

Exploration Of A Public Bike Share Program In Hudson County

Final Report

2015



TOGETHER
**NORTH
JERSEY.**

**Sam
Schwartz
Engineering
D.P.C.**





Exploration Of A Public Bike Share Program In Hudson County

Prepared for
Together North Jersey
Local Government Capacity Grant Program

Hudson County

North Jersey
Transportation Planning Authority

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The report reflects the best available information as of June 2014. It does not reflect local bike share developments subsequent to that date, such as Jersey City's decision to pursue bike share independently of Hoboken and Weehawken and changes to New York City's Citi Bike program.



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EXECUTIVE SUMMARY

In 2012, the Hudson County Division of Planning and the Hudson Transportation Management Association conducted a preliminary bike share feasibility study. The present study, funded under the Local Government Capacity Grant Program of Together North Jersey—a consortium led by Rutgers Edward J. Bloustein School of Planning and Public Policy and the North Jersey Transportation Planning Authority (NJTPA)—builds on and enhances the 2012 study with technical details and analyses.

The primary objective of this study is as follows:

- Determine goals, objectives, and performance measures for a bike share system.
- Identify geographical boundaries of a phased service area.
- Calculate the ridership and membership forecasts on the basis of statistics from four other U.S. cities with active bike share systems.
- Quantitative summary of the financial benefits, costs, and risks of a bike share system.
- Equity recommendations for a low or no-cost bike share membership model.
- Location suggestions of bike share system stations for all the phases of service area.

The recommendations that evolved out of this study are applicable for implementation of a bike share system throughout northern New Jersey, particularly multi-jurisdictional urban and suburban areas.



Outreach Efforts and System Goals

The project team collected information from both the general public and, via the Technical Advisory Committee (TAC), stakeholders to help define the direction of a bike share system for Hudson County. The outreach was undertaken in a series of key meetings with stakeholders, through an online survey and interactive map on the project website, and in a public meeting, to ensure the greatest participation and diversity of viewpoints. Public feedback was used to gauge support for bike sharing in the county and assist with determining the bike share service area station locations.

With the help of information and opinion gathered from stakeholders and the TAC, goals, objectives and performance measures were established for a bike share system in Hudson County. The goals, in order of priority, are as follows:

- Increase accessibility to jobs, recreation, and other locations
- Create positive user experiences to maintain customers and attract new users
- Maximize both membership and ridership, while balancing financial objectives of the program
- Provide a system that is accessible to a broad cross-section of people living in and visiting Hudson County
- Create a system that is financially sustainable, transparently operated, and accountable to the public
- Develop an innovative transportation system that improves Hudson County's livability and economic competitiveness
- Provide Hudson County residents and visitors a safe mode of transportation that promotes active and healthy living

Analysis of Service Area

A three-phase bike share system area was defined based on spatial analysis of commonly applied metrics used to predict bike share system demand and refined through consultation with Hudson County, NJTPA, and the TAC as well as feedback from the public. Some metrics that were used included residential population density, the number of carless households, the location of colleges and universities, and the location of transit stations. Certain equity metrics, such as the location of public/subsized housing and the identification of areas where there is lower median household income, were also included in order to achieve a system area that is socially equitable, and fair. The service area, which is represented in phases (I, II, and III) of implementation, is shown in Figure ES 1.



Ridership Forecast

Data from four comparison bike share systems (Washington, D.C.'s Capital Bikeshare, Boston's Hubway, New York City's Citi Bike, and Minneapolis's Nice Ride Minnesota) was used to forecast ridership over five years for a future Hudson County bike share system. The forecast shows that the proposed system could achieve over 600,000 rides after two years, and then one million rides per year in the third year, growing to almost 1.6 million riders per year in later years. Early on, each bike is ridden approximately two times per day. Later, each bike gets ridden approximately 2.5 times per day, similar to Boston and Washington, D.C. In the early years, the model predicts that approximately 2.2% of the system population has an annual membership, increasing to over 5% in later years.

Financial Analysis of BNR Proposal

During the course of this project, the municipalities of Jersey City, Hoboken, and Weehawken issued a request for proposals and awarded a contract for bike share implementation and operation in the three municipalities with the condition of using no public funding. The contract was awarded to a collaboration of the companies Bike N Roll (BNR), E3Think, nextbike, and P3 Global Management (the "BNR proposal").¹

Comparing the BNR proposal to ridership and membership metrics from other systems show that the proposed system has reasonable, if not conservative, assumptions compared with similar bike share systems around the country. Both annual and casual member assumptions could be higher.

Depending on the operating costs that can be achieved by BNR, extrapolated financial projections based on existing systems' figures, show a system that may break even on membership and usage fees if operating costs (and therefore service levels) are kept to a bare minimum. If operating costs are higher, then the system will be in deficit of approximately \$1,100,000 during the first year using the proposal's membership estimates. Either surpassing the membership estimates or bringing in sponsorship and advertising may close any deficit. However, as mentioned above, the annual and casual membership projections are conservative when compared to the performance of the comparison cities, potentially improving the financial outlook for the system.

¹ The report reflects the best available information as of June 2014. It does not reflect local bike share developments subsequent to that date, such as Jersey City's decision to pursue bike share independently of Hoboken and Weehawken and changes to New York City's Citi Bike program.



Equity Strategies

Bike sharing represents a great opportunity for an affordable transportation option for lower income and minority communities that historically have been marked by low automobile ownership rates and high transit dependency. Creating an equitable system was identified as an important goal for the system and a major topic of discussion during stakeholder outreach. Equity strategies regarding system area determination, station siting, membership cost and structure, per-ride pricing, credit card access, marketing and outreach, and funding are recommended for Hudson County.

Bike Share Station Density and Siting

The recommended bike share station density is 10 stations per square mile in Phase II and five stations per square mile in Phase III. The recommended station density for Phase III is lower than for Phase II, as this area was projected to have a lower bike share demand than Phase II. (While a station density recommendation is not provided for Phase I, as station density for this area will be determined by planners of the BNR system, a review of the proposed BNR station density and placement is provided in Chapter 5.)

Based on this density model, 65 stations were sited in the Phase II system area and 19 stations in Phase III. Stations were sited based on the locations of likely bicycling origins and destinations and based on suggestions provided via the project website, the public meeting, and the final TAC meeting. The proposed bike share station locations for phases II and III are shown in Figure ES 1.



Figure ES 1. Proposed Bike Share System Area and Station Locations (Phases I, II, and III)





Recommendations for the Regional Plan for Sustainable Development

This study is a part of the larger planning effort that is developing Together North Jersey's Regional Plan for Sustainable Development. The recommendations and methodologies of this study are applicable throughout the northern New Jersey region and are particularly suited to the multi-jurisdictional planning environment in urban and suburban settings. The recommendations for the plan from this study are as follows:

- The Hudson County Division of Planning should take lead on forming a Hudson County Bike Share Task Force to advance bike sharing in the county, consistent with the findings of this study.
- The task force should ensure that the Hudson County bike share system best meets the identified goals and objectives for a system in Hudson County, as described in this report and determined in consultation with the TAC and the public.
- The task force will help ensure that the performance measures proposed in this report are used by the three urban municipalities to evaluate success of the BNR system.
- The task force should encourage and support the municipalities to undertake a range of equity strategies to support low/no-cost bike share memberships and address barriers to use of the system by low-income populations who may be without access to credit or debit cards or banking accounts.
- The task force should encourage the adoption of Complete Streets policies by the county's municipalities and create a county-wide bicycle master plan.
- The County and the municipalities should install robust bikeways designed to attract a diverse range of potential bicyclists and bike share users.



INTRODUCTION

Introduction

Background

What Is Bike Sharing?

Factors Supporting A Bike Share
System In Hudson County

A large, stylized graphic of a bicycle wheel is positioned in the bottom left corner. It features a thick orange rim and several spokes radiating from the center towards the right side of the page.



INTRODUCTION

In 2012, the Hudson Transportation Management Association (TMA) and Hudson County Division of Planning conducted a bike share system feasibility study for Hudson County. By comparing the physical, demographic, infrastructural, and socio-economic conditions of the county to four other areas within U.S. (Washington D.C., Boston, Boward County, Florida, and New York City), the study depicts the suitability and usefulness of a bike share system in the county. However, it does not include technical details such as spatial analysis of recommended service area, station locations, an operational model, and detailed financial recommendations for implementation of a successful bike share system. To improve the bike share system feasibility study with the above mentioned technical details, Together` North Jersey, via the Local Government Capacity Grant Program, provided Hudson County with financial assistance to conduct the present study, *Exploration of a Public Bike Share Program in Hudson County*.

Together North Jersey is a consortium led by Rutgers' Edward J. Bloustein School of Planning and Public Policy that was formed with several partnering organizations, including the North Jersey Transportation Planning Authority (NJTPA), that was awarded a Sustainable Communities Regional Planning Grant from the U.S. Department of Housing and Urban Development. The Local Government Capacity Program was funded through this program with additional funding assistance for this project provided by the U.S. Department of Transportation.

During the course of this project, the municipalities of Jersey City, Hoboken and Weehawken issued a request for proposals and awarded a contract for bike share implementation and operation in those three municipalities with the condition of using no public funding. The contract was awarded to a collaboration of the companies E3Think, Bike N Roll (BNR), nextbike, and P3 Global Management.² As a result, the original project tasks were modified based on this new bike share environment and consist of the following:

- Working with the County³, NJTPA, and the project's Technical Advisory Committee (TAC), define the goals, objectives, and performance measures for a Hudson County bike share system.
- Solicit public feedback via the project website (including an interactive, crowd-sourcing map ("WikiMap") and online survey) and a public meeting and incorporate that feedback into the project's findings and recommendations.
- Propose a bike share service area, including phasing, based on a spatial analysis of known indicators of bike share demand and equity variables, determined and refined by consultation with the County, NJTPA, the TAC, and the public.
- Forecast bike share ridership using a best-practices model.
- Compare the model for Hudson County bike share system with case studies of four existing bike share systems.
- Provide a quantitative summary of the feasibility, partnering opportunities, benefits, costs, and risks of a Hudson County bike share system, including a limited review of the BNR proposal.
- Provide equity recommendations for a low or no-cost bike share membership model.
- Recommend bike share station density and locations, including a review of the BNR proposal's service area and station siting.

² This report references the proposed Jersey City/Hoboken/Weehawken bike share system as the "BNR proposal"

³ This report references the government of Hudson County as "Hudson County" or "the County;" "county" is used for non-governmental references.



BACKGROUND

Study Area: Hudson County

Hudson County is New Jersey's smallest and most densely populated county, as well as the densest multi-jurisdictional county in the U.S. It is a complex community of 12 municipalities, with diverse populations, housing types, industries, and topography. The county's geography varies considerably, with East Newark, Harrison, Kearny, and Secaucus located in the relatively low-lying area adjacent to the Hackensack and Passaic rivers. Most of the county's population is concentrated on the peninsula between the Hackensack and Hudson rivers. The northern portion of the county on the peninsula includes the municipalities of Guttenberg, North Bergen, Union City, Weehawken, and West New York. Hoboken and Jersey City are centrally located on the peninsula, and Bayonne is located on the southern tip. The peninsula is divided by the north-south running Palisade land formation, creating a major physical boundary between the areas above and below the cliffs (as shown in Figure 1.1, including the study area). Employment is most densely clustered east of the cliffs in downtown Jersey City and Hoboken and west of the cliffs in Union City and West New York. The county has an extensive public transportation network, including light- and heavy-rail, buses, jitneys, taxis, and passenger ferries.



Figure 1.1 Study Area and Topography



Source: United States Geological Survey, 2013

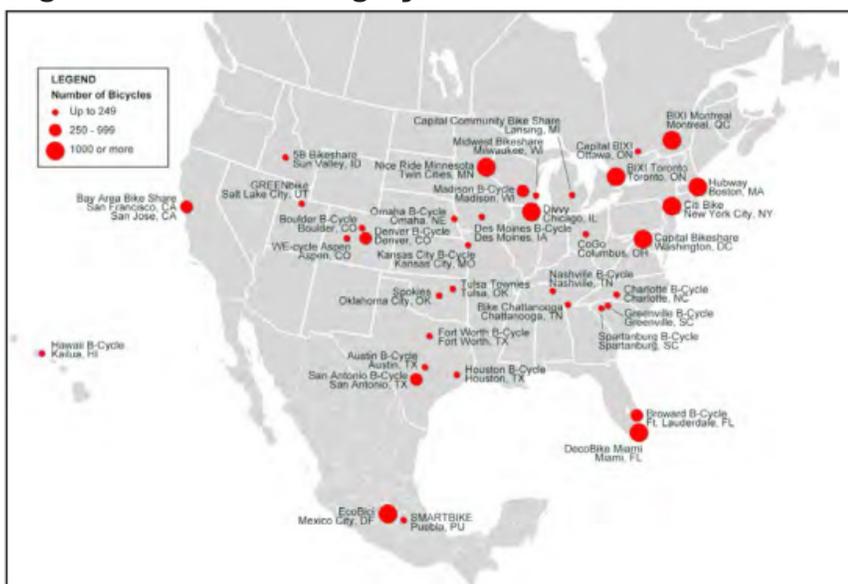


WHAT IS BIKE SHARING?

Bike sharing is a fast-growing, non-motorized transportation option for urban and suburban environments. Bike share systems make bicycles available for public use at strategically placed stations. By offering bicycle rental plans at varied annual, monthly, and daily rates, bike share can be used by everyday commuters, recreational users, and visiting tourists at affordable rates. Bike share systems have proven particularly effective in urban environments as bicycles are considered the most efficient mode of transportation for short trips, require relatively less in terms of new infrastructure construction, promote a healthy community, and take the burden of safely storing a bicycle off of the user. By making bicycles available at transit stations, bike sharing has also proven to be a great complementary system to public transportation networks, extending the transit system catchment area and helping with the “first and last mile” of trips.

Today, bike sharing systems can be found in almost all parts of the world including North America, Europe, South America, Australia, and Asia. In the U.S., contemporary bike sharing systems were developed in the second half of 2000, with majority of them starting operation in 2011. As of the end of 2013, there were 22 bike sharing systems in the U.S.—about 75% of all the systems in North America.⁴ The major bike sharing systems are concentrated in the large urban areas of the East Coast and Midwest, as shown in the map below.

Figure 1.2 Bikesharing Systems in the U.S. 2013



Source: Public Bikesharing in North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts

⁴Shaheen, S. A., Martin, E. W., Chan, N. D., Cohen, A. P., & Pogodzinski, M. (2014). Public Bikesharing in North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts. San Jose: Mineta Transportation Institute.



FACTORS SUPPORTING A BIKE SHARE SYSTEM IN HUDSON COUNTY

The initial bike share feasibility study indicated the potential suitability of a bike share system in Hudson County due to presence of certain physical, demographic, socio-economic, and infrastructure conditions:

- The climate and moderate elevations in a large section of the county - particularly in the economic core - are suitable for bicycling at least nine months in a year.
- Bike sharing would address the problem of safe and secure bicycle storage for the county's many space-challenged residents of apartments and condominiums.
- Relatively low car ownership in much of the county is conducive to bike sharing.
- Hudson County has a dense public transportation network, and most people live and work relatively near transit stops, thus a bike share system would help solve the problem of covering the "first and last" mile trips.
- Bike share would be useful to many commuters using the Port Authority Trans-Hudson (PATH) train, which does not allow bicycles on board during peak commuting hours.
- About half of the users of bike share systems in the U.S. are tourists. As Hudson County has numerous tourist destinations, bike sharing could be an important mode of transport serving them.



Outreach Efforts And System Goals

Stakeholder Outreach

Public Outreach

Definition Of Goals And Objectives
And Performance Measures

A large, stylized graphic of a wheel with orange spokes and a thick orange rim is positioned in the bottom left corner, partially overlapping the text.



This task of the project focuses on collecting information from both the general public and stakeholders to help define the direction of a bike share system for Hudson County. Outreach was undertaken in a series of key meetings with the stakeholders, through an online survey and WikiMap on the project website, and in a public meeting to ensure the greatest participation and diversity of viewpoints. Below is a summary of outreach efforts and results from it.



STAKEHOLDER OUTREACH

The team worked with a diverse and robust group of stakeholders to form the TAC for the project. Numerous organizations, including all 12 Hudson County municipalities, five not-for-profit organizations, and four government agencies, were invited to play an active role in the development of this study. Of those invited, the following participated as members of the TAC or offered input otherwise:

- Bike JC
- City of Hoboken
- City of Jersey City
- City of Union City
- Hudson County
- Hudson TMA
- New Jersey Bike and Walk Coalition
- New Jersey Bicycle and Pedestrian Resource Center
- Jersey State Park Service - Liberty State Park
- New York City Department of Transportation
- NYC Bicycle Share (operators of Citi Bike)
- NJ TRANSIT
- Port Authority of New York and New Jersey
- Tri-State Transportation Campaign

One-on-One Meetings' Summary

In November 2013, the team met with key stakeholders for one-on-one meetings to discuss the exploration of a public bike share program in Hudson County. One-on-one meetings were held with the City of Hoboken, Hudson TMA, City of Jersey City, NJ Transit, NYC Bike Share (New York Citi Bike operator), Port Authority Trans-Hudson (PATH), and New York City Department of Transportation.



Overall, all stakeholders were supportive of bike share and saw potential for it to help meet different goals of their respective organizations. Some highlights include the following:

- Many stakeholders were concerned about the need for more bicycle infrastructure in Hudson County, such as bike lanes.
- Public transit stakeholders were concerned with space at, around, or near public transit stations, and potential responsibility to maintain bike share stations as well as bicycle racks.
- Hudson TMA indicated that they could provide support for a bike share system through education and outreach.
- Advertising on bike share stations at public transit properties would be subject to review and approval.
- Several stakeholders thought that bike share needed to be revenue neutral at a minimum or, ideally profitable.
- The Citi Bike bike share operator thought that it would be difficult to have a system that supported itself from membership revenues alone, and also thought that obtaining a sponsor would be difficult. The operator also indicated that station density is very important for success of the system.
- Hoboken and Jersey City are interested in implementing bike share soon.
- Some level of integration or compatibility with Citi Bike is desirable.
- Tri-State Transportation Campaign provided significant feedback at the initial stages of the project. For example, the online survey (described below) was modified and improved based on their feedback.
- Mana Contemporary and New Jersey City University expressed positive interest in bike sharing in the county and emphasized that the system can be of immense importance to their activities and transactions. Their comments were taken into consideration relative to the service area analysis and station siting.
- Redstone Townhomes Neighborhood Association provided specific comments on service area analysis and as a result the Phase II service area boundary was extended southward.



Technical Advisory Committee (TAC) Meetings

The initial TAC meeting was held on December 11, 2013. The purpose of the meeting was to provide a background of the project; present an overview of the project tasks and deliverables; showcase the draft website; discuss service area analysis factors; and discuss the draft goals and objectives of the project. A question and answer session and open discussion were held after the presentation. Some topics discussed include equity and social justice, infrastructure concerns, and education on bike safety. The team also conducted an exercise where TAC members were asked to vote for different service area analysis metrics to help determine the service area for the project (as listed in Table 2.3).

The final TAC meeting was held on May 20, 2014. The presentation and discussions addressed modifications to the project scope, an overview of outreach efforts, general findings, equity considerations and recommendations, case studies, and ridership forecasts. As a result of discussions at the meeting, modifications were made to the proposed bike share station locations.



PUBLIC OUTREACH

The team has engaged the community about the Hudson County Bike Share system via a number of different methods. Public outreach methods included public meetings, a project website to educate the general public about bike sharing, a WikiMap to suggest station locations, and an online public survey.

Public Meeting

The project team hosted a public open house meeting on February 4, 2014, from 6:00 pm to 8:00 pm at the Hudson County Freeholders Chambers in Jersey City, which was attended by 26 members of the public. The project team conducted an extensive outreach effort to publicize the Hudson County Bike Share Feasibility Study Public Meeting. Outreach efforts included the following:

- Fliers in English and Spanish distributed to TAC and email listservs
- Newspaper and Newsletters:
 - *Jersey Journal* (January 31, 2014)
 - *The Hudson Reporter* (February 2, 2014) – circulation throughout the county in eight different editions
 - Together North Jersey newsletter
- Facebook account: NJTPA
- Twitter account:
 - Hudson County
 - NJTPA
 - Bike JC
 - City of Hoboken
 - Sam Schwartz Engineering
 - Gridlock Sam (a service of Sam Schwartz Engineering)
 - Toole Design Group
- Websites:
 - Flier posted on home page and input page of the project website
 - Hudson County Division of Planning
 - Hudson TMA
 - NJTPA



- Emails:
 - Technical Advisory Committee (including fliers)
 - All County employees
 - Mayors of the 12 municipalities
 - Hudson County Comprehensive Economic Development Strategy Committee
 - Housing authorities' directors
 - All municipal school superintendents
 - Hudson County Open Space listserv (Includes Open Space Advisory Board, stakeholders from non-profits and other municipal employees)
 - Hudson County Planning Board members
 - Various block groups and churches, primarily in Jersey City and Bayonne

All materials at public meetings were presented in both English and Spanish. The following topics were covered:

- Overview of bike share
- Feasibility study
- Efforts to date in the region
- System area
- Station locations

The final version of the presentations can be found on the project website.

Following the presentation and an open discussion, the team also provided three boards with different maps of areas in Hudson County for attendees to suggest station locations by placing stickers at their preferred station locations (see Figure 2.1). Additionally, consultant staff invited attendees to take the online survey, provide comments on the comment board, and ask questions.



Figure 2.1 Public Meeting Attendees Suggesting Station Locations



Source: Hudson County Division of Planning

Participants also provided feedback on the draft service area. Several comments focused on the importance of including New Jersey City University, St. Peter's University, and the Heights (Jersey City) in Phase I and that Bayonne should be included in Phase II or III.



