

Analysis of Impact by Introducing Bus Rapid Transit in Miami-Dade County, FL

What is Bus rapid Transit?

“BRT is a bus-based mass transit system that deliver fast, comfortable, and cost effective urban mobility” (United Nations Framework Convention on Climate Change)

BRT can provide much more attractive services than conventional bus services by its typical characteristics such as exclusive lane, signal prioritizing system, and bus stops with advanced fare collection system. Also, BRT can be provided with much cheaper costs than light rail transit, and many cities in the world are now considering introducing BRT system. One of the most famous BRT system in the world is the Curitiba's case in Brazil opened in 1974. In the United States, about 20 cities are operating or constructing, or planning BRT system.

BRT system in Curitiba, Brazil



Tufts

Introduction

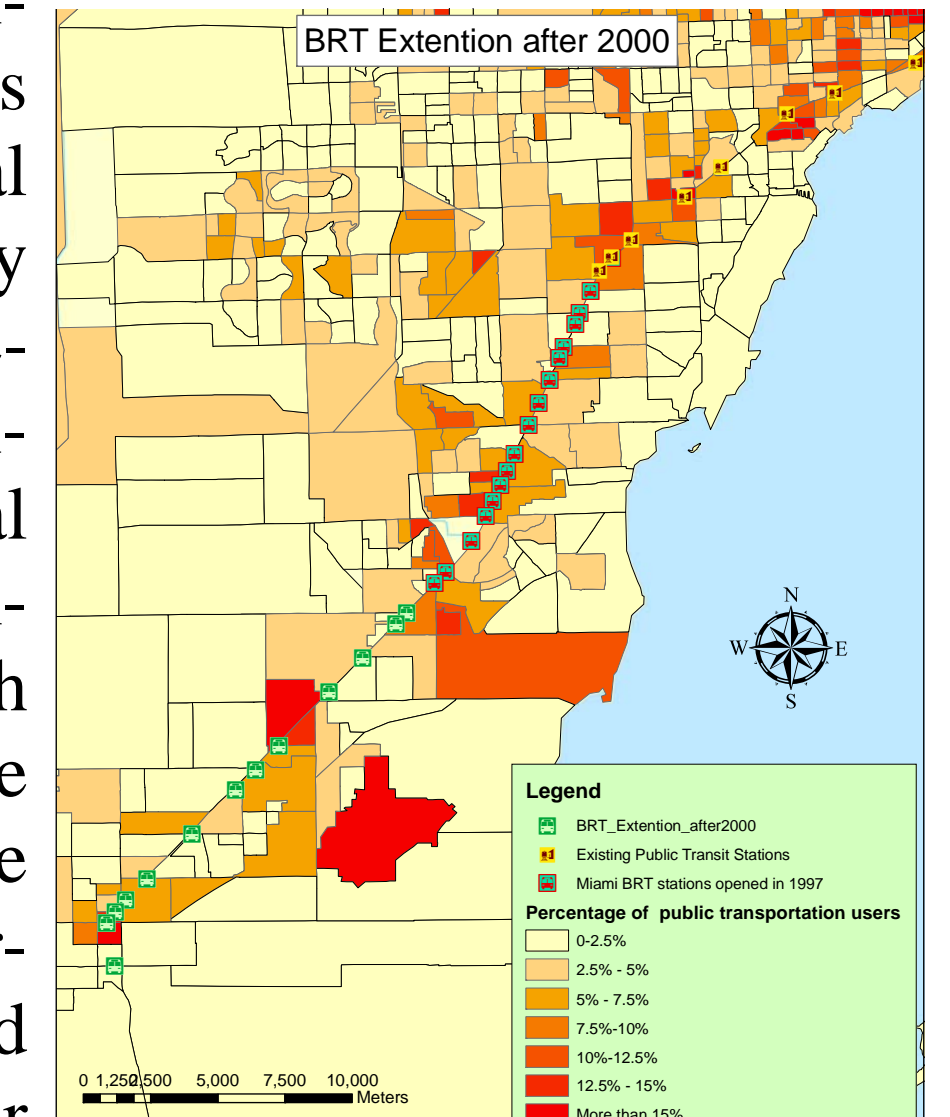
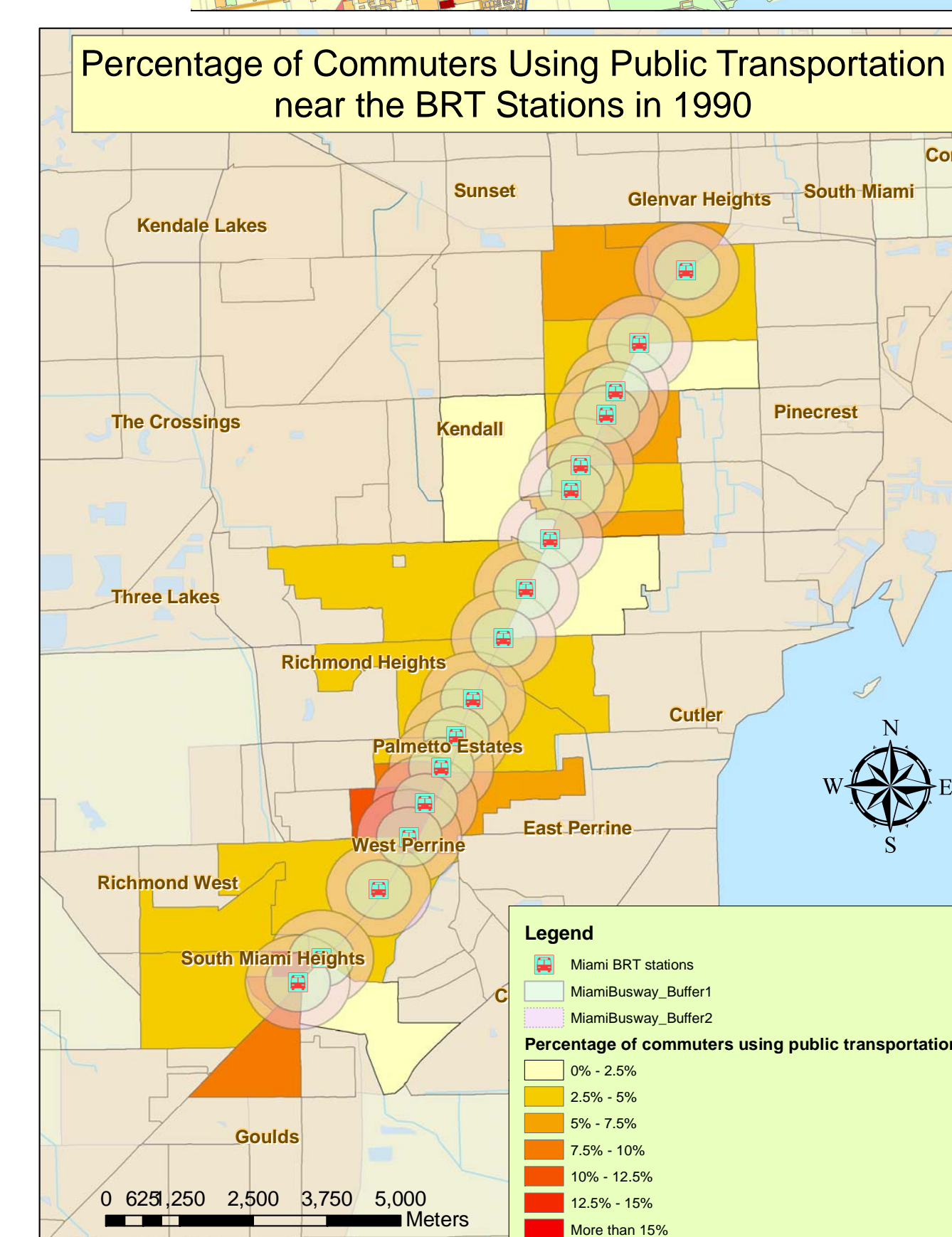
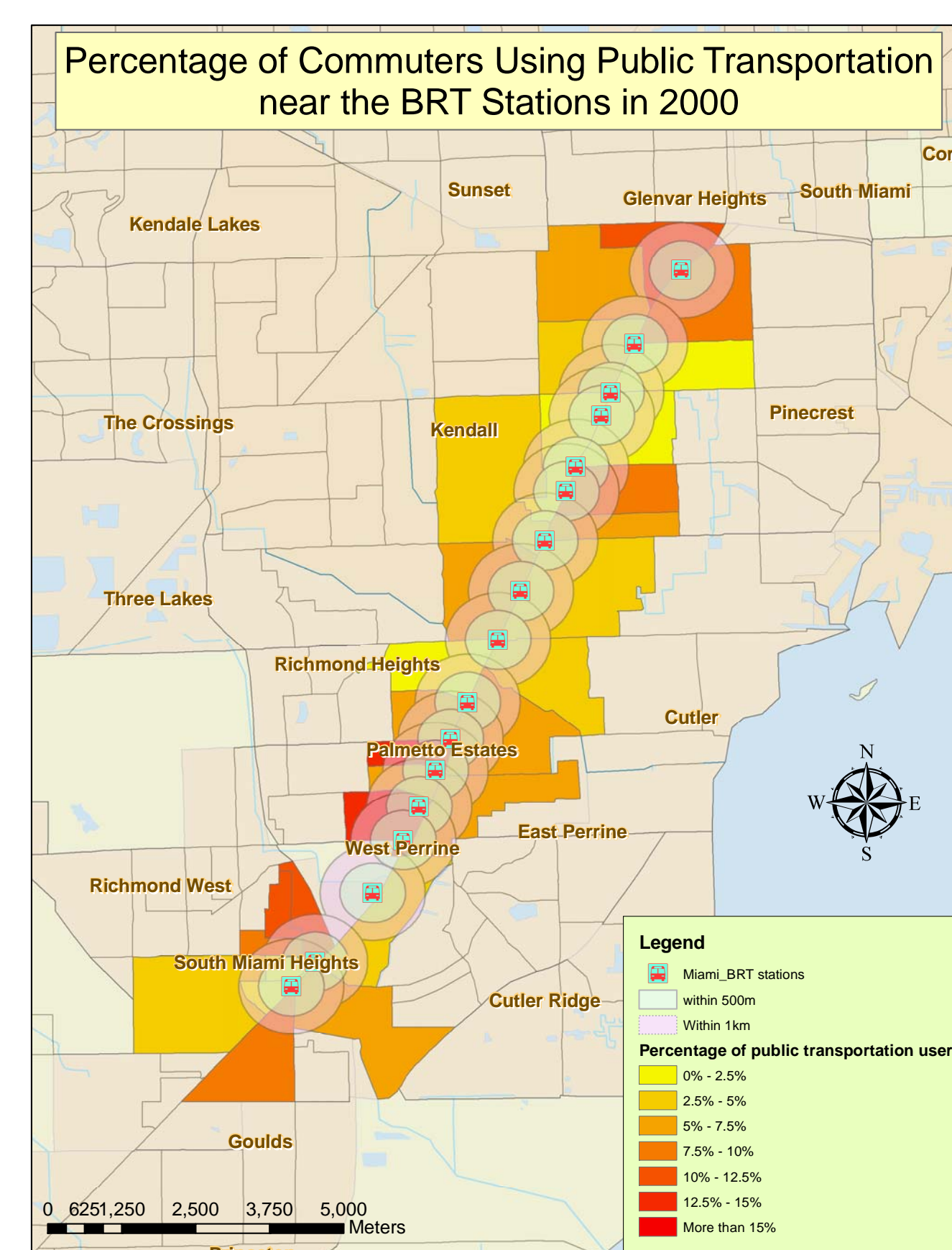
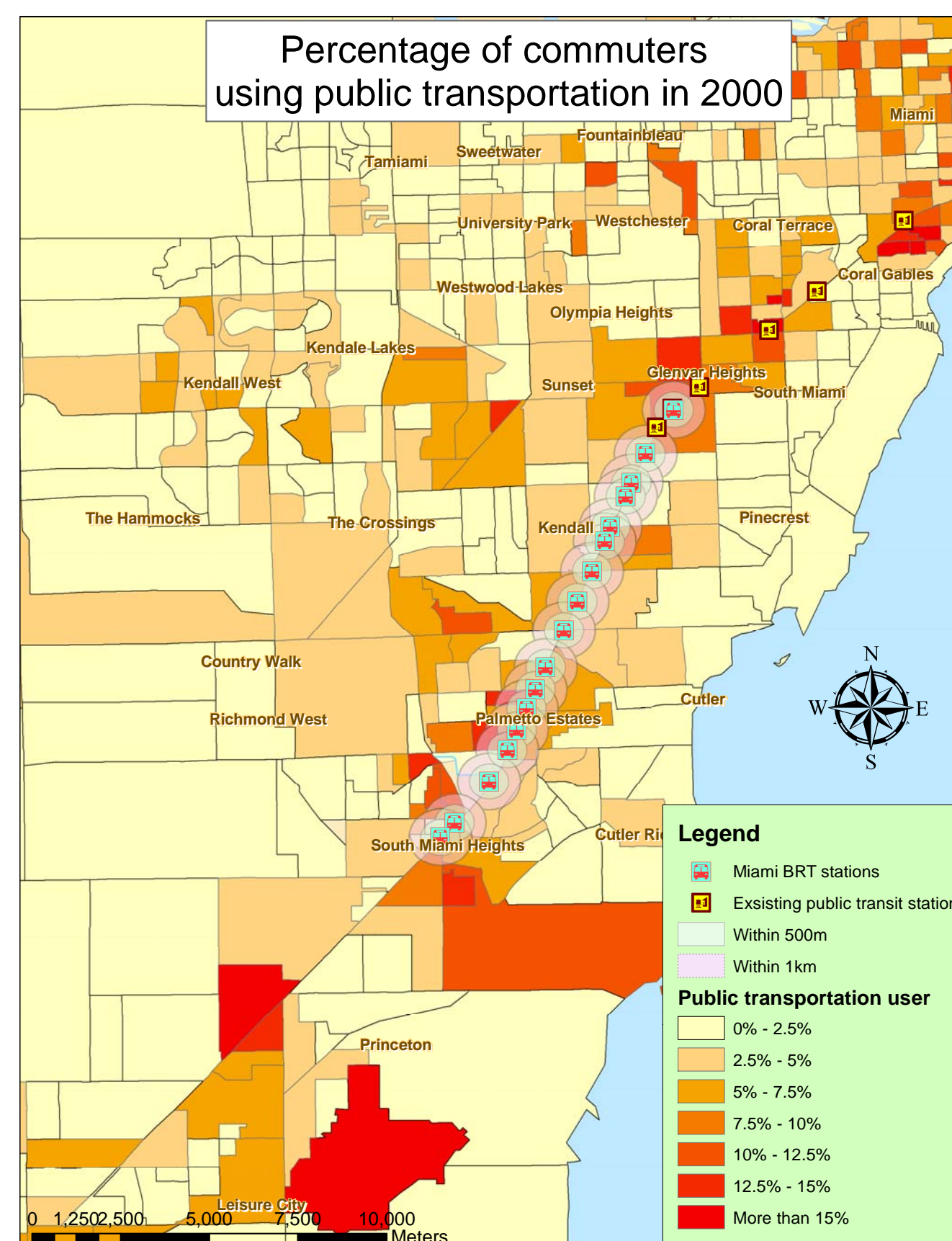
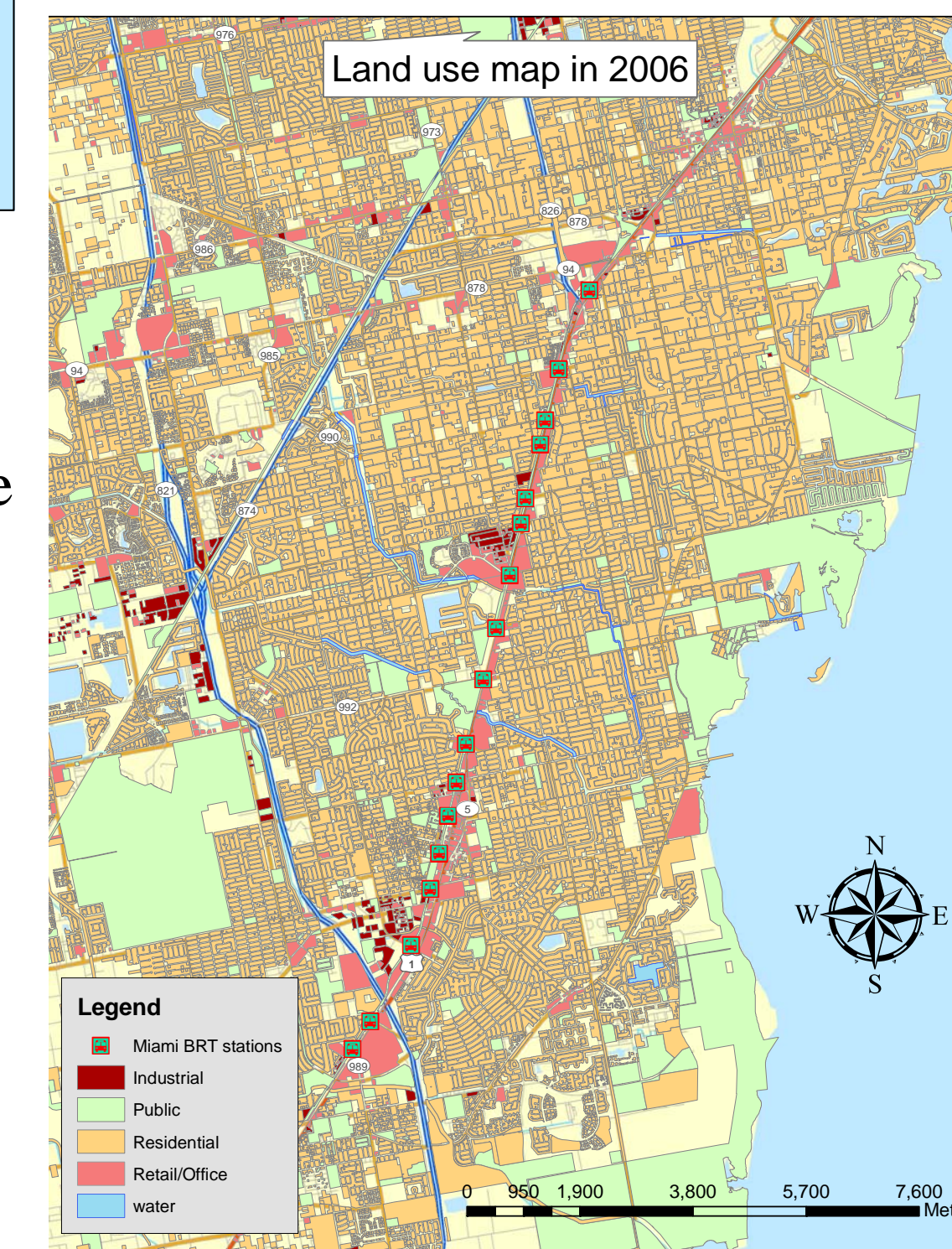
