define a boundary that would be comparable for both study sites: a 10 km distance from the centre of the central business districts (CBDs) of Ft. Lauderdale and Gold Coast.

Defining the CBDs also created some challenges, particularly for the Gold Coast. The Gold Coast has a number of “activity centres”, with none functioning as a true CBD. In the end we decided to use Southport because it was historically the Gold Coast’s CBD and has more of CBD characteristics than any of the other activity centres, like Surfer Paradise, Bundall or Robina.

An overview of the two case study areas is provided in Table 5. It shows the study area size, population, number of block groups / collection districts and the average size of the block groups / collection districts. As discussed above coming up with two comparable study sites was a challenge. While the study sites were designed to be equal in size, the Ft. Lauderdale site is 80 km² larger than the Southport site. This is due to the fact that the Ft. Lauderdale CBD is more inland than the Southport CBD. Ft. Lauderdale’s larger land area results in a study area population that is about 180,000 greater. The other data relate to the number of size of the census districts. In Ft. Lauderdale block groups are used which number 220 and are approximately 1.0 km² in size. For the Gold Coast, collection districts are used which number 399 and average 0.4 km². It was not possible to find a census boundary that provided a good match for the two study sites. Thus the census boundary for Ft. Lauderdale is 2.5 times greater than the Gold Coast census boundary. There is one census boundary that is smaller than the block group – that being the block. However blocks are much smaller numbering in the thousands for the Ft. Lauderdale study site and would not match up well against the collection district.

Variables. There are scores of possible variables that could be used to measure urban form, however an important issue is finding variables that are available (and appropriate) for both study areas. Having scanned the literature we are proposing to modify the set of variables proposed by Ewing et al. (2002). The variables as originally proposed by Ewing et

al. are shown in Table 6 along with an indication of those used in this analysis and several proposed modifications.

Table 5. Comparative Statistics

	Ft. Lauderdale	Gold Coast
Study area size (km ²)	224.2	164.0
Study area population	384,067 (2000)	205,784 (2006)
Number of block groups / collection districts	220	399
Average block group / collection district size (km ²)	1.0	0.4

Table 6. Variables for Measuring Urban Form (Ewing et al. 2002)

	Used in this analysis	Proposed alternative
Density		
Persons / km ²	Yes	
Percent of population at less than 2,500 persons / km ²	No, altered	Not appropriate for these study sites – changed 2,500 to 1,000
Percent of population at more than 25,000 persons / km ²	No, altered	Not appropriate for these study sites – changed 25,000 to 10,000
Density of the CBD	Yes	
Diversity		
Land use mix (using the Herfindahl-Hirshman method)	No	Walk Score data
Percent of residents with a primary school within 1.6 km	No	Lacking data
Centrality		
Coefficient of variation of population density across census tracts	Yes	
Rate of decline in density from the CBD	Yes	
Percent of population within 5 kms of CBD	Yes	
Percent of population more than 15 kms from the CBD	No, altered	Current analysis only examines 10 km from the CBD. Proposed alternative -- Percent of population with 5 km & 7.5 km of the CBD
Ratio of density between the highest density tracts and the region average	Yes	
Design		
Number of intersections per km ²	No	Walk Score data
Small blocks (<.025 km ²) percentage	No	Lacking data

Results

As shown above, the analysis did not include all possible indicators due to data availability. What is provided are results of the analysis for four density indicators and six centrality indicators. Table 7 provides the results of density indicators showing that the Ft. Lauderdale site has a higher overall density, but a lower CBD density than the Gold Coast site. As CBDs are not typically mapped or officially recognised, we defined the CBD as all land within a 2.5 km radius of the CBD centre. The CBD centre was estimated through local knowledge and aerial photography. The major differences between the two sites are in the other two indicators – percent of the study area population living in low density (<1,000 km²) environments; and percent of the study area population living in high density (>10,000 km²) environments. As Table 7 shows, the Gold Coast has more than double the percent of population living at low densities. In contrast, Ft. Lauderdale has nobody living in high density environments, while the Gold Coast has 1.7 percent of the study area population. The overall averages for density seem to belie some fundamental differences in the population living at high and low densities.