Project Website

The project website (hudcobikeshare.com) branding and content were developed with the help of the Hudson County Division of Planning prior to the first TAC Meeting. The draft website was then presented to all TAC members for review, and comments were incorporated and the website was then launched to the public. The website includes information about the project, educational information about bike share system, a bike share survey, and a WikiMap where users could propose potential station locations and “like” stations that have been proposed by others. The website was visited 2,710 times during the study.

Bike Share Survey

The project website’s survey and WikiMap were designed to collect input from the public. The online survey, launched in January 2014, was designed to address the following overarching issues:

- What role could bike share play in Hudson County and how would it be used?
- What kind of support (or opposition) is there for a possible bike share program?
- How much would people use and be willing to pay for the system?

The survey responses were incorporated along with TAC feedback and comparable system data for information to define system service area, station locations, system pricing, and identify any potential obstacles to implementation. The survey included 20 questions, asking respondents about their demographic and employment information, current bicycling habits, and opinions on bike share implementation in Hudson County. Additional questions were asked regarding integration with New York Citi Bike bike share, and how existing bicycle infrastructure would influence bike share use. Refer to Appendix 1 for a summary of the survey responses received.



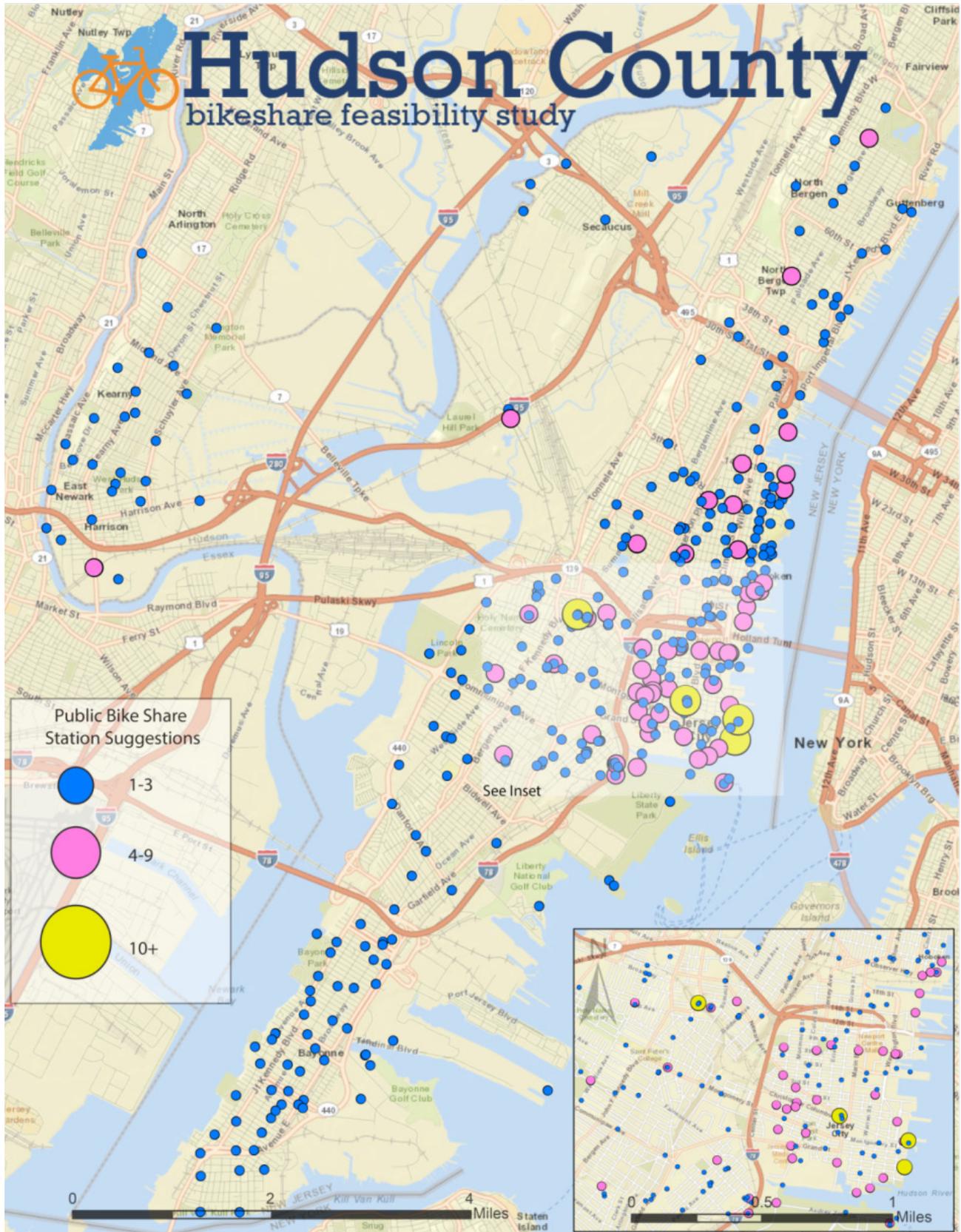
Interactive Web-Based Mapping Tool

The project website included a link to a WikiMap that provided an opportunity for the public to suggest possible bike share station locations. The WikiMap was opened for public comment in early January 2014 to April 1, 2014. During this time, 405 station suggestions were submitted, with many of these locations being preferred (“liked”) by multiple users. Station suggestions submitted during the public meeting were also entered into the WikiMap by the consulting team.

Suggested station locations are shown in Figure 2.2 (with each station weighted by the number of “likes”).



Figure 2.2 Bike Share Station Location Suggestions





DEFINITION OF GOALS AND OBJECTIVES AND PERFORMANCE MEASURES

An important component in planning for a bike share program is to understand the program's role in the community, decide what benefits are considered most valuable, and determine what will be considered a successful system. To this end, the project team developed a set of system goals and objectives based on meetings with Hudson County Division of Planning and NJTPA and then sought feedback from the TAC.

These initial goals and objectives were sent to the TAC through an online survey, where members were asked to identify priorities for a potential bike share system in Hudson County. The goals and objectives survey was sent to the TAC on December 13, 2013, via email and remained open until January 10, 2014. Survey participants were asked to provide feedback on which goals and objectives the County should focus on by ranking them from "very important" to "not important." The project team used the weighted results of the survey ranking process to develop the final prioritized program goals and objectives. Performance measures to track the progress of these goals and objectives were also developed.

Final Goals, Objectives, and Performance Measures

The resulting goals envision a bike share system that is focused on connecting Hudson County residents to transit and increasing the prevalence of bicycling in Hudson County. Additional goals were identified, including that the system must be well maintained, provide equal access to people of different income levels, and be financially sustainable. The final goals and objectives are shown in Table 2.2 below.

In addition, performance measures were developed to measure the impact of the system relative to the system goals. Effective performance measures must be detailed enough to give meaningful indications about system performance, yet simple enough to collect and report on a regular basis. The measurements proposed for Hudson County can be developed using three different input sources: automatically generated system data, a proposed annual user survey, and figures that the program administrative and marketing staff can track internally over time. If any of the proposed performance measurements fall under the responsibility of an outside vendor, the vendor should be contractually required to track these measurements. While many of these figures can be tracked in real-time, the full set of performance measures should generally be reported on an annual basis by the managing agency. Performance measures are also shown in Table 2.2 below.

**Table 2.2. Goals, Objectives, and Performance Measures**

| Rank | Category | Goals | Objectives | Performance Measures |
|------|--|---|--|---|
| 1 | Mobility and Transportation Efficiency | Increase accessibility to jobs, recreation, and other locations | <ul style="list-style-type: none"> Integrate bike share as an extension of Hudson County's public transit network and consequently increase opportunities to efficiently utilize other modes of transportation. Provide mobility through bicycle and transit connections to residents, employees, and visitors to and between CBDs and mixed-use corridors. Increase bicycle and transit mode share for a variety of trips. | <ul style="list-style-type: none"> Percentage of bike share stations within a quarter mile of a public transit stop/station. Number of trip origins and destinations at stations with direct proximity to transit stations and bus stops. Percentage of rides coupled with public transit as reported through survey. Measure of bicycle and transit mode share through planning study. |
| 2 | Operational Excellence | Create positive user experiences to maintain customers and attract new users | <ul style="list-style-type: none"> Identify system performance targets based on community objectives and develop measures to hold system operators accountable. Identify usage-based performance measures independent of user revenue targets to emphasize consumer satisfaction in addition to financial sustainability. Provide a system that integrates well with other bike share systems in the areas surrounding Hudson County. Engage local communities at the initial stages of planning station locations and promote the potential benefits that bike share will bring to the communities. | <ul style="list-style-type: none"> Performance metrics in an operator contract reported on a monthly and annual basis that include operations service levels (rebalancing, bike maintenance, station maintenance), as well as membership, ridership and customer satisfaction. Efforts to integrate and/or cross-promote between Hudson County bike share and other bike share systems in adjacent areas. Number and type of community engagement efforts in system planning. Number and type of comments received from general public and business owners about station locations. |



| Rank | Category | Goals | Objectives | Performance Measures |
|------|------------------------------|--|---|---|
| 3 | Membership and Ridership | Maximize both membership and ridership, while balancing financial objectives of program | <ul style="list-style-type: none"> • Create a system with stations located to serve the largest cross-section of the included communities, while ensuring the economic feasibility of those stations • Maximize both local and visitor membership • Encourage high ridership by members | <ul style="list-style-type: none"> • Population and employment within a quarter mile of a bike share station. • Number of annual memberships. • Number of visitor memberships. • Number of rides per (a) annual member and (b) resident. • Annual member rides from each station. • Casual member rides from each station. • Revenue generated for each station, measured by casual memberships purchased, usage fees accrued from each station, and pro-rated for annual member rides. • Number of rides per bike share bike. • Average distance bicycled per trip. |
| 4 | Social and Geographic Equity | Provide a system that is accessible to a broad cross-section of people living in and visiting Hudson County | <ul style="list-style-type: none"> • Ensure that bike share is cost-competitive and financially accessible to users of all economic strata and is an affordable alternative to other modes of transportation. • Provide station locations not only in Downtown CBD areas but also in neighboring residential areas; eventually expand the geographic coverage across Hudson County. • Develop a system that engages and serves users in minority and low-income communities and improves their access to key destinations. | <ul style="list-style-type: none"> • Average cost per trip per user. • Average annual travel savings among bike share users. • Percent of bike share trips originating or ending in low-income census tracts. • Percent of stations in low-income census tracts. • Tracking demographic user profiles through registration and user surveys for age, race, gender, income, and language. • Track subsidized memberships and ridership for low income individuals through partnerships with social service organizations. |



| Rank | Category | Goals | Objectives | Performance Measures |
|------|---|---|---|--|
| 5 | Finances and Transparency | Create a system that is financially sustainable, transparently operated, and accountable to the public | <ul style="list-style-type: none"> Plan for and ensure sustainable capital funding for system growth and ongoing equipment replacement. Clearly communicate program performance and effectiveness to stakeholders and the public. Cover all operating expenses without public assistance. Create a funding structure and/or contract incentives to support non-financial objectives. | <ul style="list-style-type: none"> Number of reports per month of defective or damaged equipment. Set and track aggressive fundraising goals for capital budget. Number of visits to the bike share service's website per month. Average revenue per station over the whole system. Annual reporting of the state of bike share that details to the members and public the progress on all bike share performance measures. Membership, ridership, and equity performance measures in operator contract. Percentage of operations paid through sponsorship, user and membership fees. |
| 6 | Livability and Economic Competitiveness | Develop an innovative transportation system that improves Hudson County's livability and economic competitiveness. | <ul style="list-style-type: none"> Optimize the number of origins and destinations that can be served by a bike sharing system serving as many neighborhoods and destinations as possible. Create the "first mile/last mile" solution for residents and employees to get to and from public transit stations such as PATH stations, NJ Transit stations, and ferry landings. Provide an alternative means of transportation for tourists, particularly to access Liberty State Park. | <ul style="list-style-type: none"> Population and employment within a quarter mile of a bike share station. Number of distinct neighborhoods served by bike share system Number of people who use bike share to get to public transit for their daily commute Average number of rides per annual member per year Number of active corporate memberships. Proportion of surveyed bike share users who are visiting the city for leisure or business. Number of casual users. Usage reports of stations located in Liberty State Park, including casual and member usage. |



| Rank | Category | Goals | Objectives | Performance Measures |
|------|-------------------|--|--|---|
| 7 | Health and Safety | Provide Hudson County residents and visitors a safe mode of transportation that promotes active and healthy living. | <ul style="list-style-type: none"> Educate the public about safe biking practices and rules of the road. Foster an active lifestyle by increasing bicycle, walking, and transit mode shares and promote a culture of safety among bike share system users. | <ul style="list-style-type: none"> Number of reported bike share crashes per 1,000,000 bike share trips. Observing bike share user use of helmets during annual bicycle counts. Survey users about use of helmets and other bicycling safety habits while using bike share. Total calories burned per year. |



FULL ANALYSIS OF SERVICE AREA

Overview

Bike Share Demand Metrics

Weighting Of Metrics

Bike Share Demand Heat Map

Bicycle Route Infrastructure



OVERVIEW

This task of the project focuses on defining a phased bike share system area based on GIS analysis of common metrics (described on page 30) used to predict bike share demand and refined through consultation with Hudson County, NJTPA, and the TAC as well as feedback from the public. To form an effective service area, the phases are contiguous and discrete areas with logical boundaries. The proposed bike share system area is shown below in Figure 3.1, followed by the GIS analysis.

Prime areas for Phase I that performed well in the GIS analysis, relative to other areas of the county, on the basis of the common metrics (described on page 40) of bike share demand, and have good existing or planned bike infrastructure were identified. This includes the following areas:

- Hoboken
- Jersey City east of the New Jersey Turnpike Extension/ Interstate 78, including Liberty State Park
- Journal Square area
- Weehawken waterfront

Phase II consists of areas that performed as well or nearly as well in the GIS analysis as Phase I and would be logical extensions of the bike share network, assuming that Phase I is successful. (While Union City is included in Phase II, its existing or planned bike infrastructure is minimal; such infrastructure would improve the comfort of bicyclists and increase the viability of bike share.) Phase II consists of the following areas:

- Union City
- Jersey City north of Audubon Avenue/Wegman Parkway (excluding certain areas adjacent to the Hackensack River and the Meadowlands)
- The remainder of Weehawken
- The waterfront of West New York, Guttenberg, and North Bergen (south of 79th Street)
- Small areas of North Bergen adjacent to Union City



Phase III consists of areas that performed well enough in the GIS analysis to be considered quite suitable for bike share, but did not perform as well as Phases I and II. Phase III consists of the following areas:

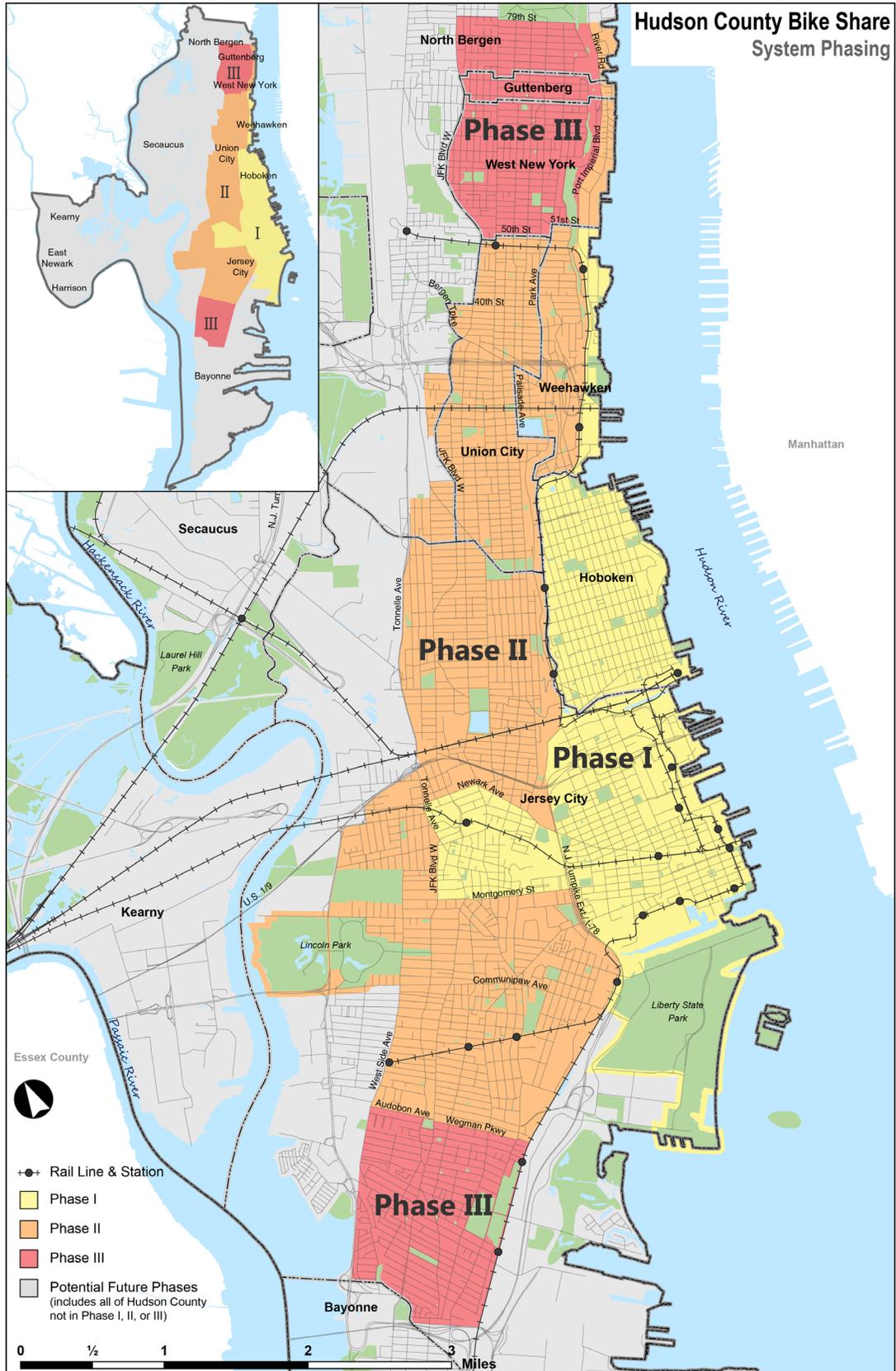
- Jersey City south to I-78/Bayonne
- The remainder of West New York and Guttenberg
- North Bergen between Guttenberg and 79th Street

Central Bayonne and a smaller area of central Harrison performed as well as Phase III, but these areas were excluded as they would result in a less viable service area that would not represent a connected, contiguous network.

The remainder of the county that is not in the first three phases is considered to be part of potential future phases, dependent on the success of earlier phases.



Figure 3.1. Proposed Bike Share System Area and Phasing



Source: Sam Schwartz Engineering, Toole Design Group, 2014



BIKE SHARE DEMAND METRICS

A combination of demographic and non-demographic data/metrics was used to aid in determining the preferred bike share service area for Hudson County. Demographic data represents characteristics of the population of the county. Non-demographic data generally represents geographic features that are part of the county's landscape, such as the locations of colleges and public transit.

The following metrics were initially selected for analysis. These metrics were determined based on a combination of common predictors of bike share demand and usage⁵ and based on methodology used by other U.S. cities, including Chicago, Denver, New York, Philadelphia, San Francisco, and Seattle.

- **Residential Population Density (Figure 3.2):**
This data reflects the density of the county's residential population. The majority of the county's population resides between the Hudson River and the Meadowlands, with Hoboken, Union City, West New York, and Guttenberg being the densest cities. Source: U.S. Census, American Community Survey, 5-year estimates, 2011.
- **Daytime Population (Figure 3.3):** Daytime population is the number of people who live in a census tract plus the number of people who work in that census tract minus the number of employed people who live in that census tract (it is assumed that residents do not work in the census tract in which they live). Daytime population mirrors residential population closely with the addition of a high concentration of workers along the Jersey City and Hoboken waterfronts. Source: Census Transportation Planning Product, American Community Survey, 5-year estimate, 2010.
- **Pedestrian and Bicycle Commuters (Figure 3.4):**
These two data points (pedestrian commuters and bicycle commuters) are summed into a single metric that represents those who commute by walking or bicycling (workers 16 years and older). There are high concentrations of pedestrian and bicycle commuters near the stations and in West New York and Guttenberg. Source: U.S. Census, American Community Survey, 5-year estimates, 2011.

⁵ Several of these common metrics, including population density, proximity to colleges, tourist destinations, and transit, were highlighted in the "Bike Sharing in the United States: State of the Practice and Guide to Implementation", a guide that was prepared by the Toole Design Group and Pedestrian and Bicycle Information Center with the sponsorship of USDOT Federal Highway Administration (FHWA).



- **Carless Households (Figure 3.5):** This data represents the number of households without access to a car. Carless households are most concentrated in Guttenberg, West New York, Union City, Hoboken, and in areas of Jersey City (Journal Square, the Heights, and the waterfront). Source: U.S. Census, American Community Survey, 5-year estimates, 2011.
- **Colleges and Universities (Figure 3.6):** This metric reflects the locations of colleges and universities. There are three campuses in Jersey City, one in Hoboken, and one in Union City near the border with West New York. Source: Websites of respective institutions, 2014.
- **Tourist Destinations (Figure 3.7):** This metric reflects the locations of the major tourist destinations, most of which are located along the waterfront. Source: Hudson County Tourism, 2014.
- **Hotels (Figure 3.8):** Hotels are a proxy for tourist origins and destinations. This metric represents the locations of hotels by size (number of rooms). Most hotel rooms in the county are located along the Jersey City waterfront and in Secaucus. Source: Hudson County Tourism and individual hotel websites, 2013.
- **Transit (Figure 3.9):** This metric is a combination of rail ridership by stations (PATH, Hudson-Bergen Light Rail, and NJ Transit) and the locations of bus stops and ferry terminals, based on available data. While the county has relatively good access to transit, much of it is focused towards travel to and from Manhattan. Source: NJTPA, 2013.
- **Businesses (Figure 3.10):** Storefront-type businesses, such as restaurants, bars, and retail stores, were used as a proxy for commercial/customer origins and destinations. Source: NJTPA “Selectory” dataset (North American Industry Classification System codes 44-45xxxx (retail), 71xxxx (arts and entertainment), 721xxx (food and drink), and 81xxx (other services)), 2013.
- **Parks and Open Space (Figure 3.11):** Parks are a proxy for recreational origins and destinations. Parks and open space of at least five acres were included in the analysis; other areas were deemed too small to generate notable bike share activity. The county has medium and large parks spread throughout. Source: Hudson County Division of Planning, 2013.