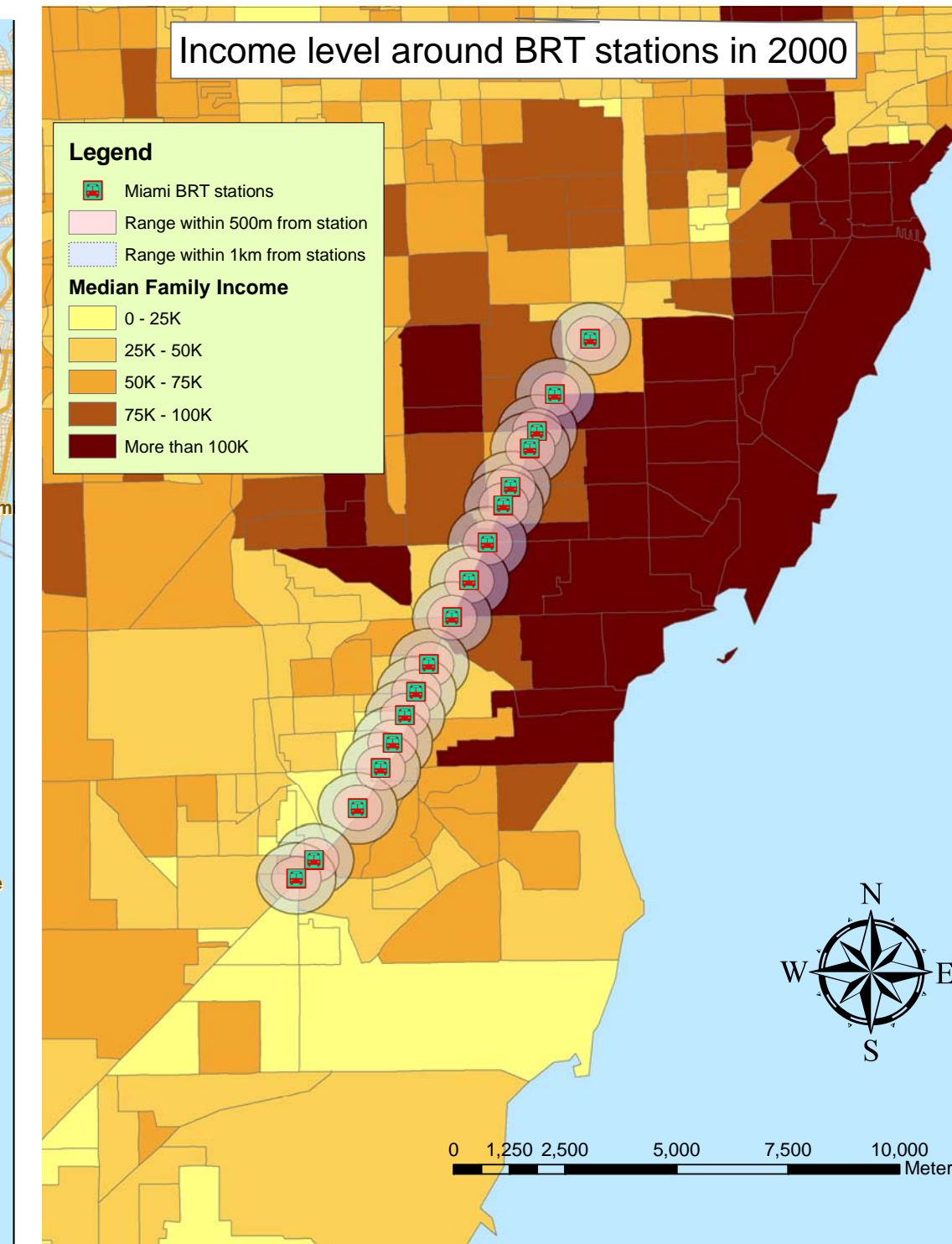
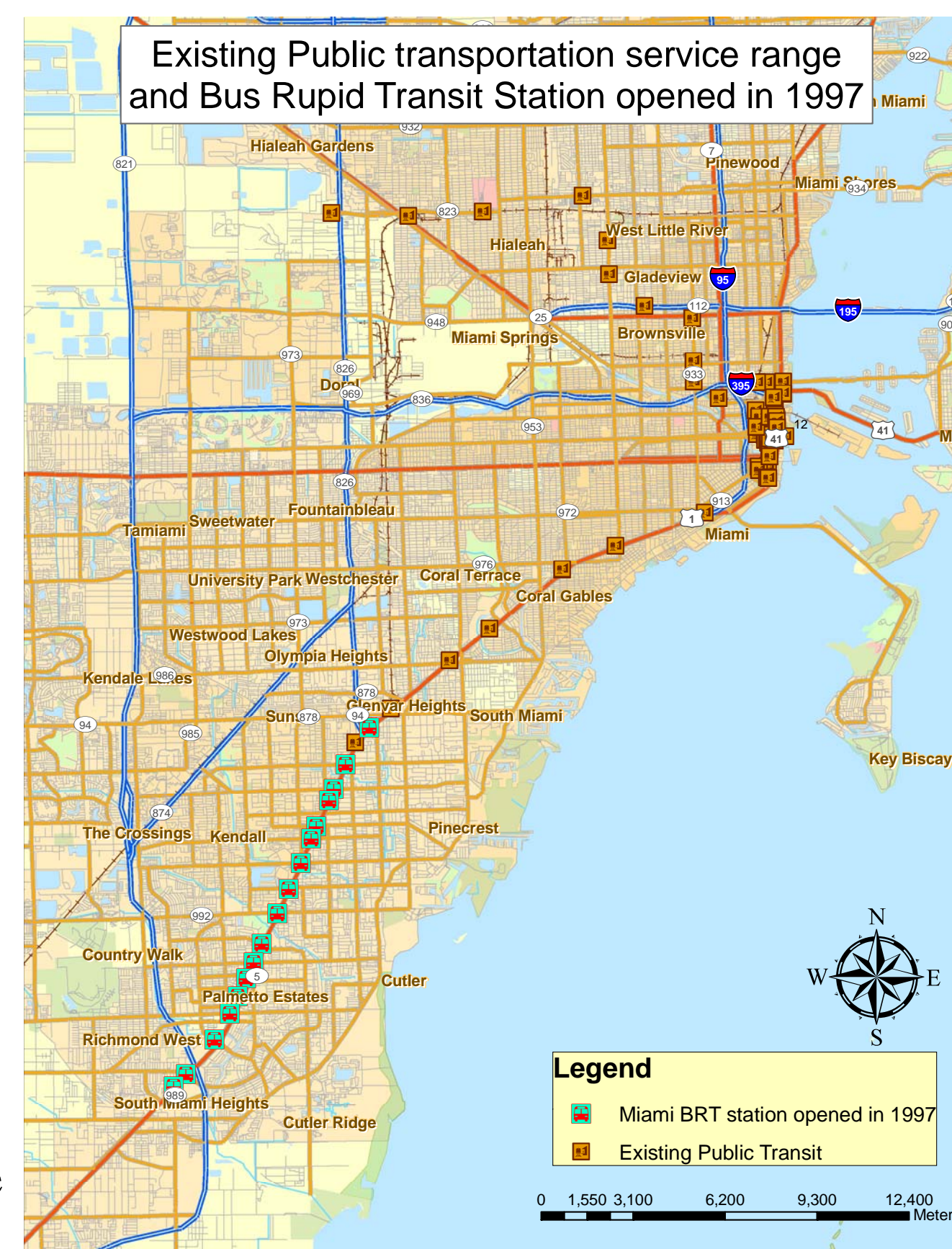
The South Miami Dade Busway is one of the pioneering and famous BRT systems in the U.S. Its initial service opened in 1997 along the U.S. route-1 where there was no existing railroad service. It connects between Dadeland South Metrorail Station where SMDB is connected with Metro rail line and South Miami heights area. It has 16 stations and its length is about 8.5 miles. The number of passengers is about 14,000 per weekday.