Table 7. Urban Form Comparison: Density

	Ft. Lauderdale	Gold Coast
Persons / km ²	1,713	1,254
Percent of population at <1,000 persons/ km ²	7.4	17.2
Percent of population >10,000 persons/ km ²	0.0	1.7
Density of the CBD (within 2.5km)	2,350	2,993

Density maps for Ft. Lauderdale and the Gold Coast are provided in Figures 1 and 2, respectively. A visual inspection confirms the findings in Table 7 that show overall higher and lower densities in the Gold Coast when compared to Ft. Lauderdale. Another interesting point illustrated by the Gold Coast map is the pattern of higher densities along the Pacific Ocean that then decline as one moves inland. We would have expected a similar pattern for Ft. Lauderdale that is not evident from the map.

The six centrality indicators and their values are provided in Table 8. Given that both cities developed around the car, both study sites appear to have weak centrality values. The first thing to point out is the lack of any relationship between density and distance from the

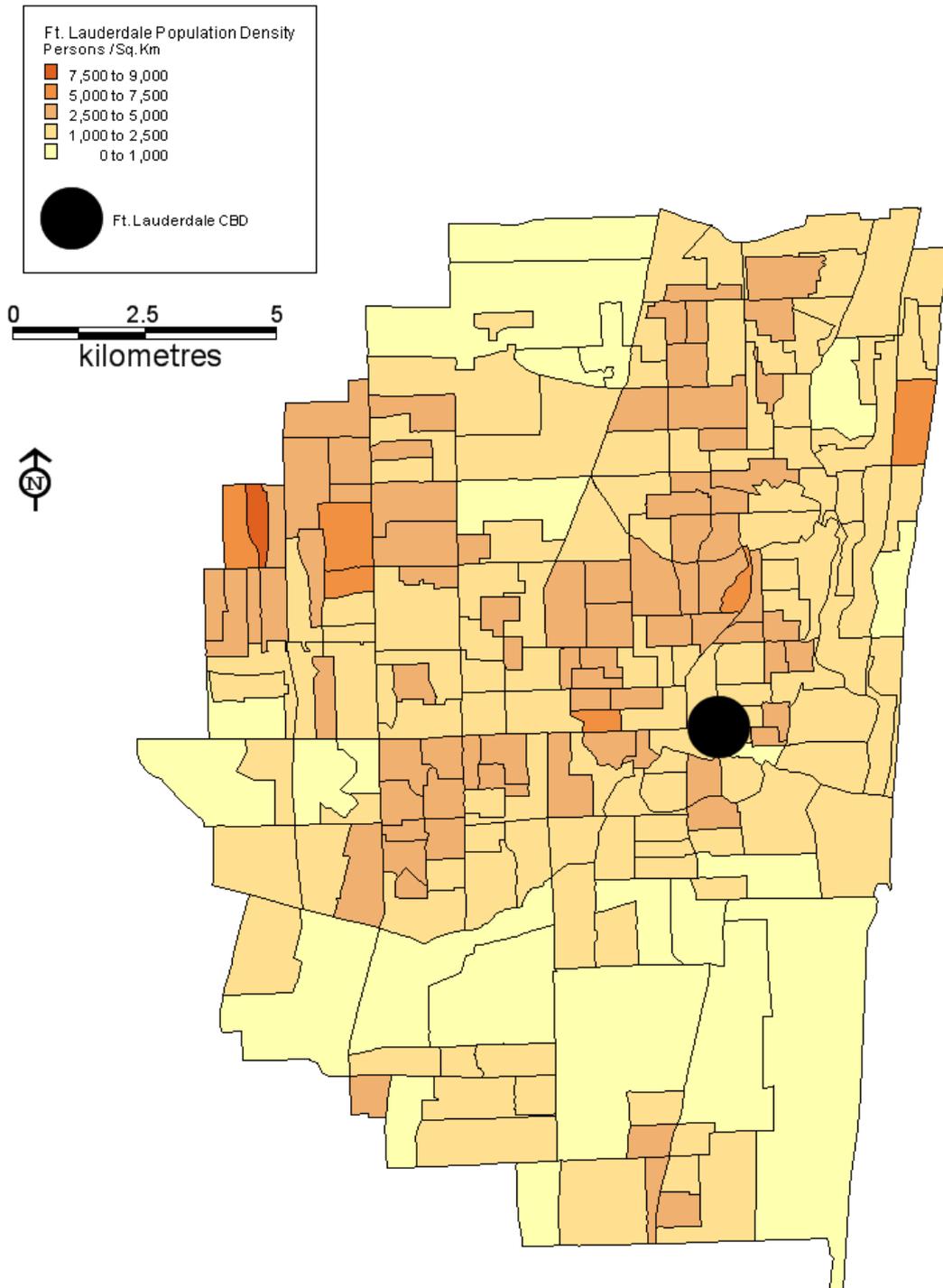


Figure 1. Map of Population Density for Ft. Lauderdale

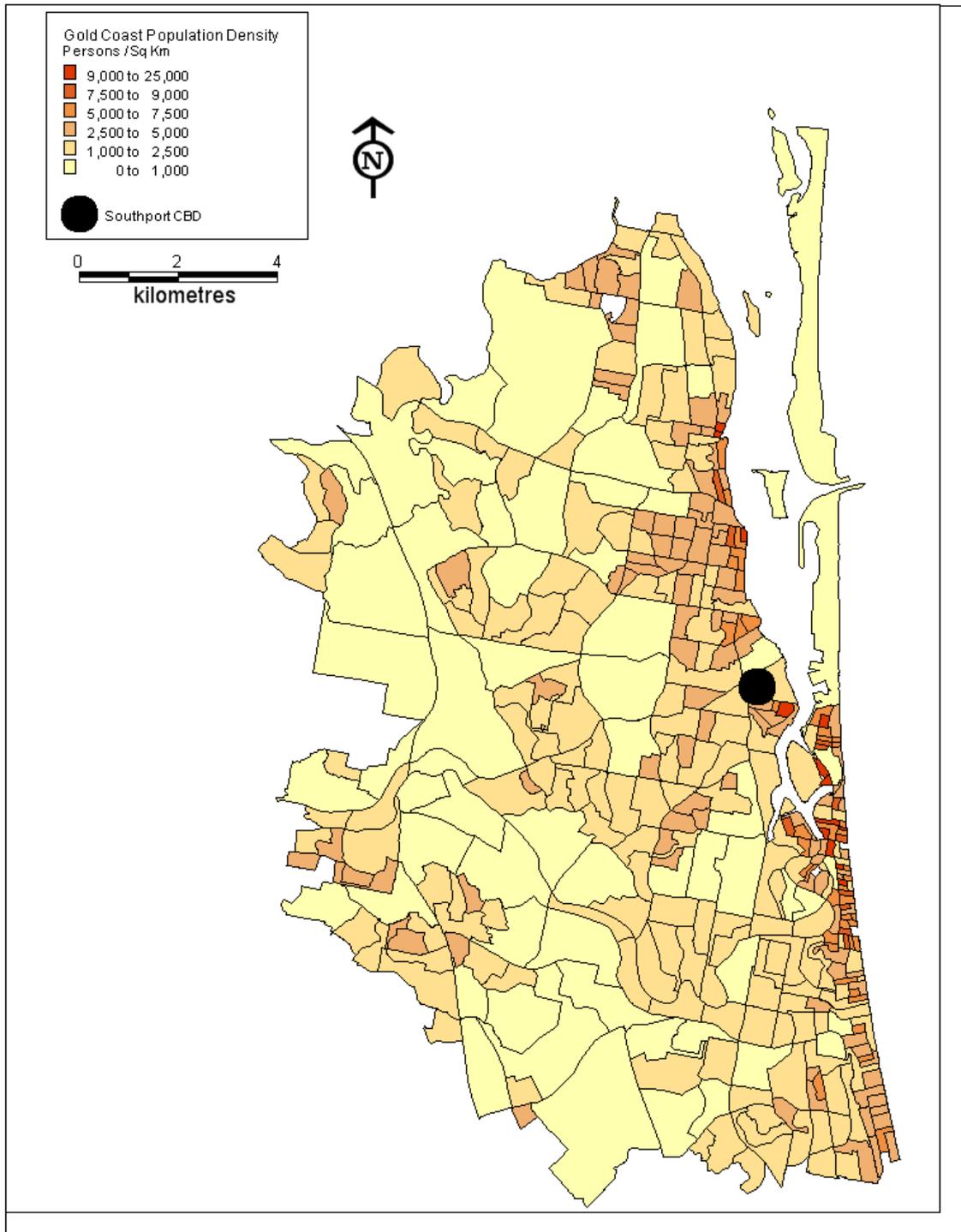


Figure 2. Map of Population Density for Gold Coast

CBD. A scatterplot (and the associated regression line) of this relationship for Ft. Lauderdale is shown in Figure 3 and for the Gold Coast in Figure 4. Note the lack of any relationship between these two variables that is again attributable to the multi-nodal development made possible by the car.