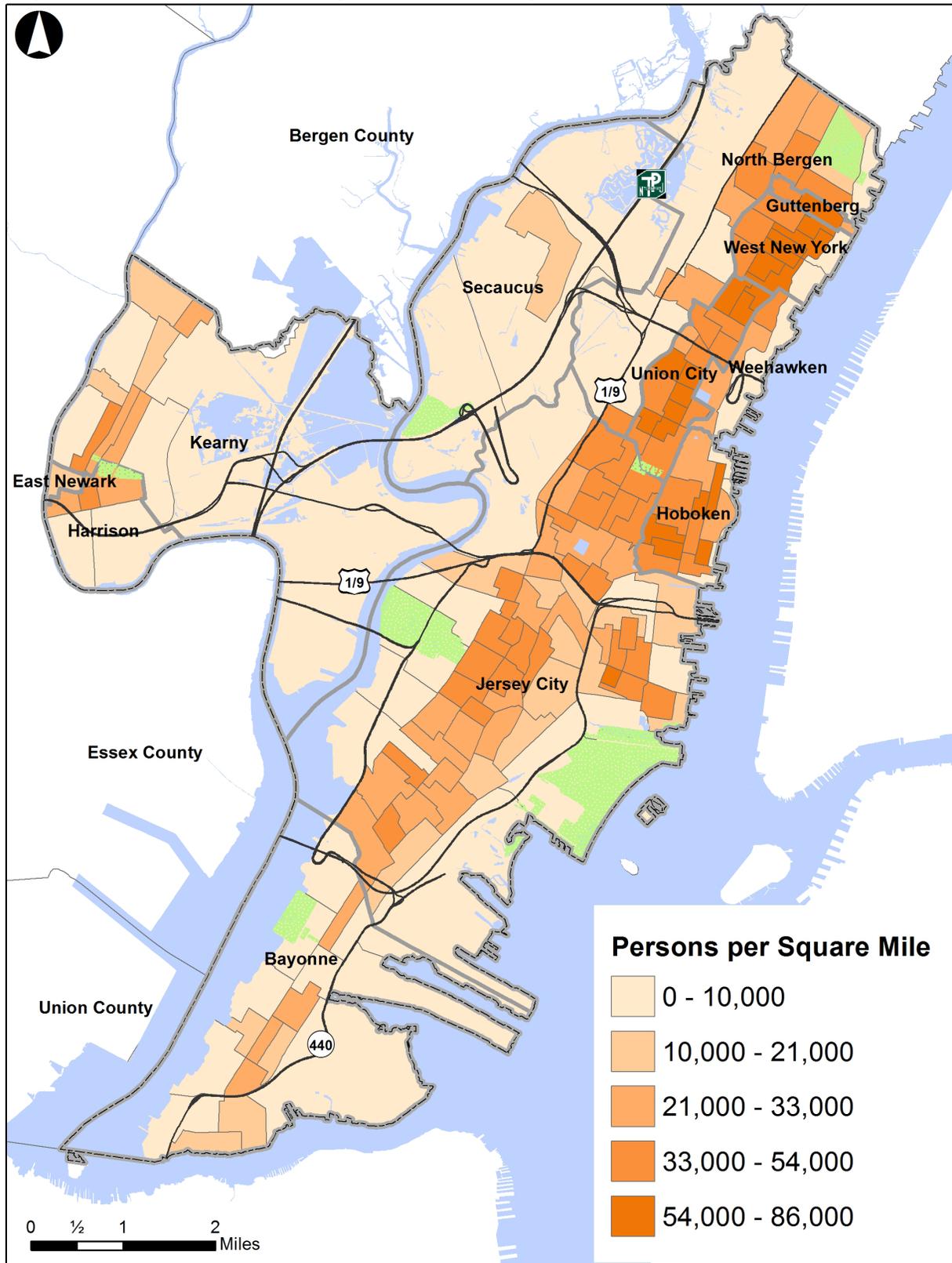


Based on the project's goals and objectives, a number of additional metrics were considered to achieve a system area that is socially equitable, fair, and just. Of those considered, the following metrics were selected based on the vote of the TAC (discussed below):

- **Median Household Income (Figure 3.12):** The analysis was structured to support lower income areas over higher income areas. Higher income areas are concentrated along the waterfront, while lower income areas are generally between the Palisades and the Meadowlands. Source: U.S. Census, American Community Survey, 5-year estimates, 2011.
- **Public/Subsidized Housing (Figure 3.13):** The analysis was structured to favor locations of public and subsidized housing. Public and subsidized housing can be found throughout the county. Source: State of New Jersey, Division of Community Affairs, 2012.



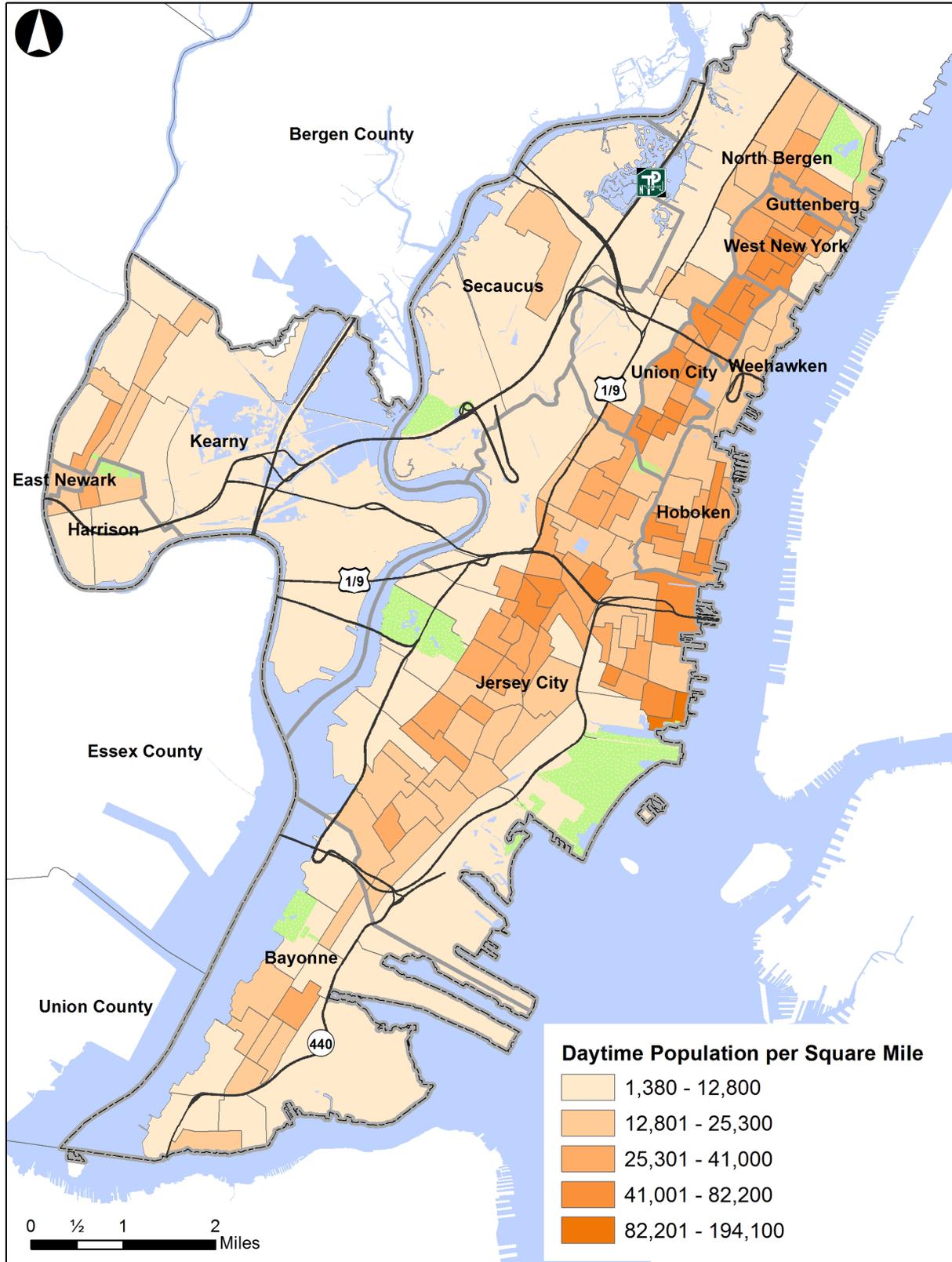
Figure 3.2. Residential Population Density



Source: U.S. Census, American Community Survey five-year estimate, 2011



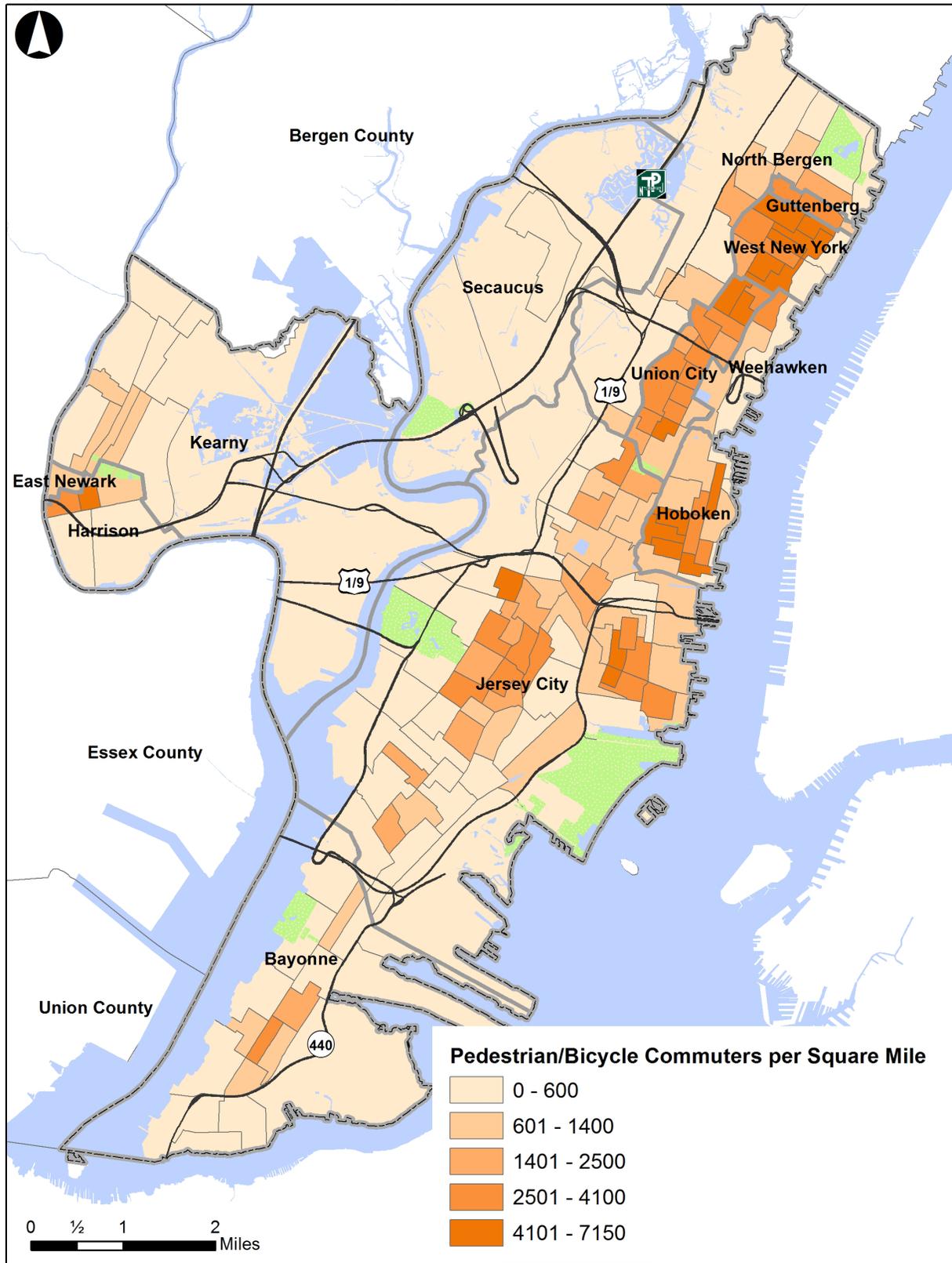
Figure 3.3. Daytime Population



Source: Census Transportation Planning Product, American Community Survey five-year estimate, 2010



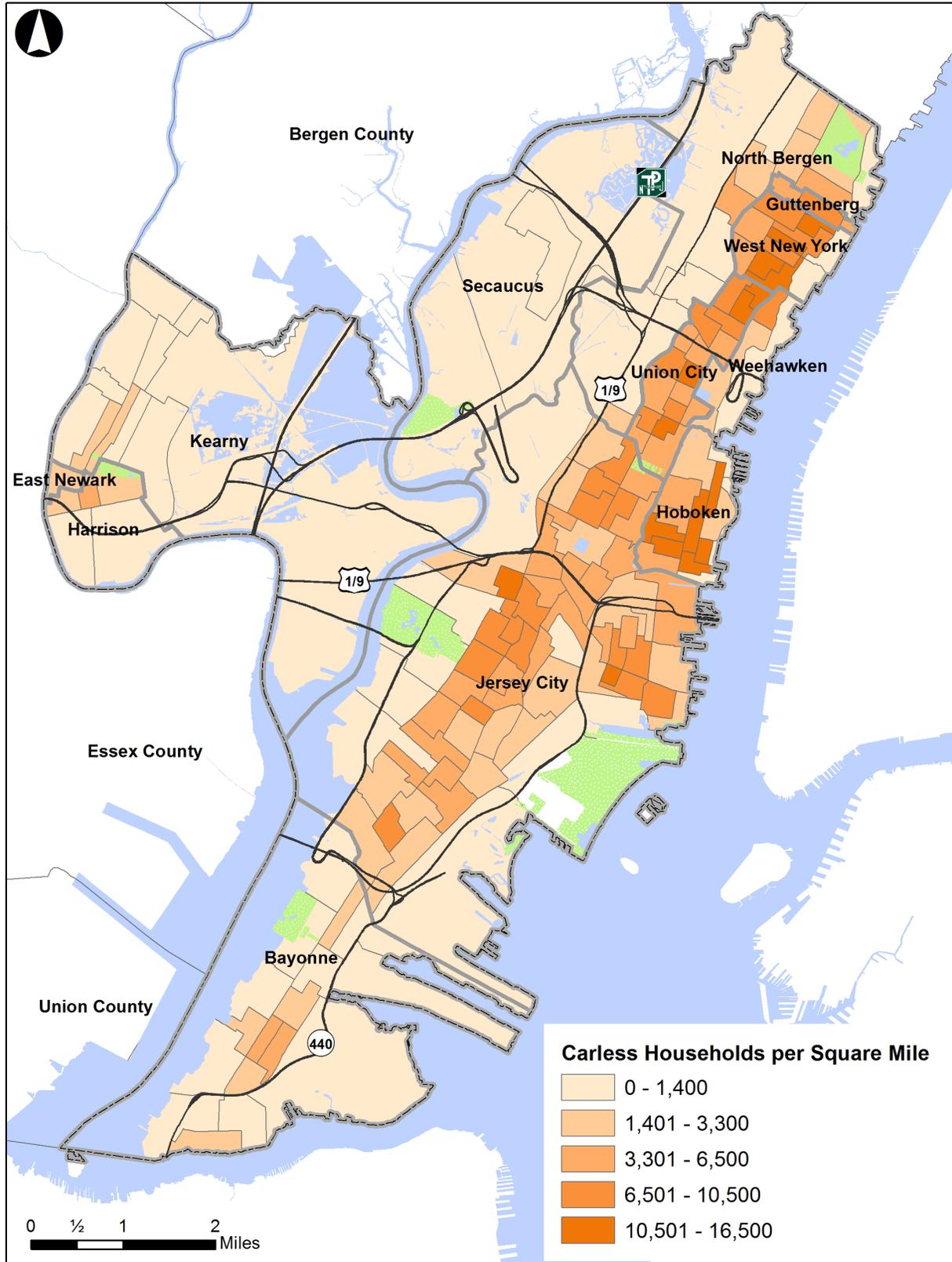
Figure 3.4. Pedestrian and Bicycle Commuters