Research Objective

Promoting modal switch from car use to use of public transportation is important issue in terms of achieving sustainable development including reduction of air pollution and CO2 emission. BRT systems has strong potential to solve such issue because of their attractive service quality. This project investigate how introduction of SMDB can impact on the modal switch of people living around service range by time series analysis.

Research Method

- 1st step; Located each SMDB station referring google map and route map of SMDB. Then Created data file of each station location. Also, downloaded data file of existing public transportation (Metro rail line and Metro Mover)
- 2nd step; Researched income level around SMDB service range, using census data by census block group level, because there exist significant correlation between income level and commute means. Also, gained current land use data on the website to confirm that the SMDB service range are mainly included in residential areas.
- 3rd step; Downloaded census data about commute means in 1990 and 2000 by census block groups.
- 4th step; Created range within 500 meters and 1km from each SMDB station and selected census block groups which intersects with the range within 500 meters
- 5th step; Calculate percentage of commuter using public transportation in each census block groups and compared the difference between 1990 and 2000.



Findings & Limitations

- Percentage of commuter using public transportation is relatively high in the census block groups along the SMDB stations comparing to other areas.
- Percentage of commuter using public transportation in the census block groups selected step4 increased from 4.0% in 1990 (1,522/37,326) to 5.6% (1,736/30,635) in 2000.
- Income level is relatively high in north side and most of commuters depend on cars yet. That may be one of reasons why the percentage of commuter using public transportation did not increase significantly.
- There are many census block groups where the percentage of public transportation user reduced.

Unfortunately, there are many limitations such as;

- It is impossible to compare in completely same range because census block group range was changed from 1990 to 2000.
- Many census block groups selected in 4th step involve areas where SMDB stations are too far.
- Not the number of bus user but the sum of public transportation user had to be used because the census question form asked to select one commute means used for most of the distance if people use more than one mode. In fact, classification of BRT is not clear, therefore, it is unclear which mode of public transportation SMDB user selected for their answers.

Conclusion & Further Research

This research could show the fact that commuters using public transportation increased after SMDB introduction along its service range, however, it would still be unwise to conclude that it had effects to promote modal switch due to many limitations. Nevertheless, indicating possibility of effect on modal switch by data is meaningful. Further research may be able to show the effect of SMDB more clearly as SMDB service has been expanded to Florida City after 2000. It is worth of continuing time series analysis from 1990 to 2010 with expanding focusing areas.

Poster by Soichiro Nakahashi
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Data sources; Florida Geographic Data Library, National Historical Geographic Information System, U.S.Census.
Projection; Albers Conical Equal Area