Table 8. Urban Form Comparisons: Centrality

	Ft. Lauderdale	Gold Coast
Centrality		
Percent of population within 2.5km of CBD	11.7	13.9
Percent of population within 5km of CBD	34.0	43.6
Percent of population within 7.5km of CBD	61.3	69.1
Rate of decline in density from CBD	Not stat sig	Not stat sig
Ratio of high density areas to study area avg.	3.7	11.7
Population density coefficient of variation across block groups/collection districts	0.53	0.88

The most significant difference between the study sites involves the “ratio of high density areas to study area averages”. The values for this indicator were calculated by averaging the density for the five highest density areas in each study area and comparing that to the overall average for each study area. On this indicator the Gold Coast ratio (11.7) was more than three times greater than Ft. Lauderdale (3.7).

The other indicator with a significant difference relates to the coefficient of variation with the Gold Coast having a value of 0.88 which is 0.35 greater than the comparable figure for Ft. Lauderdale (0.53).

Conclusions

Clearly, more work needs to be done, however from this preliminary analysis it appears that the built form does differ – however not as much as expected given the contextual differences described earlier. If further analysis confirms this preliminary analysis, it would suggest that differences in context and planning regulations are not as important in determining built form as are non-planning factors – such as bank lending requirements, consumer demand and development industry standards and practices. It is possible that we have overestimated the role of planning (and planners). However this does not mean that we can do away with planning regulations, but it does suggest that the manner in which the planning (and planning regulation) is carried out may not be as important as once thought.

This analysis did not use the complete set of variables shown in Table 6 due to problems in obtaining data. Efforts are being made to source third-party data from Walk Score (www.walkscore.com) which may provide comparable values for the two diversity indicators: land use mix and percent of population within 1.6 km of a primary school and one of the design indicators: density of intersections. The final design indicator – percentage of small blocks will be sourced from the respective land records departments in Florida and Queensland.

Once these additional data are included, the analysis can be finalised. To provide some rigor to the interpretation of the indicator values, a simple index will be created. Indicators within each of the four categories (density, diversity, centrality, design) will be Figure 3. Scatterplot of Density and Distance from the CBD for Ft. Lauderdale weighted equally and scaled to 100. To arrive at the composite index, the four category indices will be weighted equally and summed. Once the indices are created, we will be able to compare the urban form of the two areas, not only with the composite index, but also with each of the four individual category indices.