Source: U.S. Census, American Community Survey five-year estimate, 2011



Figure 3.5. Carless Households



Source: U.S. Census, American Community Survey five-year estimate, 2011



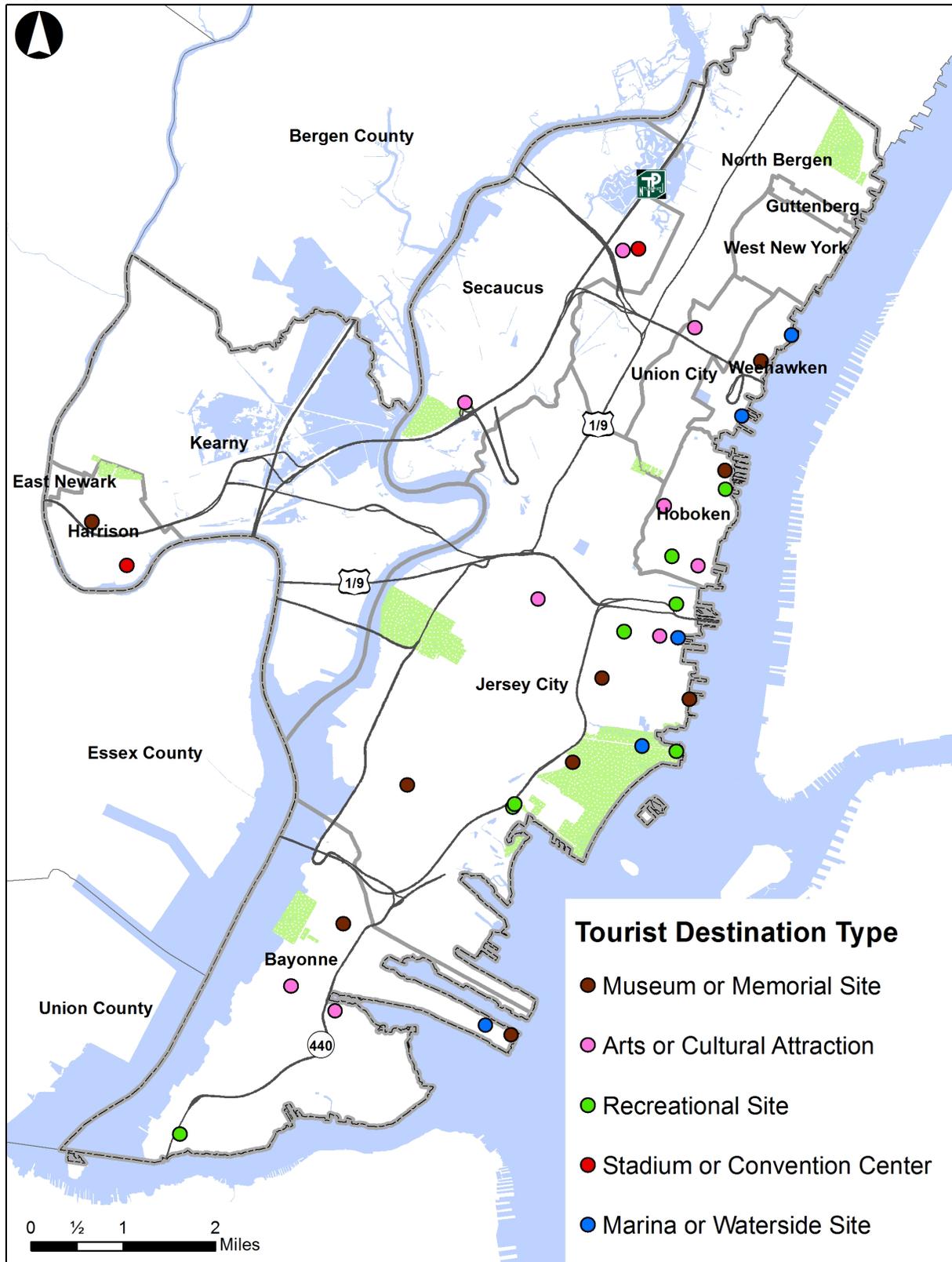
Figure 3.6. Colleges and Universities



Source: Websites of the respective institutions, 2014



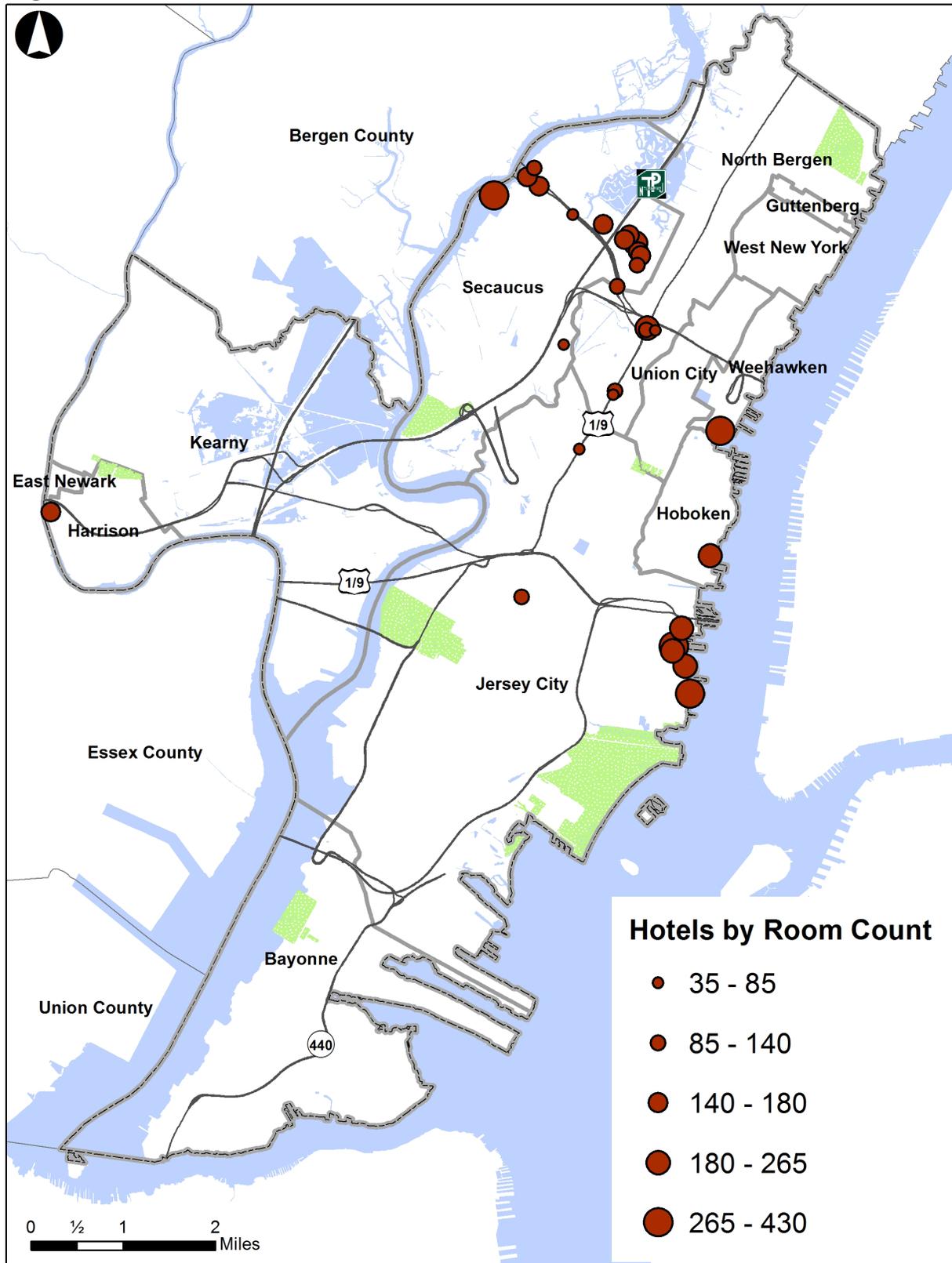
Figure 3.7. Tourist Destinations



Source: Hudson County Tourism, 2014



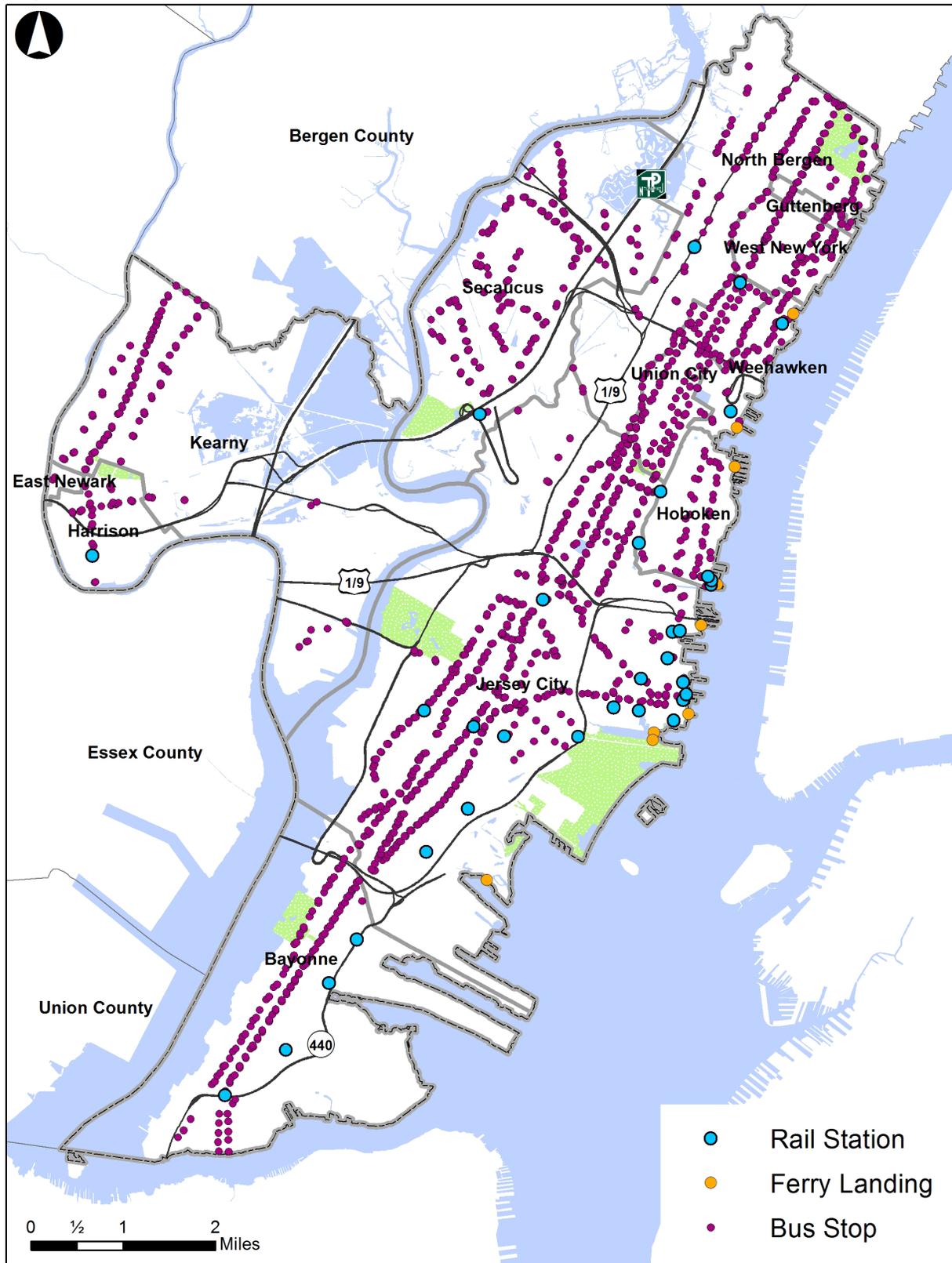
Figure 3.8. Hotels



Source: Hudson County Tourism and individual hotel websites, 2013



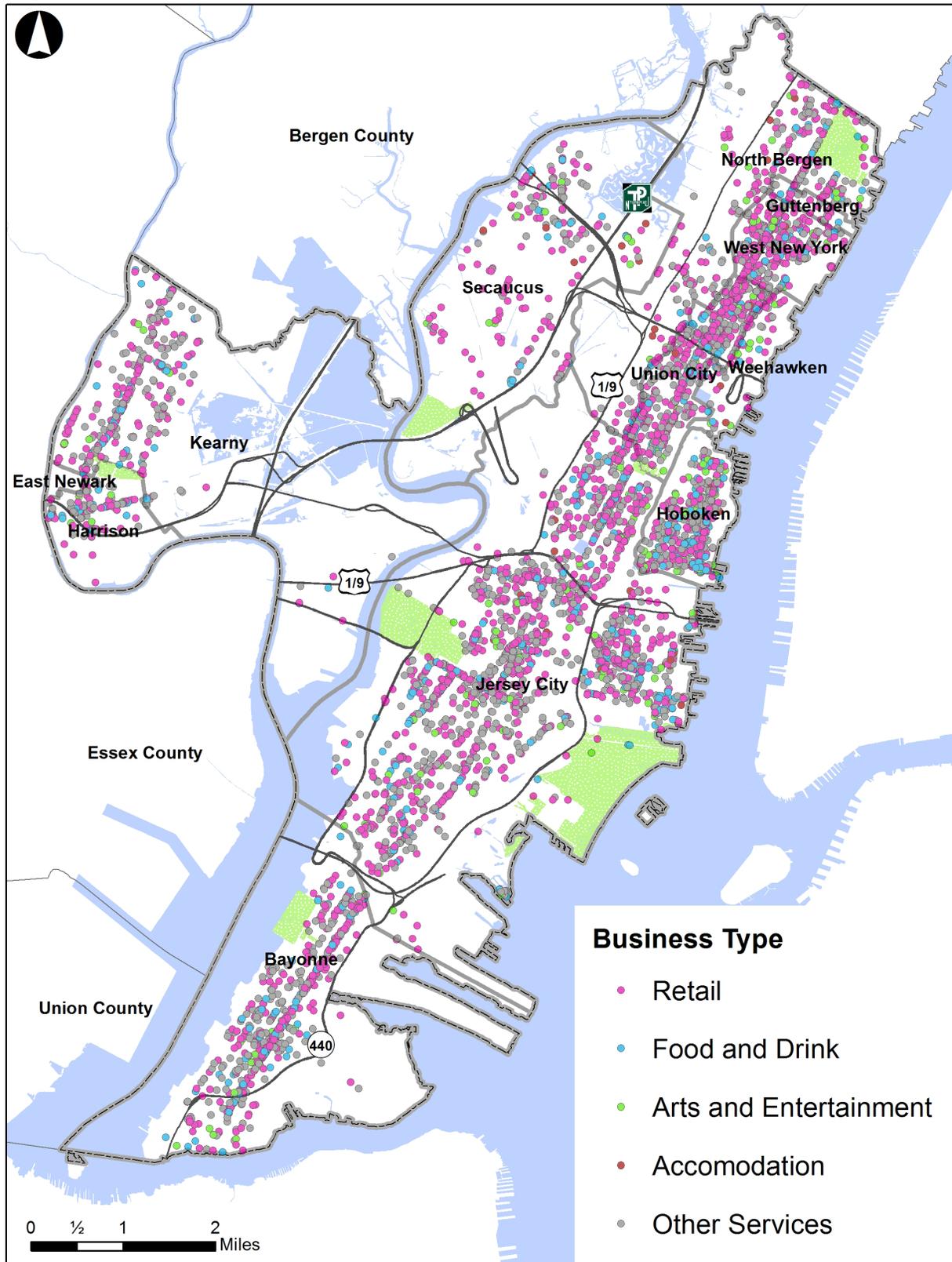
Figure 3.9. Transit



Source: NJTPA, 2013



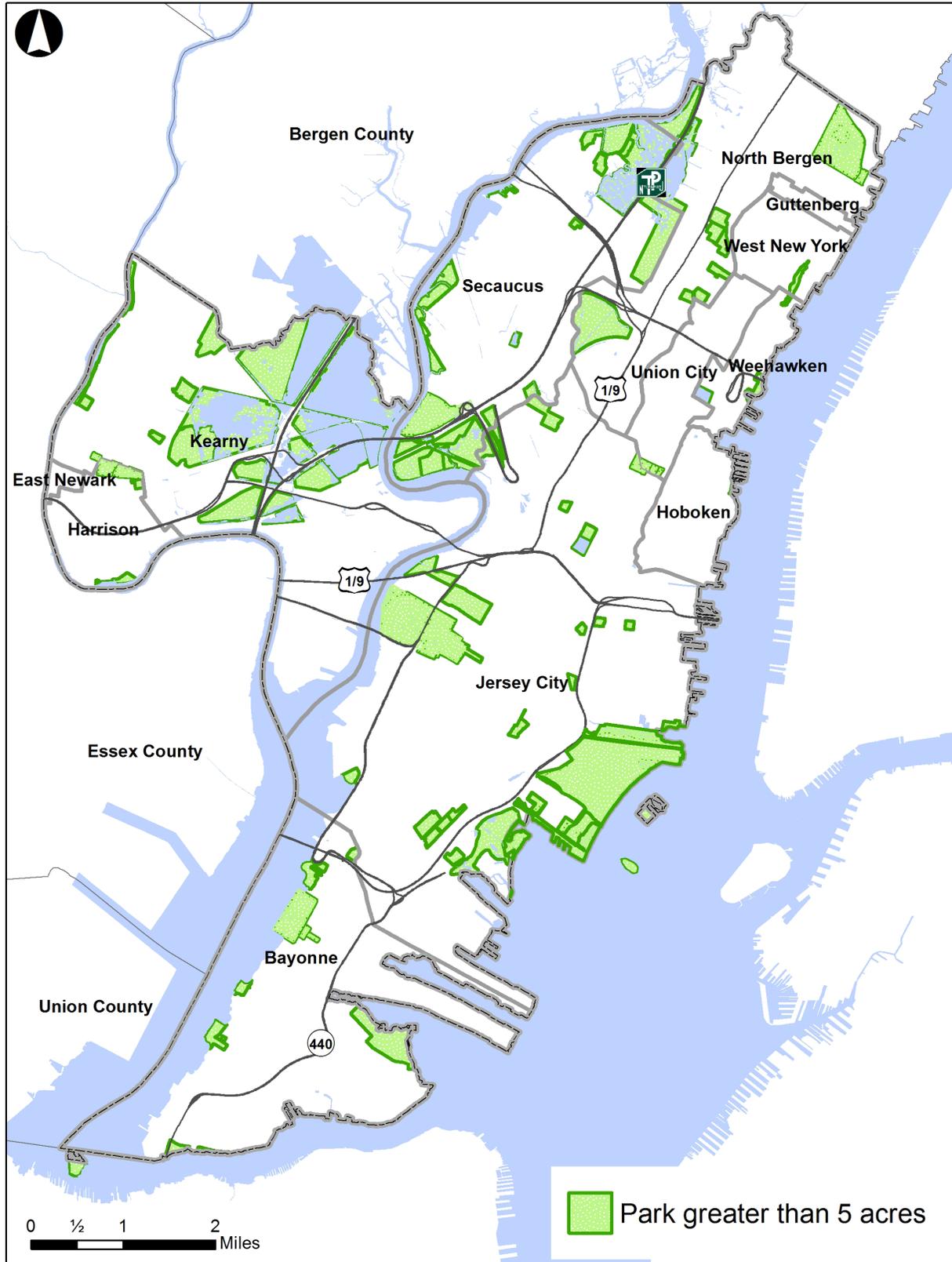
Figure 3.10. Businesses



Source: NJTPA "Selectory" dataset (North American Industry Classification System codes 44-45xxxx (retail), 71xxxx (arts and entertainment), 721xxx (accommodation), 722xxx (food and drink), and 81xxxx (other services)), 2013



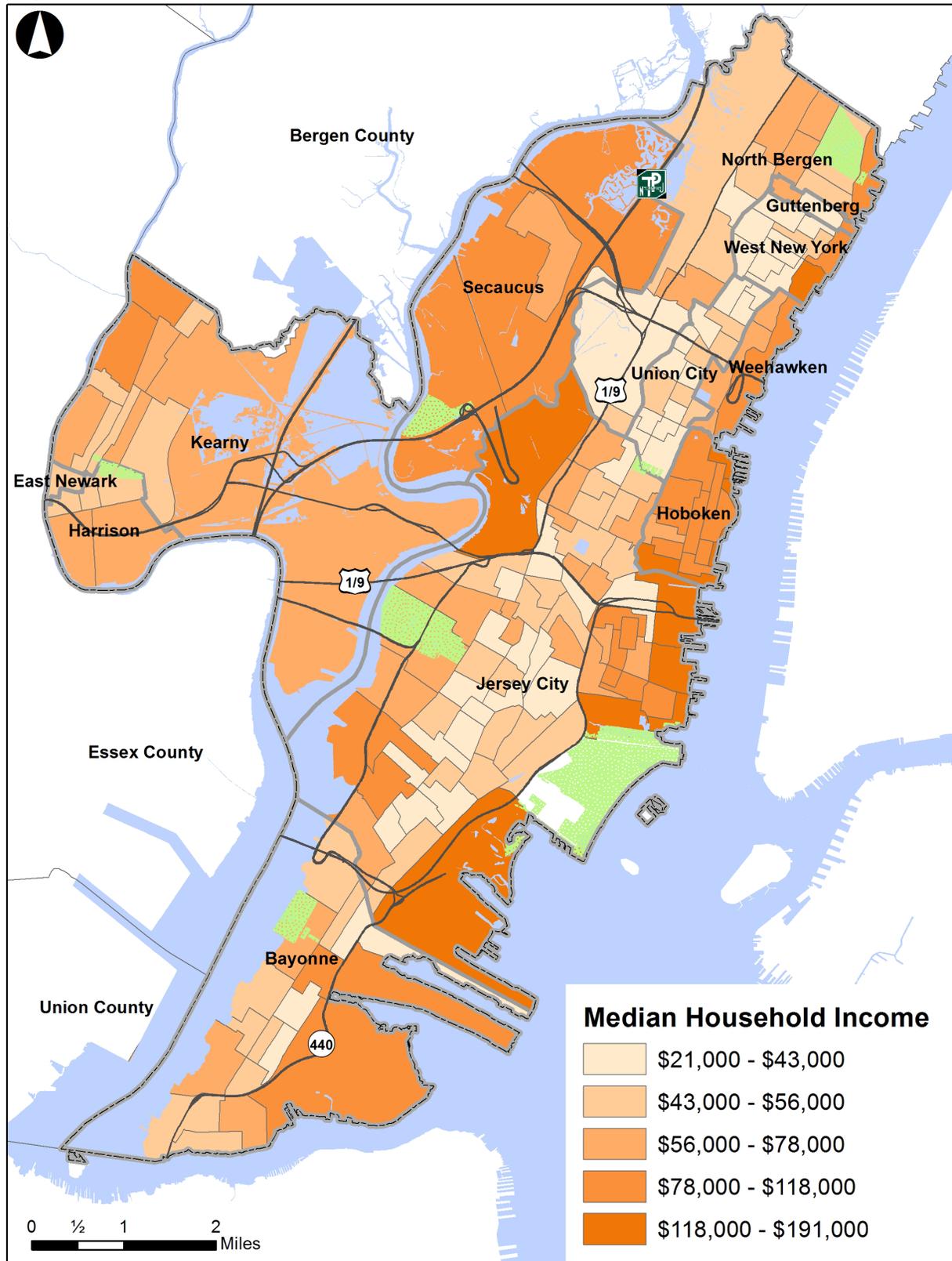
Figure 3.11. Parks and Open Space



Source: Hudson County Division of Planning, 2013



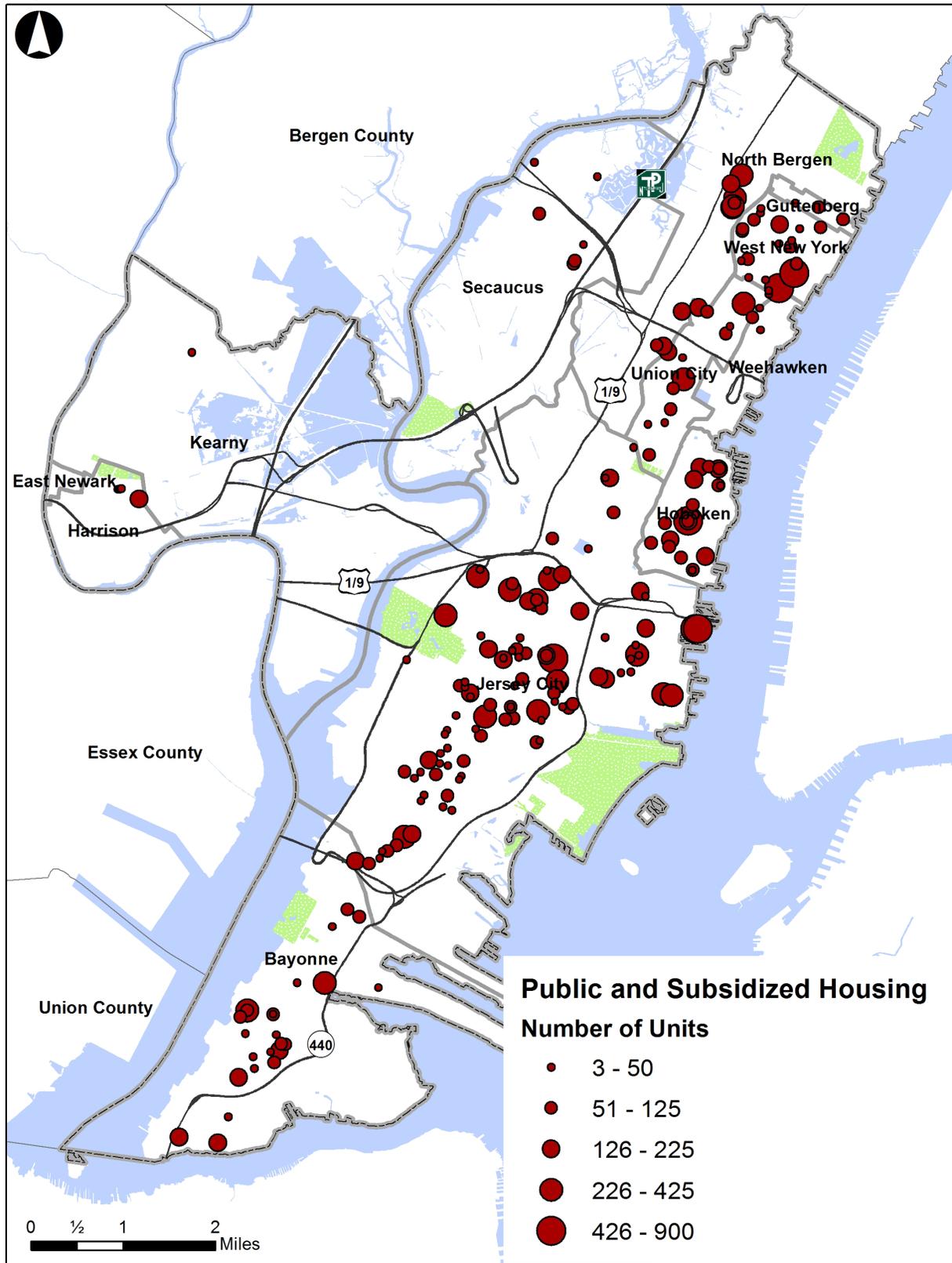
Figure 3.12. Median Household Income



Source: U.S. Census, American Community Survey five-year estimate, 2011



Figure 3.13. Public/Subsidized Housing



Source: State of New Jersey, Division of Community Affairs, 2012



WEIGHTING OF DEMAND METRICS

Certain metrics are better predictors of bike share demand than others, and the importance of individual metrics should be aligned with project goals and objectives. During the first TAC meeting, the TAC members were asked to prioritize the metrics via a vote. Votes by metric are listed in Table 3.1.

Each metric was assigned a weight (1.00, 1.33, or 1.66) based on the TAC vote (see Figure 3.14), consultation with Hudson County Division of Planning and NJTPA, and professional judgment. The final weights are listed in Table 3.1. The relatively narrow, 1.00 to 1.66 scale balances the overall importance of each metric. Metrics receiving one to three votes were assigned the weight of 1.00; six to 10 votes the weight of 1.33; 11 to 18 votes the weight of 1.66. The higher the weight value for a given metric, the greater relative importance of the metric. (While daytime population did not receive any votes by TAC members, it is one of the most significant predictors of bike share demand and was thus assigned a weight of 1.33.)

Figure 3.14. TAC Member Voting on Metrics



Source: Sam Schwartz Engineering

**Table 3.1. Service Area Metrics: TAC Votes and Weighting**

| | TAC Votes | Weighting |
|--------------------------------|-----------|-----------|
| Residential Population Density | 6 | 1.33 |
| Daytime Population | 0 | 1.33 |
| Ped/bike Commuters | 8 | 1.33 |
| Carless Households | 15 | 1.66 |
| Colleges and Universities | 7 | 1.33 |
| Tourist Destinations | 6 | 1.33 |
| Hotels | 1 | 1.00 |
| Transit | 18 | 1.66 |
| Businesses | 3 | 1.00 |
| Parks and Open Space | 6 | 1.33 |
| Median Household Income | 11 | 1.66 |
| Public/Subsidized Housing | 10 | 1.33 |



BIKE SHARE DEMAND HEAT MAP

A heat map was created to visualize and quantify suitable locations for bike share based on the metrics described above via the following process:

1. **Rasterization:** The data associated with each metric was rasterized and scaled from zero to 100 based on the range of the data to create a unit-less metric. For example, population density ranges from zero to 86,000 people per square mile; it was converted to a zero to 100 scale, with 100 representing the maximum value of 86,000 persons per square mile. The extent for each raster was set to be the boundaries of the county. A cell size of 260 feet was used to approximate the length of a small city block in the county.

Point data was rasterized using a kernel density over a given zone of influence. With a kernel density, influence is inversely proportionate to distance (in other words, influence diminishes over distance). Distances were determined using what is considered the typical maximum distance people are willing to travel to certain destination points by bicycle. For example, a person traveling to a rail station is generally willing to travel up to 10 minutes to reach the station. If that journey is made via bike share, assuming the rider starts at a bike share station near his or her origin (for instance, his or her home), at an average bicycling speed of eight miles per hour, a 10-minute bicycling distance to a rail station is 1.33 miles. Thus the catchment area (or zone of influence/kernel size) of a rail station for those traveling to/from the station via bicycle is 1.33 miles. The zones of influence for the point data are listed below in Table 3.2.

| | Zone of Influence (kernel size, in miles) |
|--|---|
| Colleges and Universities | 1.33 |
| Tourist Destinations | 1.33 |
| Hotels | 1.33 |
| Transit: Rail Stations/Ferry Terminals | 1.33 |
| Transit: Bus Stops | 0.66 |
| Businesses | 0.25 |
| Parks and Open Space | 1.33 |
| Public/Subsidized Housing | 0.66 |

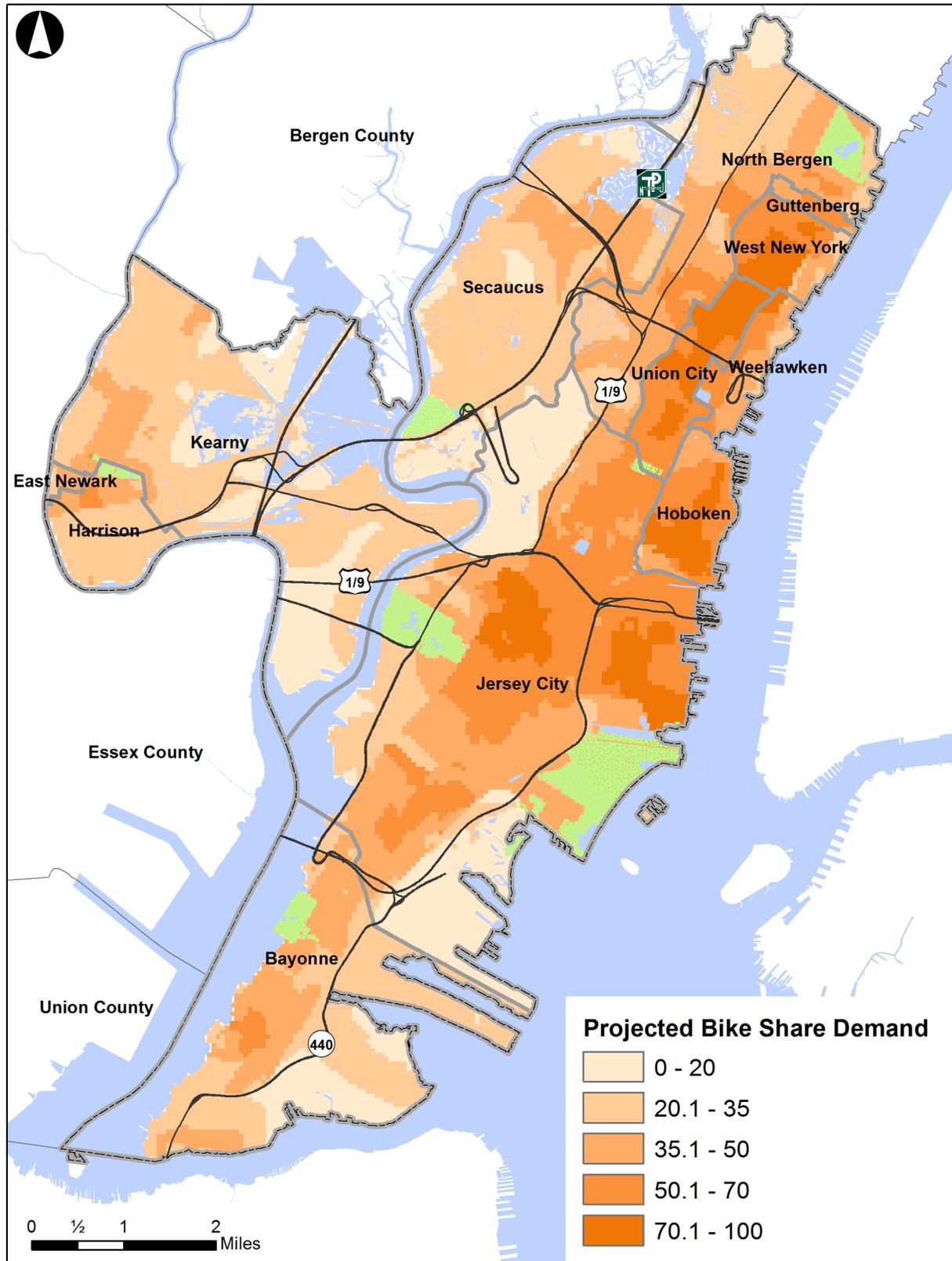


For features that have an associated attribute (such as number of hotel rooms), the density of that attribute was used to assign a scaled value over the zone of influence, ranging from zero to 100. Otherwise, just the density of the feature itself (such as number of businesses) was used to determine the scaled value of the raster.

2. **Map Algebra:** Once rasterized and scaled, the metrics were combined using the weighting described above and map algebra.
3. **Heat Map:** The combined metric was rescaled from zero to 100, with higher values corresponding to the areas of highest projected bike share demand. These areas are shown in darker orange in Figure 3.15 and form the basis for the bike share phasing recommendations described above.



Figure 3.15. Projected Bike Share Demand



Source: Sam Schwartz Engineering, 2014



BICYCLE ROUTE INFRASTRUCTURE

Adequate bicycle route infrastructure is necessary for a bike share system to meet its potential. A network of bike routes – standard bike lanes, buffered bike lanes, protected bike lanes (also known as cycle tracks), and greenways – spaced at regular intervals (approximately every ½- to ¼-mile) improves bicycling safety and comfort and has been shown to attract a wide range of bicyclists of all ages and abilities. In communities with few existing bicyclists and little in the way of bike routes, bike sharing will attract an insufficient number of customers to sustain it. Bicycle route infrastructure should, ideally, be in place prior to implementing a bike share system, or at least be implemented in conjunction with bike share.

Hoboken and Jersey City have an adequate bike lane network to support bike share, and Jersey City is actively implementing additional routes (see Figure 3.16). Figure 3.17 below shows Hudson County’s network of existing, planned, and proposed bike routes (as of December 2013). The bike route network in the rest of the county is insufficient to support a bike share system. However, as many cities – such as New York, Hoboken, and, more recently, Jersey City – have shown, a network of bike lanes can be implemented fairly rapidly and at minimal cost relative to total transportation and public works expenditures. These cities have found the political will necessary to reconfigure many of their streets to accommodate and encourage bicycling.

Figure 3.16. Bike Lane along Logan Avenue, Jersey City



Source: Sam Schwartz Engineering

Prior to or in conjunction with Phase II and III expansion of bike sharing in Hudson County, additional bicycle route infrastructure is needed in Guttenberg, North Bergen, Union City, and West New York. The County could help facilitate this process by creating a County bicycle master plan and encouraging the cities to implement bike routes (as discussed in Chapter 4).



Figure 3.17. Existing, Planned, and Proposed Bike Routes



Source: City of Jersey City and City of Hoboken - Department of Transportation and Parking, 2013



RIDERSHIP FORECAST AND MARKET ANALYSIS

Washington D.C.'s Capital Bikeshare

Boston's Hubway

New York City's Citi Bike

Minneapolis' Nice Ride Minnesota

Comparison Of Case Studies To
Hudson County

Ridership Forecast

Equity Strategies



Several bike share programs, in cities of comparable size and characteristics to Hudson County, provide a unique opportunity to inform this feasibility study, and offer multiple years of data. Four peer systems were selected from among active systems based on their similarities with Hudson County in terms of population size, program scale, and integration with transit. For example, the population of Hudson County, which is about 660,282, is close to Boston's (645,966) and Washington, D.C.'s populations (646,449)⁶. In addition, Hudson County's proximity to New York City made Citi Bike a sensible choice for a case study. The selected programs also highlight several different ownership and operational models. For example, Citi Bike is privately funded and operated, while Nice Ride is owned and managed by a non-profit. Capital Bikeshare and Hubway are "regional systems" that include multiple jurisdictions, which would also be applicable to Hudson County as well. In addition, highlights of Hoboken's pilot program are included. The following peer systems are discussed in more detail below:

- Washington D.C.'s Capital Bikeshare
- Boston's Hubway
- New York City's Citi Bike
- Minneapolis' Nice Ride Minnesota

⁶ Source of population figures: 2013 ACS 1-Year Estimates.



Bike Share Case Study
Full Year 2013

Washington, D.C. Area

www.capitalbikeshare.com

Description

Capital Bikeshare launched in 2010 with 110 stations and 1,100 bicycles, as a collaborative effort between Arlington County and Washington, D.C. Since then, the system has expanded to the neighboring jurisdictions of Montgomery County and the City of Alexandria. The regional system now includes over 300 stations and over 2,000 bicycles, and is the third largest system in the U.S.

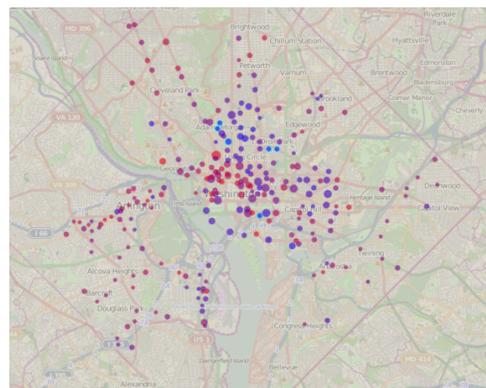
System Characteristics

| | |
|----------------------|-----------------------------|
| Equipment: | PBSC Urban Solutions (Bixi) |
| Equipment Type: | Solar/modular |
| Equipment Ownership: | Jurisdictional |
| Operator: | Alta Bicycle Share |
| Operations: | Year-round (365 days) |



System Size¹

| | |
|----------------------------|-------------------------|
| Bikes: | 2,500 |
| Stations: | 244 |
| Docks: | 4,092 |
| Service Area: ² | 22.8 sq. mi. |
| Station Density: | 10.7 stations / sq. mi. |

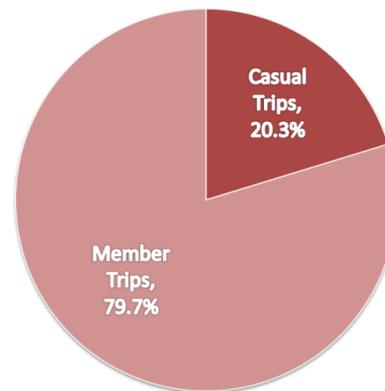


Demographics

| | |
|---|-----------------------|
| System Population: ³ | 1,999,147(2012) |
| Metro Area Population: ⁴ | 5,225,000 (2013) |
| Estimated Annual Tourists: ⁵ | 18,900,000 (2012) |
| Average System Population Density: | 3,366 people / sq. mi |

Membership and Ridership⁶

| | |
|--|------------------|
| Casual Subscriptions: | 256,451 |
| Annual Members: | 24,024 |
| Casual Subscriber Rides: | 530,709 |
| <u>Annual Member Rides:</u> | <u>2,086,393</u> |
| Total Rides: | 2,617,102 |
| Rides per annual membership: | 86.8 |
| Rides per casual subscription: | 2.1 |
| Population per bike: | 800 |
| Percent population with annual membership: | 1.2% |
| Casual subscriptions per station: | 1,051 |
| Tourists per casual subscription: | 74 |



Total 2.9 rides per bike per day



Bike Share Case Study
Full Year 2013

Washington, D.C. Area

Capital Funding Sources⁷

Initial System (1,100 Bikes, 110 Stations)

FHWA (D.C. portion) \$6.2 million

Revenue Model

Sponsorship, membership and usage fees are reinvested into the system through a collaborative agreement of the regional members. Jurisdictions pay a flat per-dock fee to operator in current agreement.

Membership Fees

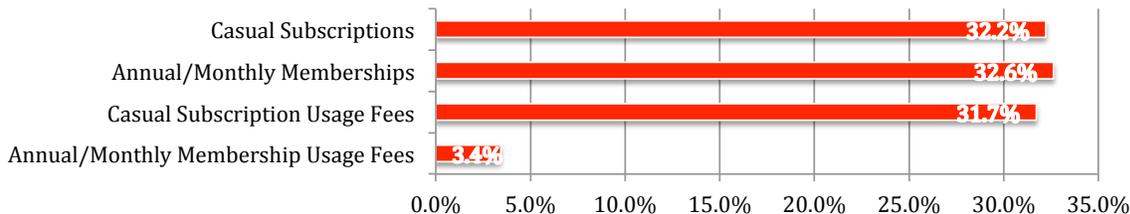
| | |
|---------------------------------------|------|
| Annual: | \$75 |
| Annual Corporate: | \$50 |
| Annual Monthly Payments: ⁸ | \$84 |
| Monthly: | \$25 |
| 72 Hours: | \$15 |
| 24 Hours: | \$7 |

Usage Fees

| |
|--|
| First 30 minutes free |
| Additional 30 minute increments: |
| - Annual: \$1.50 (2 nd half hour); \$3 (3 rd half hour); |
| \$6 (per additional half hour) (max \$70.50/day) |
| - Casual: \$2 (2 nd half hr); \$4 (3 rd half hr); \$8 (per additional half hour) |
| (max \$94/day) |

Breakdown of User-Generated Revenue⁹

Breakdown of User-Generated Revenue



Operating Costs¹⁰

| | |
|---------------------------------------|--------|
| Operating expense per dock per month: | \$114 |
| Operating expense per ride: | \$2.32 |
| Fare box recovery: ¹¹ | 98% |

¹ As of December 2013

² Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

³ 2012 US Census Estimates. State & County QuickFacts. Includes total population for the City of Alexandria, VA; Arlington County, VA; Washington, D.C.; and Montgomery County, MD

⁴ Metropolitan Washington Council of Governments. CLRP Long Range Transportation Plan

⁵ Destination DC

⁶ Accessed from CapitalBikeshare.com on January 30, 2014. Data is for 2013.

⁷ Capital Bikeshare website

⁸ Monthly installments of \$7

⁹ Capital Bikeshare Monthly Reports

¹⁰ Capital Bikeshare Monthly Reports

¹¹ Fare box recovery is the percentage of operating costs recovered from annual memberships, casual subscriptions, and usage fees.



Hubway

Bike Share Case Study

Full Year 2012

Boston, MA

Description

Hubway launched in 2011 in the City of Boston, growing as a regional system now serving the communities of Boston, Cambridge, Somerville, and Brookline by 2012. It has garnered multiple sources of funding, including FTA and CDC, many sponsorships, from title to station, and piloted a helmet vending machine solution.

System Characteristics

| | |
|----------------------|--|
| Equipment: | PBSC Urban Solutions (Bixi) |
| Equipment Type: | Solar/modular |
| Equipment Ownership: | Jurisdictional |
| Operator: | Alta Bicycle Share |
| Operations: | Seasonally March to November (Cambridge year round pilot starting 2014) |



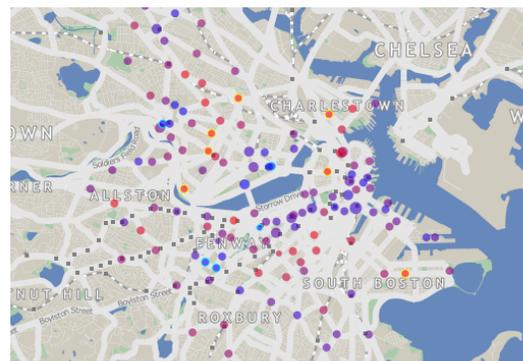
www.thehubway.com

System Size¹

| | |
|---------------------------------|--------------------------|
| Bikes (Total EOY Average): | 1,000 704 ² |
| Stations (Total EOY Average): | 104 79 |
| Docks (Average): | 1,407 |
| Service Area ³ : | 21.9 sq. mi. |
| Station Density: | 3.6 stations / sq. mi. |

Demographics

| | |
|--|-------------------------|
| System Population ⁴ : | 878,786 (2012) |
| Metro Area Population ⁵ : | 4,640,800 (2012) |
| Estimated Annual Tourists ⁶ : | 22,500,000 |
| Average System Population Density ⁷ : | 14,027 people / sq. mi. |



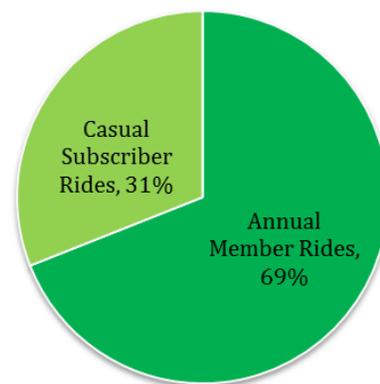
Membership and Ridership⁸

| | |
|-----------------------|--------|
| Casual Subscriptions: | 68,752 |
| Annual Members: | 7,048 |

| | |
|-----------------------------|----------------|
| Casual Subscriber Rides: | 168,498 |
| <u>Annual Member Rides:</u> | <u>365,257</u> |
| Total Rides: | 533,755 |

| | |
|--------------------------------|-----|
| Rides per annual membership: | 52 |
| Rides per casual subscription: | 2.5 |

| | |
|--|-------|
| Population per bike: | 1,248 |
| Percent population with annual membership: | 0.8% |
| Casual subscriptions per station: | 870 |
| Tourists per casual subscription: | 327 |



Total 3.0 rides per bike per day



Hubway

Bike Share Case Study

Full Year 2012

Boston, MA

Funding Sources⁹

Initial System (610 Bikes, 60 Stations)

| | | | |
|---------------|----------------------|-------------------------------|----------------------------------|
| Grants | \$4.5 million | Sponsorship | \$1.5 million |
| FTA | \$3 million | Title – New Balance | \$600,000 over 3 years |
| BPHC / CDC | \$450,000 | Station sponsorships– over 30 | \$50,000 each, paid over 3 years |
| CMAQ | \$250,000 | | |

Business Model

Jurisdictions fund capital and operations through different combinations of public funding, membership and usage fees, advertising and sponsorship, with profit sharing for each jurisdiction.