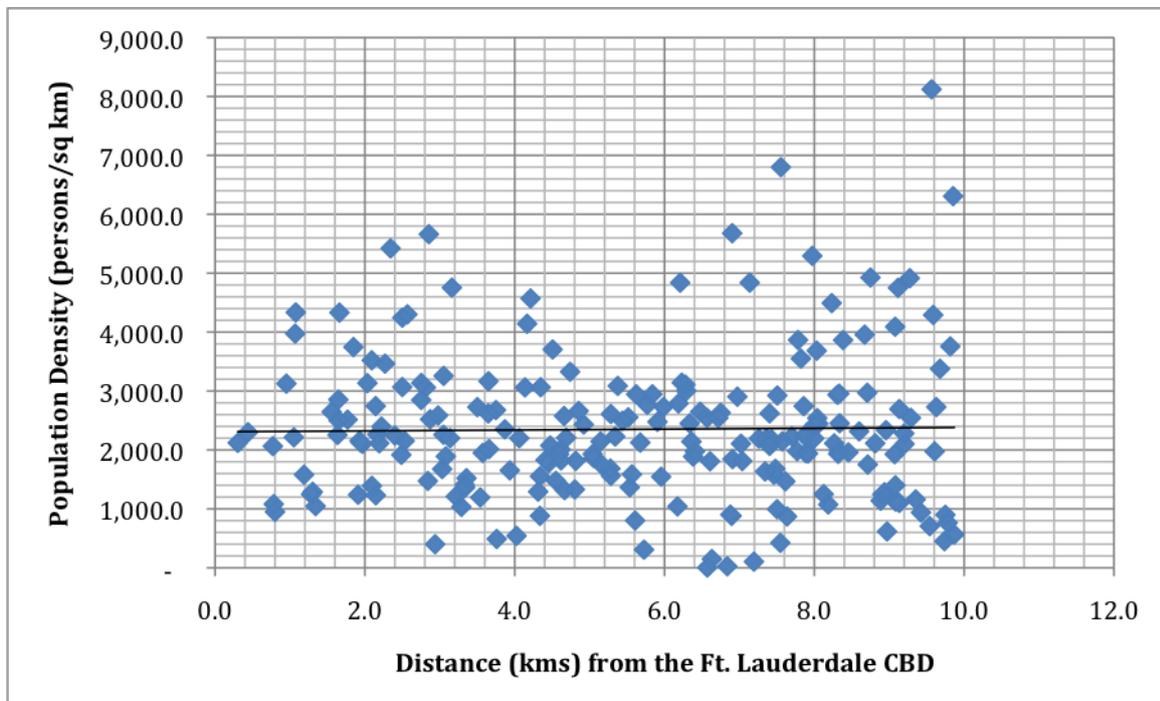


Figure 3. Scatterplot of Density and Distance from the CBD for Ft. Lauderdale

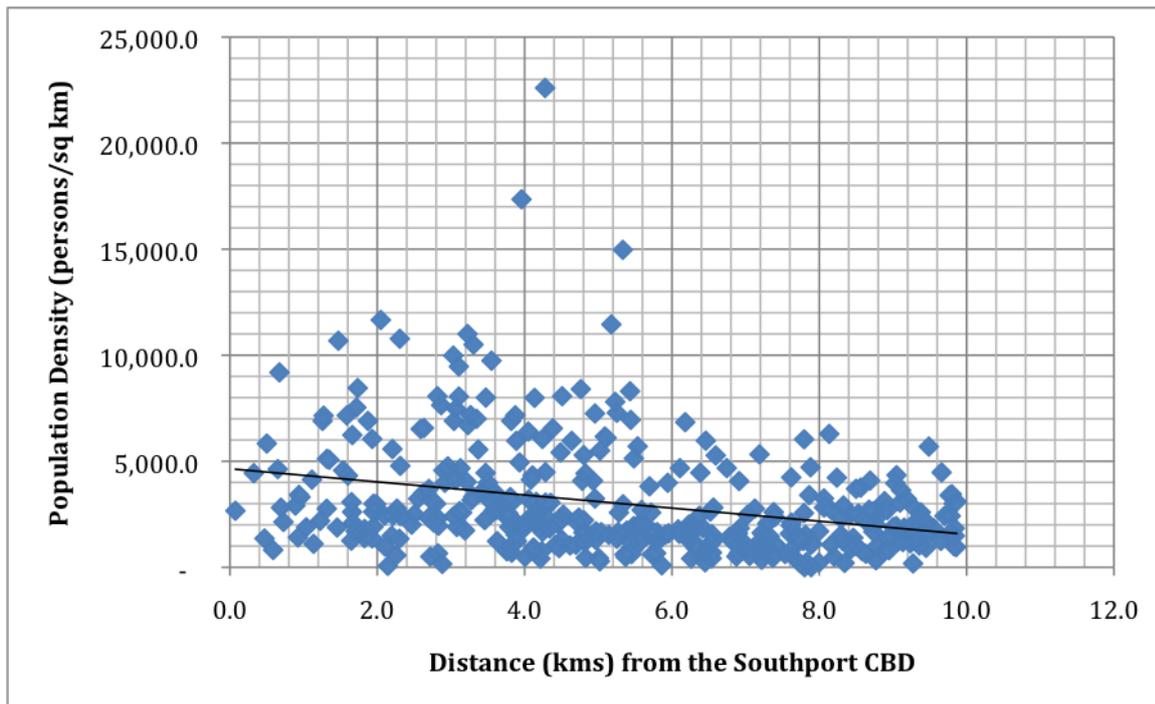


Figure 4. Scatterplot of Density and Distance from the CBD for Southport (Gold Coast)