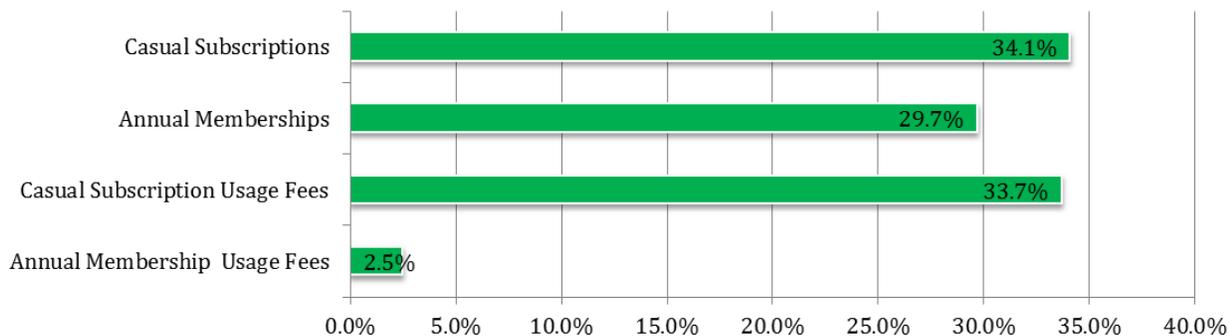
Membership Fees

| | |
|--------------------|------|
| Annual: | \$85 |
| Annual Corporate: | \$50 |
| Annual Discounted: | \$5 |
| Monthly: | \$20 |
| 72 Hours: | \$12 |
| 24 Hours: | \$6 |

Usage Fees

| |
|--|
| First 30 minutes free |
| Additional 30 minute increments: |
| - Annual: \$1.50 (2 nd half hour); \$3 (3 rd half hour); |
| \$6 (per additional half hour) (max \$75/day) |
| - Casual: \$2 (2 nd half hr); \$4 (3 rd half hr); \$8 (per additional half hour) |
| (max \$100/day) |

Breakdown of User-Generated Revenue



Operating Costs¹⁰

| | |
|---------------------------------------|----------|
| Operating expense per dock per month: | \$121.75 |
| Operating expense per ride: | \$2.87 |
| Farebox recovery ¹¹ : | 88.3% |

Equity Strategy¹²

\$5 subsidized annual memberships through Boston Public Health Commission. 600 sold through EOY 2012.

¹ Information based on data included in the Metropolitan Area Planning Council’s *Bicycle Share Operation Services* RFP issued in November 2013. It includes data from system launch up to September 2013. The data presented represents 2012.

² End-of-Year (EOY) represents the system inventory at the end of 2012; the Average is the weighted average of system inventory over the course of 2012.

³ Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

⁴ System population is calculated as the sum of the populations in Boston, Cambridge, Somerville, and Brookline. Population sources: United States Census Bureau, 2012.



Hubway

Bike Share Case Study

Full Year 2012

Boston, MA

⁵ Metro population area is the population of the Boston-Cambridge-Newton, MA-NH Metropolitan Statistical Area, United States Census Bureau, 2012.

⁶ Greater Boston Convention and Visitors Bureau. Statistics & Reports, 2012. Accessed January 2014:
<www.bostonusa.com/partner/press/statistics/>

⁷ Population density calculated from population and land area totals for Boston, Cambridge, Somerville, and Brookline. United States Census Bureau, 2012.

⁸ Membership data from the MAPC's *Bicycle Share Operation Services* RFP issued in November 2013, Appendix E. Ridership data from *Hubway by the Numbers*, 2012. Accessed online at www.hubway.com.

⁹ City of Boston Press Release: Mayor Menino Signs First-Ever Bike Share Contract Launching Hubway in Boston, 2011.
<http://www.cityofboston.gov/news/default.aspx?id=5075>

¹⁰ Contract between City of Boston and Alta Bicycle Share, April 2011, using Annual Cost Cap for Operating Costs.

¹¹ Fare box recovery is the percentage of operating costs recovered from annual memberships, casual subscriptions, and usage fees.

¹² Hubway Subsidized Membership Flyer <<http://www.thehubway.com/assets/pdf/flyers/pbhc-subsidized-membership-flyer.pdf>> and Inclusivity is a big hurdle for bike share programs, May 7, 2013 <<http://axisphilly.org/article/the-big-hurdle-for-bike-share-programs-inclusivity/>>



Citi Bike

Bike Share Case Study

Year End 2013

New York City, NY

Description

Citi Bike launched May 2013 in New York City in lower Manhattan and Brooklyn. Initial launch was delayed due to software problems and Hurricane Sandy. It is the largest system in the United States and is unique in that it is privately funded.

System Characteristics

| | |
|----------------------|--|
| Equipment: | PBSC Urban Solutions (Bixi) |
| Equipment Type: | Solar/modular |
| Equipment Ownership: | Private |
| Operator: | NYC Bicycle Share (subsidiary of Alta) |
| Operations: | 365 days, 24/7 |

System Size¹

| | |
|------------------|-------------------------------|
| Bikes: | 6,000 |
| Stations: | 330 |
| Docks: | 11,571 |
| Service Area: | 16.75 square miles |
| Station Density: | 19.7 stations per square mile |

Demographics

| | |
|--|-------------------------|
| System Population ² : | 4,218,300 (2013) |
| Metro Area Population ³ : | 19,831,900 (2012) |
| Estimated Annual Tourists ⁴ : | 52,700,000 |
| Population Density ⁵ : | 45,043 people / sq. mi. |

Membership and Ridership⁶

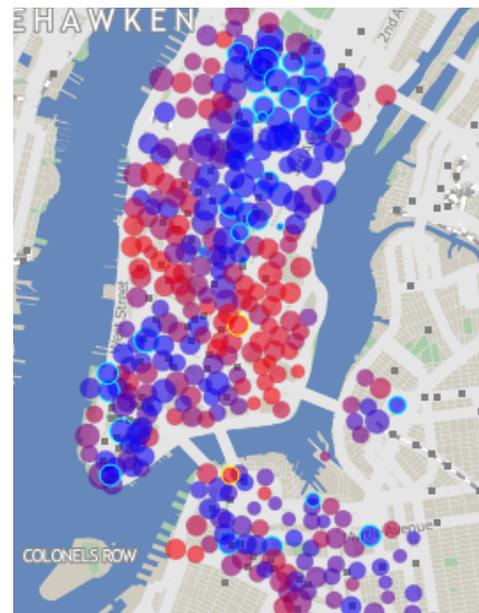
| | |
|--------------------------|-----------|
| Casual Subscriptions: | 354,326 |
| Annual Members: | 96,125 |
| Casual Subscriber Rides: | 734,665 |
| Annual Member Rides: | 5,387,542 |
| Total Rides: | 6,122,207 |

| | |
|--------------------------------|-----|
| Rides per annual membership: | 56 |
| Rides per casual subscription: | 2.1 |

| | |
|--|-------|
| Population per bike: | 703 |
| Percent population with annual membership: | 2.3% |
| Casual subscriptions per station: | 1,074 |
| Tourists per casual subscription: | 149 |



www.citibikenyc.com



Total 4.7 rides per bike per day



Citi Bike

Bike Share Case Study

Year End 2013

New York City, NY

Capital Funding Sources⁷

Initial System (6,000 Bikes, 330 Stations)

| | |
|----------------------------------|----------------|
| Citi Bank (over 5 years) | \$41 million |
| Master Card | \$6.5 million |
| Total Capital Costs ⁸ | \$47.5 million |

Business Model

Privately owned and operated. Capital costs paid for through financed sponsorship, operating costs covered through membership and usage fees with profit sharing for the City of New York and Citi Bike.

Membership Fees

| | |
|--------------------|--------|
| Annual: | \$95 |
| Annual Corporate: | N/A |
| Annual Discounted: | \$60 |
| Monthly: | N/A |
| Weekly: | \$25 |
| 72 Hours: | N/A |
| 24 Hours: | \$9.95 |

Usage Fees

| | |
|-----------------------|---|
| Annual Members: | First 45 minutes free; |
| Additional charges: | - \$2.50 (75 min); \$9 (105 min); \$9 (per additional 30 min) |
| Casual Subscriptions: | First 30 minutes free; |
| Additional charges: | - \$4 (1 hr); \$13 (1.5 hrs); \$12 (per additional 30 min) |

Operating Costs⁹

| | |
|---------------------------------------|-----|
| Operating expense per dock per month: | N/A |
| Operating expense per ride: | N/A |
| Fare box recovery ¹⁰ : | N/A |

Equity Strategy¹¹

All NYC Housing Authority residents and members of select New York Community Development Credit Unions receive a \$60 annual membership (\$35 off of full price). As of July 23, 2013, 285 NYCHA residents had registered.

¹ L. Gordon-Koven & N. Levenson, Citi Bike Takes New York, Rudin Center for Transportation Management and Policy, NYU Graduate School of Public Service, <http://wagner.nyu.edu/rudincenter/wp-content/uploads/2014/03/CitiBikeTakesNewYork.pdf>

² System population includes the populations of Manhattan and Brooklyn. United States Census Bureau, 2013. January 2014.

³ Metro area population based on the population of the New York – Newark – Bridgeport, NY-NJ-PA metropolitan area. United States Census Bureau, 2012. January, 2014.

⁴ NYC The Official Guide, Statistics Page, <http://www.nycgo.com/articles/nyc-statistics-page> 2012. January, 2014.

⁵ System population density is calculated as the sum of population divided by the sum of land areas for Manhattan and Brooklyn. United States Census Bureau, 2012. January, 2014.

⁶ Citi Bike, System Data, Year End 2013. <https://citibikenyc.com/system-data>

⁷ New York City Bike Share, NYC DOT, 2014. <http://a841-tfpweb.nyc.gov/bikeshare/faq/>

⁸ Sponsorship funding paid over 5 years, financed by a loan from Goldman Sachs.

⁹ Because it is a privately funded system, information on operating costs is not publicly available.

¹⁰ Fare box recovery is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees.

¹¹ Citi Bike Discounted Annual Memberships, <http://citibikenyc.com/pricing/discounted>. Citi Bike Signups Scarce Among Poor New Yorkers, Data Show, <http://www.dnainfo.com/new-york/20131022/lower-east-side/nycha-residents-make-up-less-than-05-percent-of-citi-bike-riders>, October 22, 2013.



Nice Ride

Bike Share Case Study
Year End 2012

Minneapolis, MN

Description

Nice Ride Minnesota launched in June 2010 in the City of Minneapolis and quickly expanded into Saint Paul, MN the following year. To date, there have been no reported thefts and two crashes.

System Characteristics

- Equipment: PBSC Urban Solutions (Bixi)
- Equipment Type: Solar/modular
- Equipment Ownership: Non-profit owned
- Operator: Nice Ride MN
- Operations: Seasonally April through October



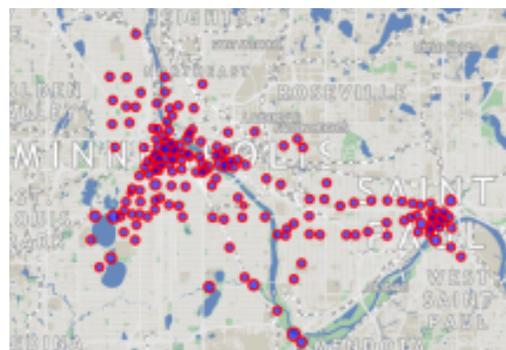
www.niceridemn.org

System Size¹

- Bikes: 1,328
- Stations: 146
- Docks: 2,656
- Service Area²: 34 sq. mi.
- Station Density: 4.3 stations / sq. mi.

Demographics

- System Population³: 683,650 (2012)
- Metro Area Population⁴: 3,422,264 (2010)
- Estimated Annual Tourists⁵: 17,900,000
- Average System Population Density⁶: 6,452 people / sq. mi.

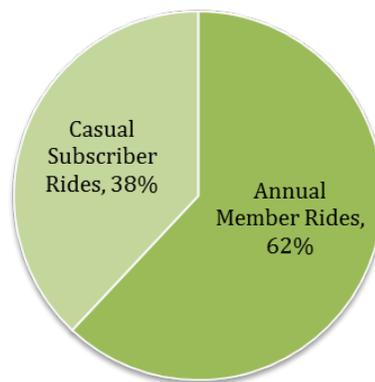


Membership and Ridership⁷

- Casual Subscriptions: 54,451
- Annual Members: 3,500
- Casual Subscriber Rides: 103,850
- Annual Member Rides: 170,197
- Total Rides: 274,047

- Rides per annual membership: 49
- Rides per casual subscription: 1.9

- Population per bike: 515
- Percent population with annual membership: 0.5%
- Casual subscriptions per station: 373
- Tourists per casual subscription: 329



0.8 rides per bike per day



Nice Ride

Bike Share Case Study

Year End 2012

Minneapolis, MN

Capital Funding Sources⁸

Initial System (700 Bikes, 65 stations)

| | |
|----------------------|-----------------------|
| Sponsorship | \$1,250,000 |
| Grants | \$1,750,000 |
| Other | \$141,000 |
| Total Capital | \$3.14 million |

Revenue Model

Non-Profit owned and managed with revenues generated from fundraising, sponsorship, membership and usage fees.

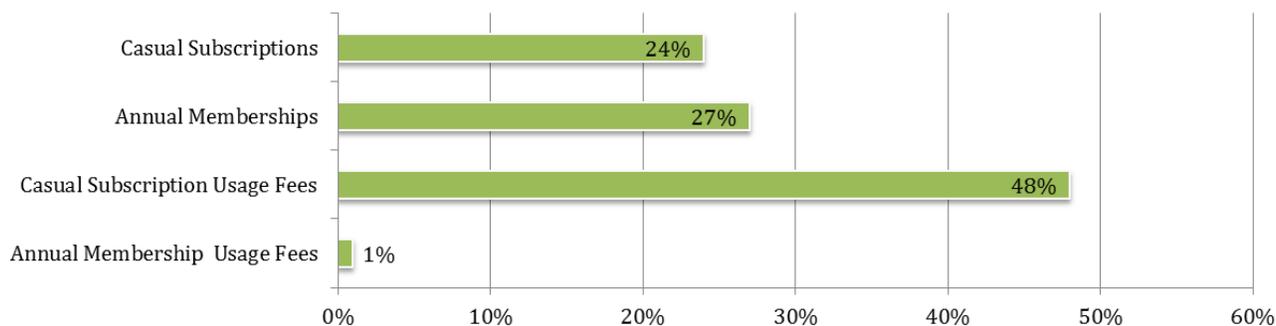
Membership Fees

| | |
|-----------------|------|
| Annual: | \$65 |
| Annual Student: | \$55 |
| 30 Day: | \$15 |
| 24 Hours: | \$6 |

Usage Fees

- Annual members:
 - First 60 minutes free
 - \$3 (60-90 mins); \$6 (per additional half hour) (max \$65/day)
- Casual members:
 - First 30 minutes free
 - \$1.50 (30-60 mins); \$3 (60-90 mins); \$6 (per additional half hour) (max \$65/day)

Breakdown of User-Generated Revenue



Operating Costs¹

| | |
|---------------------------------------|---------|
| Operating expense per dock per month: | \$35.59 |
| Operating expense per ride: | \$3.58 |
| Fare box recovery ⁹ : | 54% |

Equity Strategy

Target sponsored 600 free memberships for low-income residents. In addition, Nice Ride hired a staff person to sell discounted \$20 memberships. The outreach resulted in a few partnerships and events but almost no subscriptions.¹⁰

¹ Nice Ride Annual Report, 2012. Per dock per month cost calculated over 12 months, although system is not operational November through April.

² Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

³ System population includes the populations of Minneapolis and St. Paul. United States Census Bureau, 2012. January 2014.

⁴ Metro area population based on the population of the Minneapolis – St. Paul – Bloomington, MN-WI metropolitan area. United States Census Bureau, 2012. January, 2014.



Nice Ride

Bike Share Case Study

Year End 2012

Minneapolis, MN

⁵ Meet Minneapolis, http://www.minneapolis.org/sites/default/files/u7/pdfs/MediaKit_Meet.pdf

⁶ System population density is calculated as the sum of population divided by the sum of land areas for Minneapolis and St. Paul. United States Census Bureau, 2012. January, 2014.

⁷ Nice Ride Annual Report, 2012.

⁸ Nice Ride Annual Report, 2012.

⁹ Fare box recovery is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees.

¹⁰ Bringing Bike Share to a Low-Income Community: Lessons Learned Through Community Engagement, Minneapolis, Minnesota, 2011, http://www.cdc.gov/pcd/issues/2013/12_0274.htm.



COMPARISON OF CASE STUDIES TO HUDSON COUNTY

Table 4.1 below includes key statistics from the comparable cities. Statistics from the proposed system in Jersey City/Hoboken/Weehawken by Bike N Roll/nextbike, discussed in more detail below, are included as a comparison.

Table 4.1. System Comparison

| | Launched | Covered Population | Population Density (People / Sq. Mi.) | Estimated Annual Tourism (millions) | Population per Bike | Annual Subscription | Annual Members | Casual Members | Annual Members / Population |
|---|----------|----------------------------|---------------------------------------|-------------------------------------|---------------------|---------------------|------------------|----------------|-----------------------------|
| NYC (Part Year 2013) | 2013 | 4,128,000 | 45,043 | 52.7 | 703 | \$95 | 96,000 | 354,000 | 2.3% |
| Boston (2012) | 2011 | 879,000 | 14,027 | 22.5 | 1,249 | \$85 | 7,000 | 69,000 | 0.8% |
| Washington DC (2013) | 2010 | 2,000,000 | 3,366 | 18.9 | 800 | \$75 | 24,000 | 256,000 | 1.2% |
| Minneapolis (2012) | 2010 | 684,000 | 6,452 | 17.9 | 515 | \$65 | 3,500 | 54,000 | 0.5% |
| Average | | | | | 817 | | | | 1.2% |
| Hoboken Pilot | 2013 | 52,034 | 39,212 | | | \$15 / month | 182 live monthly | 443 | |
| Hudson County (BNR Proposal)⁷ | | 313,000⁸ | 29,070 | N/A | 391 | \$95 | 5,000 | 23,000 | 1.6% |

⁷ Figures are from the BNR proposal ("Bike the Skyline"); final contract/implementation figures may vary. Only exception is that the number of stations in the proposal was 45, but has been updated to 102 since the proposal.

⁸ Estimated population of Phase 1 system, as included in the BNR proposal.



Table 4.1. System Comparison (cont'd)

| | Bikes | Stations | Docks | Annual Members / Bike | Casual Members / Station | Rides / Casual Member | Rides / Annual Member | Trips / Bike / Day | Bikes / Station | Dock / Bike Ratio | Docks / Station | Stations / Sq. Mi. |
|---|------------|------------|--------|-----------------------|--------------------------|-----------------------|-----------------------|--------------------|-----------------|-------------------|-----------------|--------------------|
| NYC (Part Year 2013) | 6,000 | 330 | 11,571 | 16.0 | 1,073 | 2.1 | 56.0 | 4.7 | 18.2 | 1.9 | 35.1 | 19.7 |
| Boston (2012) | 704 | 79 | 1,407 | 9.9 | 873 | 2.5 | 52.0 | 3.0 | 8.9 | 2.0 | 17.8 | 3.6 |
| Washington DC (2013) | 2,500 | 244 | 4,092 | 9.6 | 1,049 | 2.1 | 86.8 | 2.9 | 10.2 | 1.6 | 16.8 | 10.7 |
| Minneapolis (2012) | 1,328 | 146 | 2,656 | 2.6 | 370 | 1.9 | 49.0 | 0.8 | 9.1 | 2.0 | 18.2 | 4.3 |
| Average | | | | 9.5 | 841 | 2.2 | 61.0 | 2.9 | 11.6 | 1.9 | 22.0 | 9.6 |
| Hoboken Pilot | 25 | 7 | | 7.3 | 63 | 6.2 | | 0.7 | 3.6 | | | |
| Hudson County (BNR Proposal) | 800 | 102 | | 6.3 | 288 | | | | 10.0 | | | 9.4 |



Following is a summary of the comparative metrics between Hudson County and the comparable systems. Minneapolis has been included in the average (as shown in Table 4.1), although its metrics on population and other demographics are clearly different than the other dense northeastern cities, because it has a different business and operating model (not-for-profit) that adds to the variety of systems studied. Therefore, the averages can be considered conservative:

- **Population:** The proposed Hudson County system has a smaller population coverage, but higher population density than most of the other systems. The Hudson County system area's population is noted as 29,070 people/sq. mile, which is much more dense than the population density of Boston's system area (14,027 people/sq.mile) and Washington's system area (3,366 people/sq. mile).
- **Population per Bike:** The average of the comparable systems is 817 persons per bike, whereas the BNR proposal indicates 391 persons per bike. This indicates that the Hudson County system is more saturated than any of the other comparable systems in terms of bike density.
- **Tourism:** No tourist statistics could be identified to compare with the other cities.
- **Annual Members:** Using the BNR annual member estimate of 5,000, the annual members/population ratio is similar to other cities, such as Boston, which has about 7,000 annual members. However, the annual members per bike is lower than other cities (at 6.3 members per bike compared to 9.5 in other cities). This ratio may be suppressed because of the higher bike saturation as indicated above. Nevertheless, the annual member estimate in the BNR proposal could be conservative.
- **Casual members:** The average of the other systems indicates 844 casual members per station, with the BNR proposal at 288. The BNR proposal could be conservative.



Some other data, not quantified in the table above, reflects transit usage and bike infrastructure. With about 39% of residents commuting via public transportation, transit usage is higher in Hudson County than in all the other cities, except for New York⁹. However, bicycle infrastructure in Hudson County is not as developed compared to any of the other cities.

In summary, population density and transit metrics imply that a system in Hudson County could be well adopted by the local population. However, unknown tourist metrics make it difficult to determine how well the system will be adopted by casual users. The lack of bicycle infrastructure could be a barrier to high utilization.

⁹ U.S. Census, American Community Survey five year estimate, 2011.



RIDERSHIP FORECAST

Data from the comparison cities were used to forecast ridership using a ridership model developed by Toole Design Group. The ridership model takes into account the many aspects of a bike share system that drive different types of usage. Key model assumptions include:

- Phase I with a population of 313,000 people, 102 stations and 800 bikes as per the updates of BNR proposal.
- The total built-out of the system includes 186 stations and 1,808 bikes. The expansion of the system in the identified second and third phases is based on the recommended system density that is described further in Chapter 5.