References

- Booth, Philip A. 1996. *Controlling Development: Certainty and Discretion in Europe, the USA and Hong Kong*. London: UCL Press.
- Bourne, L.S. 1986. Urban Policy Research in Comparative Perspective: Some Pitfalls and Potentials. *Tijdschrift voor economische en sociale geografie* 77, no. 3 : 163-68.
- Clifton, K., R. Ewing, G. Knaap and Y. Song. 2008. Quantitative analysis of urban form: a multidisciplinary review, *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*, 1: 1, 17-45.
- Cullingworth, J. Barry. 1993. *The Political Culture of Planning: American Land Use Planning in Comparative Perspective*. New York: Routledge.
- Dear, Michael. 2005. Comparative Urbanism. *Urban Geography* 26, no. 3: 247-51.
- Dedekorkut, A., S. Mayere-Donhue and N. Sipe. 2011. Do Planning Regulations Matter? A Comparison of South East Queensland and South Florida. *Proceedings of the Subtropical Cities Conference 2011*, Ft Lauderdale, Florida, March 11.
- Ewing, Reid, R. Pendall, D. Chen. 2002. *Measuring Sprawl and its Impact*. Smart Growth American.
- Faludi, Andreas, and Stephen Hamnett. 1975. *The Study of Comparative Planning*, Centre for Environmental Studies CES CP Vol. 13. Delft: Delft University of Technology.

- Harloe, M. 1981. Note on Comparative Urban Research. In *Urbanization and Urban Planning in Capitalist Society*, edited by Michael Dear and Allen J., Scott, New York, 179–195. New York: Methuen.
- Knaap, G.J., Y. Song, R. Ewing. 2009. *Seeing the elephant: Multi-disciplinary Measures of Urban Sprawl*. University of Maryland Smart Growth Center (smartgrowth.umd.edu).
- Kohn, M.L. 1987. Cross-National Research as an Analytic Strategy. *American Sociological Review* 52, no. 6: 713-31.
- Masotti, L. H., and J. Walton. 1976. Comparative Urban Research: The Logic of Comparisons and the Nature of Urbanism. In *The City in Comparative Perspective: Crossnational Research and New Directions in Theory*, edited by John Walton and Louis H. Masotti, 1-16. London: Sage.
- McFarlane, C. 2010. The Comparative City: Knowledge, Learning, Urbanism. *International Journal of Urban and Regional Research* 34, no. 4: 725-42.
- Masser, I. 1984a. Cross-National Research: Some Methodological Considerations. *Environment and Planning B: Planning and Design* 11, no. 2: 139-47.
- Masser, I. 1984b. Cross National Comparative Planning Studies: A Review. *The Town Planning Review* 55, no. 2: 137-49.
- Mayere, S., A. Dedekorkut and N. Sipe. 2010. Resembling Florida: Transpacific Transfer of Ideas from One Gold Coast to Another. Proceedings of the 14th International Planning History Conference, Istanbul, Turkey.
- Nijman, J. 2007. Introduction—Comparative Urbanism. *Urban Geography* 28, no. 1: 1-6.
- Schwarz, N. 2010. Urban form revisited—Selecting indicators for characterizing European Cities. *Landscape and Urban Planning* 96: 29-47.
- Ward, K. 2008. Editorial—toward a Comparative (Re) Turn in Urban Studies? Some Reflections. *Urban Geography* 29, no. 5: 405-10.
- Ward, Kevin. 2010. Towards a Relational Comparative Approach to the Study of Cities. *Progress in Human Geography* 34, no. 4: 471-87.