Timing of the phases is as follows:

- Phase I starts in spring of Year 1, with 102 stations and 800 bikes. The Phase I boundaries were roughly based on the BNR proposal, but also confirmed and modified somewhat based on the GIS analysis performed as part of this study, as described in Chapter 3.
- Phase II starts in spring of Year 3, with an additional 70 stations and 840 bikes. The number of stations is based on the identified service area of Phase II (see Figure 3.1) and the recommended station density of 10 stations per square mile (see Chapter 5).
- Phase III starts in the spring of Year 4, with an additional 14 stations and 168 bikes. The number of stations is based on the identified service area of Phase II (see Figure 3.1) and the recommended station density of 5 stations per square mile (see Chapter 5).
- Annual members per bike starting in year 1 at 9.5 (average of comparison cities) and growing at 4% per year thereafter (this growth rate has been selected on the basis of the average growth rate of the comparable cities and expert knowledge of the project team members).
- Annual member ridership of 61 rides per year (average of comparison cities).
- Casual membership of 841 casual members per station per year (average of comparison cities).
- Casual member ridership of 2.2 rides per casual membership (average of comparison cities)

As listed above, the model uses the number of bikes and stations, annual and casual members (based on comparable cities), and projected rides per membership (also based on comparable cities) to predict the annual ridership for the first 10 years of operations. The model outputs are shown in Table 4.2.



Table 4.2. Ten-Year Membership and Ridership Projection for Phase I of Proposed Hudson County Bike Share System

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
|-------------------------------------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Stations | 102 | 102 | 155 | 183 | 186 | 186 | 186 | 186 | 186 | 186 |
| Bikes | 800 | 800 | 1,430 | 1,766 | 1,808 | 1,808 | 1,808 | 1,808 | 1,808 | 1,808 |
| Membership And Ridership | | | | | | | | | | |
| Live Annual Members | 6,840 | 7,904 | 15,988 | 19,141 | 20,093 | 20,897 | 21,733 | 22,602 | 23,507 | 24,447 |
| Members Per Bike | 8.6 | 9.9 | 11.2 | 10.8 | 11.1 | 11.6 | 12.0 | 12.5 | 13.0 | 13.5 |
| Member Rides | 253,821 | 475,607 | 782,891 | 1,114,512 | 1,209,085 | 1,274,731 | 1,325,720 | 1,378,749 | 1,433,899 | 1,491,255 |
| Casual Rides | 169,848 | 188,720 | 305,283 | 341,547 | 344,137 | 352,741 | 361,559 | 370,598 | 379,863 | 389,360 |
| Total Rides | 423,669 | 664,328 | 1,088,174 | 1,456,059 | 1,553,222 | 1,627,472 | 1,687,279 | 1,749,347 | 1,813,762 | 1,880,615 |
| Casual Members | 77,204 | 85,782 | 138,765 | 155,249 | 156,426 | 161,119 | 165,952 | 170,931 | 176,059 | 181,341 |
| Trips / Bike / Day | 2.1 | 2.5 | 2.3 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 3.1 | 3.2 |
| % Rides Casual | 40.1% | 28.4% | 28.1% | 23.5% | 22.2% | 21.7% | 21.4% | 21.2% | 20.9% | 20.7% |
| % Rides Annual | 59.9% | 71.6% | 71.9% | 76.5% | 77.8% | 78.3% | 78.6% | 78.8% | 79.1% | 79.3% |
| % Population With Annual Membership | 2.2% | 2.5% | 3.6% | 4.3% | 4.5% | 4.7% | 4.9% | 5.1% | 5.3% | 5.5% |



These forecasts show that the proposed system could achieve almost one million rides after two years, and then one million rides per year in the third year growing to almost 1.8 million rides per year in later years. Early on, each bike is ridden approximately two times per day. Later, each bike gets ridden approximately three times per day, similar to Boston and Washington DC. In the early years, the model predicts that approximately 2.2% of the system population has an annual membership, increasing to over 5% in the later years.

As shown above, the model relies on many assumptions. Table 4.3 includes a sensitivity test for Year 2 ridership (first full year of operations after Phase I is built) with a range of assumptions of annual members per bike and casual members per station per year.

Table 4.3. Sensitivity Test for Year 2 Ridership Varying Annual and Casual Membership Rates

| | | Casual Members Per Station in Year 1 | | |
|-----------------------------------|------|--------------------------------------|---------|---------|
| | | 400 | 800 | 1200 |
| Annual Members Per Bike in Year 1 | 4.0 | 290,016 | 379,776 | 469,536 |
| | 8.0 | 490,271 | 580,031 | 669,791 |
| | 12.0 | 690,527 | 780,287 | 870,047 |

The sensitivity analysis shows a wide range of potential ridership with the low-end similar to the Minneapolis system, of 290,000 rides per year, and the high end similar to the New York system, of 870,000 rides per year. The ridership for the Hudson County system will depend on the operator's ability to penetrate both the local and the visitor markets.



EQUITY STRATEGIES

A major topic of discussion at the first TAC meeting was creating a system for Hudson County that provides access to a wide cross section of the community. Bike sharing represents a great opportunity for an affordable transportation option for lower income and minority communities that historically have been marked by low automobile ownership rates and high transit dependency. While bike share systems have typically launched in high demand and revenue generating areas of existing cities, geographic and social equity have become important considerations. The following section identifies strategies for achieving social and geographic equity of a bike share program in Hudson County.

Barriers to Success in Bike Share in Low Income Communities

The uptake of bike share in both minority and low-income communities has not been significant to date. Bike share programs continue to face challenges reaching these populations, despite a number of innovative approaches. There are several reasons for this:

Location of Bike Share Infrastructure: In most systems in the U.S., bike share stations have been located in high demand and revenue generating locations such as downtown and in more affluent neighborhoods. Low-income neighborhoods, typically located on the outskirts of the system, have only experienced the installation of very few and sparsely situated stations. The stations tend to be located far away from other stations and in areas that do not include good bike infrastructure. Therefore, potential trips from these stations do not have convenient origins or destinations and the trip is not necessarily a pleasant one. It will be important for Hudson County to strongly consider how the planning of the system will affect the location and density of stations in low income and minority communities.

Digital Divide: To date, much of the marketing for bike share programs is done online due to limited marketing budgets. This represents a challenge for the jurisdictions that find it difficult to reach communities that are not regularly online.



System Access and Verification: Third generation bike share is possible because of the accountability created by the credit card system. However, many people in lower-income communities do not possess credit cards. Potential strategies for access depend on the nextbike system and its technological capabilities, as well as local partner organizations' willingness to take on financial risk. This is discussed in more detail below.

Cultural Issues: Bike share is becoming the mark for sustainable, technology-inspired cities, and is now familiar to well-traveled middle- to upper-class communities. There continue to be many communities within bike share cities that have not yet adopted bicycling as part of their everyday lives, do not know what bike share is, or do not understand it. In many low-income communities, cars are seen as a sign of success, and bicycles may be viewed as signs of poverty. Education and outreach campaigns should be considered to help overcome this obstacle.

Cost Barrier to Entry and Communication: Most bike share systems have an annual one-time fee paid at the beginning of the year. Although it is an extremely affordable way to get around the city, the one-time fee can represent the largest barrier to using the system for a low-income person. Hudson County should therefore focus on offering alternative payment plans such as a monthly payment option that amortizes the cost of an annual membership into easy access lower monthly payments.

Financial Sustainability and Incentives: The financial incentives for the operator have traditionally not been focused on reaching out to low-income or minority communities. Because they typically have access only to low budgets or must be financially self-sustaining (as the proposed Jersey City, Hoboken and Weehawken system is), they tend to focus their outreach resources on early-adopter, downtown and tourist markets that must generate enough revenue to cover the costs of implementation and operation. Outreach programs to low-income and minority communities have typically been high demand and high resource consuming programs which can take a big toll in the total marketing expenditures. The County should consider how the proper alignment of equity goals with the incentives offered to a potential operator could help with the marketing and promotion of the system throughout these communities.



Examples from Other Cities

The case study cities include a number of equity strategies; these include:

Discounted Memberships: Many cities offer some sort of discount for low-income populations. They may be subsidized (in Boston, by the Centers for Disease Control, and as low as \$5), or not subsidized. Residents of the New York City Housing Authority and various Community Development Credit Unions receive approximately 30% off, or \$65 memberships.

Station Locations: Many cities have located stations targeted in low-income neighborhoods. Typically, these stations have not seen impressive ridership due to lack of nearby stations, lack of bicycle infrastructure, lack of targeted marketing and other unknown reasons.

Access for Residents Without Credit Cards: Credit cards (or debit cards with a credit card symbol) are required by bike share systems to become members and check out a bicycle. These cards create the fundamental accountability that makes bike share possible. However, a few bikeshare systems have now eliminated the credit card requirement to increase system access by low-income communities, such as Nice Ride Minnesota, Kansas City B-cycle, Capital Bikeshare (DC), and Spartanburg B-cycle (South Carolina). Customers of Nice Ride Minnesota and Kansas City B-cycle use different kinds of prepaid cards to access the bike share system. The Bank on DC / Capital Bikeshare partnership gets unbanked people into the banking system, and then offers them a credit / debit card and a discounted bike share membership¹⁰. Capital Bikeshare allows residents of Arlington County to pay for annual memberships in cash¹¹. In South Carolina, Spartanburg B-cycle is developing a program to allow access to the system without a credit or debit card¹⁰.

¹⁰ Shaheen, S. A., Martin, E. W., Chan, N. D., Cohen, A. P., & Pogodzinski, M. (2014). Public Bikesharing In North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends and User Impacts. San Jose: Mineta Transportation Institute.

¹¹ <http://newsroom.arlingtonva.us/release/capital-bikeshare-annual-cash-membership-now-available-for-arlington-residents/>



Recommendations for Hudson County

To achieve the goal of an equitable bike share system for the Hudson County, some existing strategies should be employed, and some new ones implemented.

System Area And Station Locations: As described in Chapter 3, the recommended system area was determined through a process that included equity measures. In addition, recommended station locations (shown in Figure 5.1 and described in Chapter 4 in detail below), were determined in part based on the locations of public/subsidized housing. Because there is no public investment being provided for the BNR system, it is important that the cities ensure that this goal is being met during system planning.

Discounted Memberships: Hudson County should work with the system operator to offer a certain number of discounted memberships for the system. Such a program was included in BNR's proposal. The County should be aware, though, that too many low-priced memberships can be detrimental to a privately owned system, as there will not be enough revenue to support operations. Therefore, the County may need to consider subsidizing such memberships for a robust program.

Credit Card Access: The issue of credit card access is limited or enabled by the background technology. For example, some bike share systems technically require a credit card to create an account. Others require it by policy only. The County must work with nextbike to understand whether an account can be created in the system without a credit card. If this is possible, then partner organizations and a small amount of funding can be set up to allow access to people without credit cards with proper identification verification and escrow funding for financial accountability. There have been no projects with such a setup to date, but Philadelphia's project may include such characteristics.

Pricing: Most systems include an annual membership fee of \$50 to \$100 to be paid once a year. This cost can be a significant barrier to entry to lower-income populations. It is recommended that Hudson County consider strategies to lower this barrier to entry by introducing pricing structures such as annual membership paid in monthly installments, similar to a cell phone plan, and a pay-per-ride option of \$1 to \$3 per ride.



Marketing and Outreach: Although many systems have made some efforts towards creating an equitable system, few have earmarked specific funding for significant marketing and outreach for low-income communities. Non-digital marketing can be more expensive than the typical online approach using websites, earned media and social media. A key aspect of successful marketing and outreach is budget dedicated funding for this effort. Marketing materials also must be produced in languages spoken in the service area communities, which may not be English. In addition, two other important characteristics are as follows:

Local Champions: It will be important to the success of the outreach strategy to identify individuals within targeted communities to champion bike share and spread the word using various communications strategies, media, events and venues available in their communities. These trusted advocates could be political figures, community organizers, or even committed individuals with a proven means to influence their local communities. They can also advise the operator on the best messaging and means to communicate to their communities.

Community Organizations: Experience from existing programs has found that it is not difficult to find community organizations that want to partner with bike share systems. However, there should be a limited number of important and effective partners that are brought on early in the system establishment to maximize the impact of the partnership.



Dedicated Funding: It is important that Hudson County and the municipalities interested in bike share identify separate and dedicated funding to achieve the equity goal. Most systems around the country have not procured specific funding for outreach and low-cost memberships. This lack of funding has likely suppressed success of these programs. It is recommended that even with the privately funded BNR/nextbike system, the County fund these programs separately if a truly equitable system is desired.

Finally, it is recommended that Hudson County follow updates on equity programs around the country. It is anticipated that several cities in the next few years, most notably Philadelphia, will be dedicating significant funding to many of the above-recommended strategies to increase equity in bike share systems.



BIKE SHARE STATION DENSITY AND SITING

Bike Share Station Density

Bike Share Station Siting

Review Of BNR Station Density And Placement



BIKE SHARE STATION DENSITY

The recommended station density for Phases II and III of the Hudson County bike share system (see Figure 3.1 for system area) is 10 stations per square mile and five stations per square mile, respectively. The recommended station density for Phase III is lower than for Phase II, as this area was projected to have a lower bike share demand than Phase II, as described in Chapter 3. (While a station density recommendation is not provided here for Phase I, as station density for this area will be determined by planners of the BNR system, a review of the proposed BNR station density and placement is provided below.)

Bike share station density is determined based on the following factors:

- Bike share demand (as described in Chapter 3)
- Available funding; systems with greater financial resources can support a greater density than those with more limited resources
- The need to ensure that stations are sufficiently dense in order to (a) be reasonably convenient to a user's likely origin and destination and (b) minimize the distance to the next closest station if a user finds a station to be empty or full

According to common literature, stations should generally be placed at a density that would result in, at most, a 10-minute walk to a station for users originating within the bike share system area, and the station densities recommended here largely conform to this. (Transportation planners, as a rule, consider 10 minutes to be the maximum most users of public transportation are willing to walk to a transit origin point, such as a bus stop, rail station, or, in this case, a bike share station.)

With 29,770 persons per square mile¹² in the combined Phase I, II, and III system area, the population density is comparable to many jurisdictions that have 20 to 35 bike share stations per square mile. This level of station density is considered ideal by many bike share system planners in order to maximize market penetration and bicycle use. However, such systems are typically publically subsidized in order to support the higher density. Thus the recommendation of five to 10 stations per square mile (Phase III and II respectively) is based on a privately funded model, such as the planned BNR system, with stations still sufficiently dense to support a viable system.

¹²U.S. Census, American Community Survey five year estimate, 2011.



BIKE SHARE STATION SITING

Based on the density model described above, bike share stations were sited for the Phase II and III system area, as shown in Figure 30 below. (Phase I siting is contained in the BNR proposal.)

Stations were sited based on the locations of the following origins and destinations, with gaps filled in as needed. These origins and destinations are displayed above in Chapter 3, with the corresponding figure number indicated below.

- Colleges and universities (Figure 3.6)
- Tourist destinations (Figure 3.7)
- Hotels (Figure 3.8)
- Rail stations and bus routes (Figure 3.9)
- Retail corridors (Figure 3.10)
- Parks and open space (Figure 3.11)
- Public/subsidized housing (Figure 3.13)

In addition, stations were placed based on suggestions provided via the project website and the February 4, 2014, public meeting, each of which was incorporated into the online WikiMap (Figure 2.2).

Stations were placed without consideration of existing and potential bike routes because in Phase II and III, these routes are only found in Jersey City, where their development is ongoing and subject to change.

To serve residents west of West Side Avenue in Jersey City, stations were located on the western edge of Phase II.

Figure 5.1 includes 84 bike share stations, with 65 in Phase II and nine and 10 located in the northern and southern portions of Phase III respectively.



Figure 5.1. Recommended Bike Share Locations, Phases II and III



Source: Sam Schwartz Engineering and Toole Design Group, 2014



REVIEW OF BNR STATION DENSITY AND PLACEMENT

As described previously, during the course of this study, the cities of Jersey City, Hoboken, and Weehawken issued a RFP to implement and operate a bike share system for these three urban municipalities. The RFP defined 4.8-square-mile system area including Hoboken, Weehawken, and an area of Jersey City extending south from Hoboken to the north side of Liberty State Park and generally west to Journal Square. The selected BNR proposal indicates that 45 stations would be located within the system area, resulting in a station density of 9.4 stations per square mile. This density is consistent with that recommended above for Phases II and III. However, station density as proposed is not consistent across the RFP system area, and stations are generally limited to the area within ½-mile of the Hudson River waterfront. In addition, the three stations proposed for Jersey City west of Interstate 78 may be of limited value given their considerable distance from other stations. (Recommended service area boundaries are described in Chapter 3. Phase I boundaries are roughly based on the BNR proposal, but also were modified somewhat based on the GIS analysis performed as part of this study,)

Based on the goals and objectives developed in consultation with public and the TAC (as described in Chapter 2), it is recommended that there be a more uniform distribution of stations across the RFP service area and less concentration on the waterfront.

However, as noted previously, at the time of this study, the number of BNR-proposed stations was also revised from 45 to 102, with station placement and potential revisions to the RFP's system area unknown. Thus there is insufficient information to further evaluate the proposed station placement and density.



CONCLUSION: REGIONAL CONNECTIONS, IMPLEMENTATION, AND NEXT STEPS

Promoting Regional Equity

Improving Access To Opportunities

Addressing Regional Issues In Coordinated Way

Supporting Multiple RPSD Planning Topics



This study is a part of Together North Jersey’s Regional Plan for Sustainable Development (RPSD). The study strongly supports RPSD’s central idea of promoting regional equity in the 13 counties of northern New Jersey. It also supports the planning goals of improving access to opportunities (housing, jobs, educational, cultural and recreational facilities) and addressing regional issues in a coordinated way. The recommendations generated through this study are most associated with the RPSD topics of Transportation, Energy and Climate, Asset-Based Infrastructure Development, Health and Safety, and Business Environment and Entrepreneurial Support.



PROMOTING REGIONAL EQUITY

Serving and engaging users of all communities, including minority and low-income communities, has been identified as an important objective of any bike share system established in Hudson County. A bike share system can provide an affordable transportation option to lower income and minority communities, historically marked by lower automobile ownership rates and higher rates of transit dependency. A bike share system in the county should be not only financially affordable but also geographically accessible to the under privileged. The development of this objective was inspired by discussions during the beginning of the stakeholder outreach efforts. It also mirrors the fact that geographic and social equity has increasingly become an important consideration for implementation and operation of bike share systems in the U.S.

After reviewing barriers to success and examples from other cities, the following equity strategies are recommended for a Hudson County bike share system (refer to equity strategies discussion in Chapter 4 for additional details):

- **System Area and Station Locations:** Equity must be taken into account when identifying bike share system area and station locations—as is done in this study—through metrics such as the location of public/subsidized housing, median household income, and carless households.
- **Discounted Memberships:** Work with the system operator to offer a certain number of discounted memberships for the system.
- **Credit card access:** To the extent that the technology allows it, create programs for those without credit cards (mostly people of lower income and minority communities) to access the system.
- **Pricing:** Lower the barrier to entry by introducing low-cost pricing structures such as:
 - Annual membership paid in monthly installments, similar to a cell phone plan
 - Pay-per-ride option of \$1-3 per ride
- **Marketing and outreach:** Dedicate marketing and outreach efforts to low-income markets and include local champions and community organizations. Identify funding sources for this purpose, such as funds through the Centers for Disease Control or other public health focused sources.
- **Dedicated funding:** Identify separate and dedicated funding to achieve the equity goal.



It is also recommended that Hudson County follow updates on equity programs around the country. It is anticipated that several cities, most notably Philadelphia, will be dedicating significant funding for many of the above-recommended strategies in the next few years to increase equity in bike share systems.

Notably, specific efforts were undertaken throughout the study process to include, engage, and consider traditionally under-represented communities and data about these communities:

- Distribution of Spanish-language invitations to the public meeting, translation of the public presentation into Spanish (available at the meeting and online), and availability of a Spanish translator at the meeting
- Focused discussion of equity issues at TAC meetings and via online input, leading to specific equity-related goals, objectives, and performance measures and inclusion of equity-related bike share demand metrics to determine the recommended bike share system area
- Expansion of the initial Phase II system area to include a larger area of traditionally under-represented communities, based on public feedback



IMPROVING ACCESS TO OPPORTUNITIES

The study identified a goal to “increase accessibility to jobs, recreation and other locations” and an objective to “provide station locations not only in downtown CBD areas but also in neighboring residential areas; eventually expand the geographic coverage across Hudson County.” The goal and objective reflect the view that it is indeed possible to further promote and improve access to opportunities through a bike share system in Hudson County. The TAC and general public especially supported use of bike share system to improve access to transit stations. Hudson County has an extensive public transit network, and improving access to public transit stations will improve people’s access to other opportunities such as jobs, educational, cultural, and recreational facilities.

The study also promotes improved access to opportunities by strategically selecting the geographic boundaries of the service area and station locations for the bike share program. The service area has been demarcated on the basis of the density of opportunities—such as the density of residences, businesses, and tourist locations—located within the county. The bike share station locations were also suggested considering the location of opportunities. For instance, every rail and ferry stop within the service area has a bike share station. One bike share station has been located near to each major educational institution within the county, such as New Jersey City University , Hudson County Community College, and Saint Peter’s University. Bike share stations have also been suggested near parks and open spaces such as Liberty State Park, Lincoln Park, Bayonne Park, and Washington Park.



ADDRESSING REGIONAL ISSUES IN COORDINATED WAY

Following the planning process of Together North Jersey, the goals, objectives, performance measures, service area, station locations, and recommendations of this study were determined with the help of stakeholders from different levels of the government, non-governmental organizations, and the general public. The stakeholders were primarily engaged through the TAC, and the opinion of the general public was gathered through the online survey, WikiMap, and public meeting. The outcomes of this study were significantly improved due to these opinions and feedback.

The study recommends formation of a Hudson County Bike Share Task Force for successful implementation of a bike sharing in the county. The task force would be a modified version of the existing TAC and should include Hudson County, NJTPA, Hudson TMA, the counties' municipalities, and the New Jersey Department of Transportation (NJDOT) (such as via the NJDOT Bicycle and Pedestrian Resource Center). The task force should work closely with the BNR team on the planning and implementation of Phase I of the bike share system and also guide the expansion of bike share in the county, post-Phase I.

The task force should work with the cities to help ensure that the bike share system best meets the identified goals and objectives for a system in Hudson County, as described in this report and determined in consultation with the TAC and the public. The task force should also help ensure that the performance measures proposed in this report are used by the three urban municipalities to evaluate success of the BNR system.



SUPPORTING MULTIPLE RPSD PLANNING TOPICS

The recommendations are primarily associated with the Transportation and Energy and Climate topics of the RPSD and, to a lesser extent, the Health and Safety, Asset-Based Infrastructure Development and Business Environment and Entrepreneurial Support topics. Table 6.1 provides a listing of the recommendations by RPSD topics:

Table 6.1. Recommendations and RPSD Topics

| Recommendation | RPSD Topic |
|---|---|
| The Hudson County Division of Planning should take the lead on forming a Hudson County Bike Share Task Force to advance bike sharing in the county. | <ul style="list-style-type: none"> • Transportation • Energy and Climate • Health and Safety |
| The task force should ensure that the Hudson County bike share system best meets the identified goals and objectives for a system in Hudson County, as described in this report and determined in consultation with the TAC and the public. | <ul style="list-style-type: none"> • Transportation • Business Environment and Entrepreneurial Support |
| The task force will help ensure that the performance measures proposed in this report are used by the three urban municipalities to evaluate success of the BNR system. | <ul style="list-style-type: none"> • Transportation • Business Environment and Entrepreneurial Support |
| The task force should encourage and support the municipalities as well as identify potential public-private partnerships to implement equity strategies to support low/no-cost bike share memberships. | <ul style="list-style-type: none"> • Health and Safety |
| The task force should encourage the adoption of Complete Streets policies by the county's municipalities, create a county-wide bicycle master plan, and install robust bikeways designed to attract a diverse range of potential bicyclists and bike share users. | <ul style="list-style-type: none"> • Transportation • Asset-Based Infrastructure Development • Energy and Climate • Health and Safety |

The methodologies, findings, and recommendations of this study are applicable throughout northern New Jersey region and are particularly suited to the multi-jurisdictional planning environment in urban and suburban settings. The results of the survey can be used to understand characteristics and preferences of potential users of a bike share system in New Jersey. The ridership and membership forecasts can also be used by other jurisdictions to plan a successful system.



APPENDIX 1. SURVEY RESPONSES





This appendix provides a summary of the 65 responses received from the online survey. It should be noted that there are some limitations to this survey. It is a small sample size, and many of the respondents are self-selecting individuals who either strongly support or oppose bike share and may be more inclined to complete the survey – rather than a randomly chosen sample. The results of the survey should not be considered a statistically valid sample.



DEMOGRAPHIC AND EMPLOYMENT INFORMATION

Survey participants were asked to provide demographic and employment information as a part of the survey. Respondents were of an average age of 39 years, mostly white, employed, resided in a household that earned an income over \$60,000 annually, and represented both males and females. Specific demographic information is shown below (see Figures A1.1 through A1.6).

Figure A1.1. Age of Survey Participants

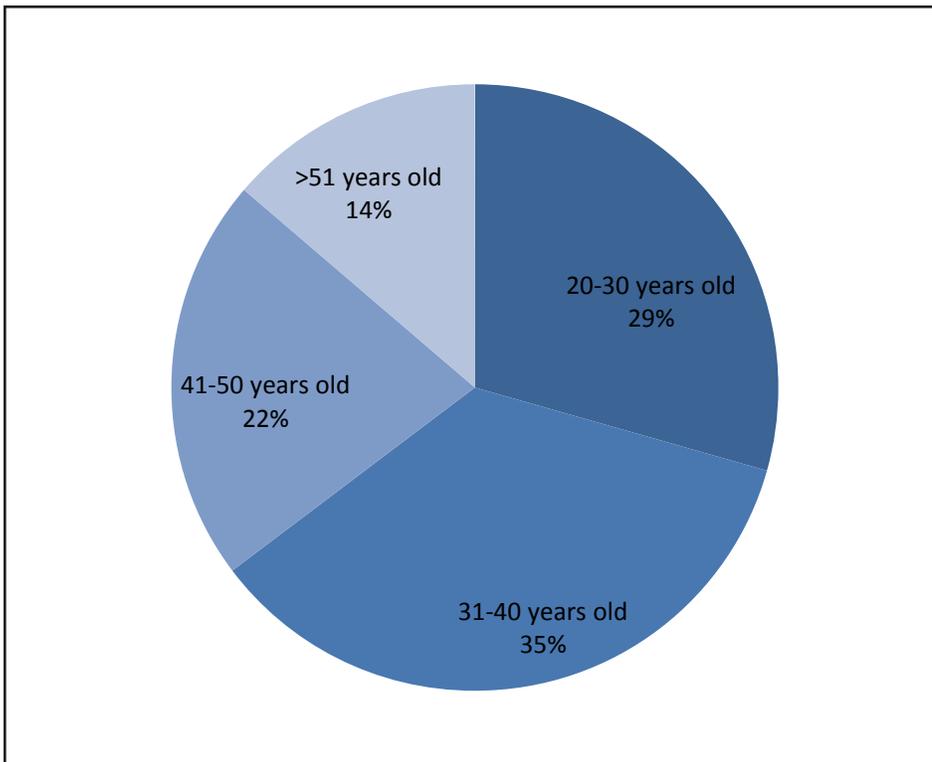




Figure A1.2. Gender of Survey Participants

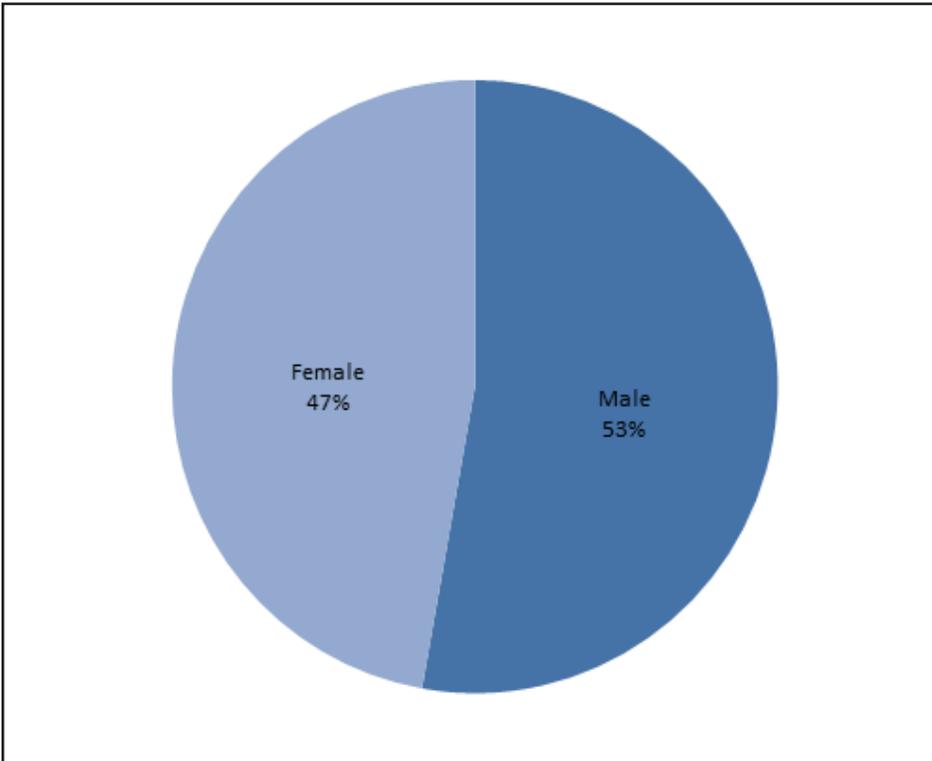


Figure A1.3. Ethnicity of Survey Participants

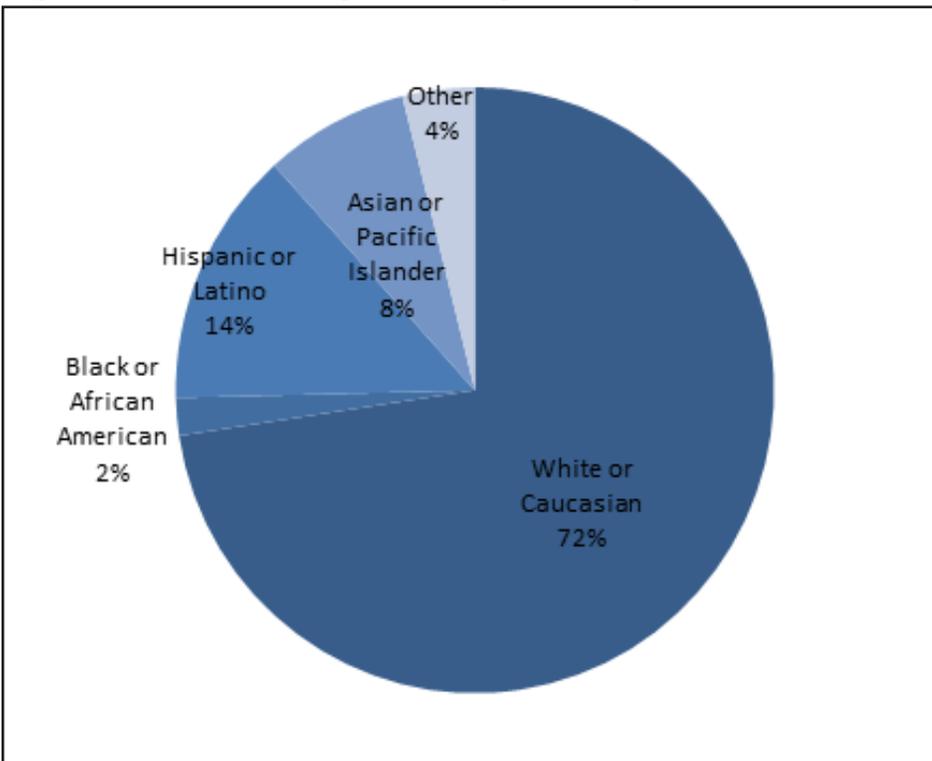




Figure A1.4. Annual Household Income of Survey Participants

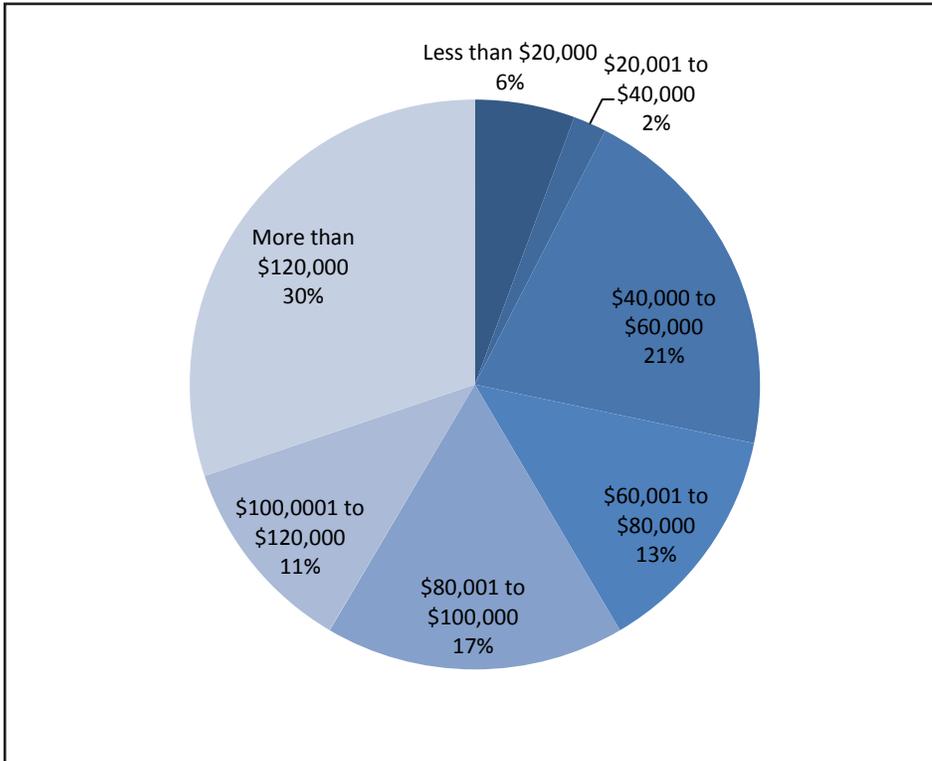


Figure A1.5. Employment Status of Survey Participants

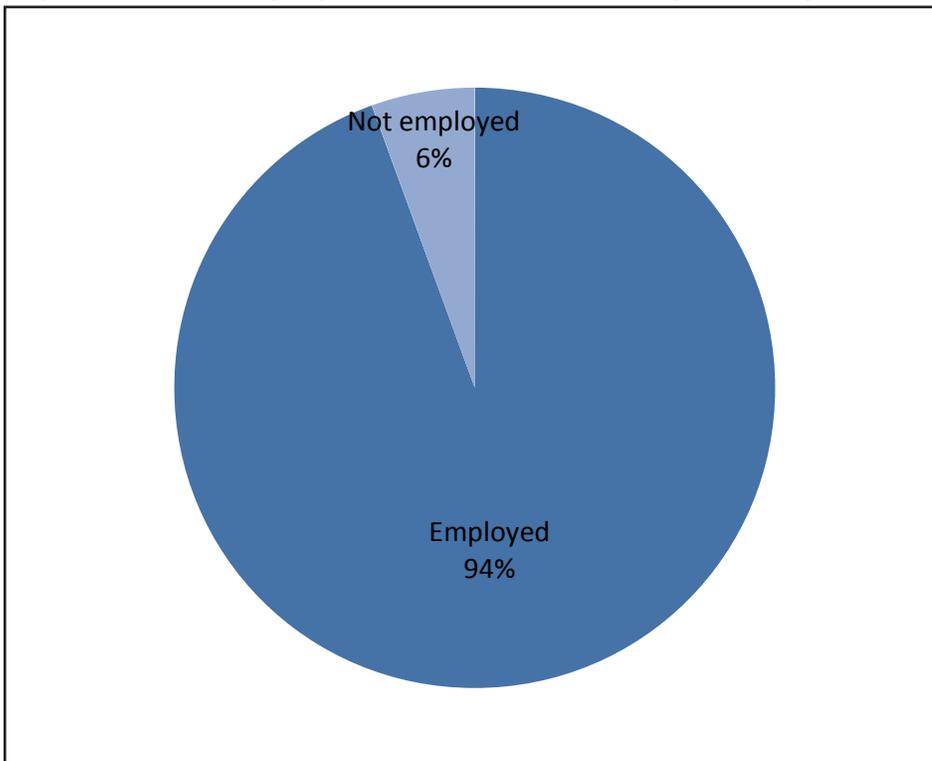
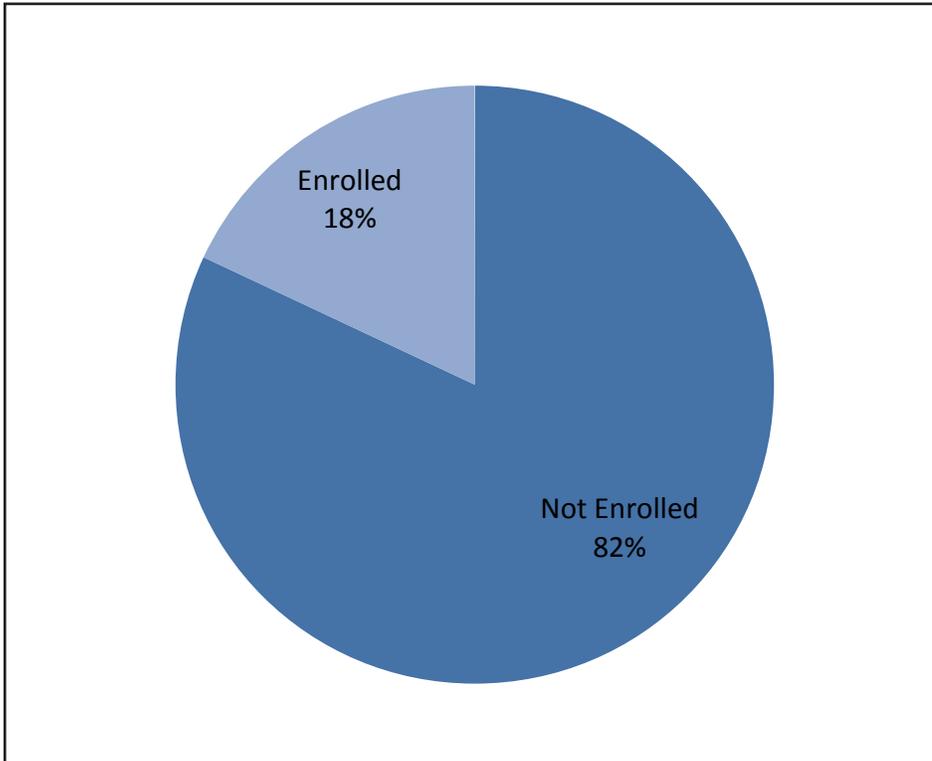




Figure A1.6. College Enrollment Status of Survey Participants



The survey also asked respondents to provide the ZIP code of their current residence, place of employment, and school (if currently enrolled). The majority of respondents (65%) live in Jersey City, with 15% in Hoboken and the remainder either in other Hudson County towns or outside the county.



Based on the results of the survey, Table A1.1 compares the demographics of respondents with Hudson County's population. This shows that survey respondents tended to over-represent white and higher income populations.

Table A1.1. Comparison of Survey Respondent and County Demographics

| Demographic | Survey Respondents | County Population ¹³ | Representation |
|----------------------------------|--------------------|---------------------------------|--|
| Age (median) | 39 | 43 | Survey approximately represented county age |
| Gender (% female) | 47% | 50% | Survey approximately represented female population |
| Ethnicity (% white) | 88% | 66% | Survey over-represented white populations |
| Annual Household Income (median) | \$80,000 | \$32,500 | Survey over-represented higher income households |
| College Enrollment (% enrolled) | 19% | 8% | Survey over-represented county college enrollment |

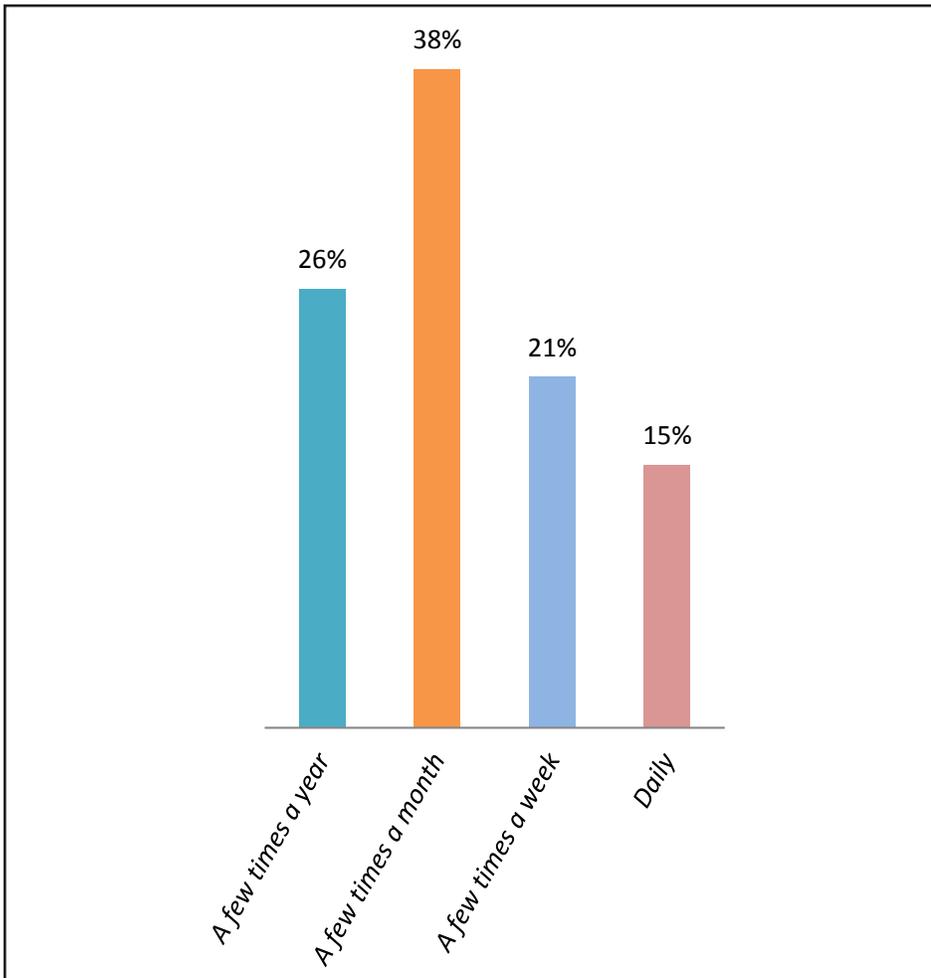
¹³ U.S. Census Bureau, "State & County QuickFacts," U.S. Department of Commerce, 2012. <http://quickfacts.census.gov/qfd/states/#>, April 2014.



CURRENT BICYCLE USAGE

Generally, survey respondents represented active cyclists. The majority (65%) of respondents reported having access to a working bicycle, with 36% indicating that they bicycle daily or multiple times per week (see Figure A1.7). Approximately 31% of respondents are year-round bicyclists who are willing to ride regardless of weather conditions.

Figure A1.7. Bicycling Frequency

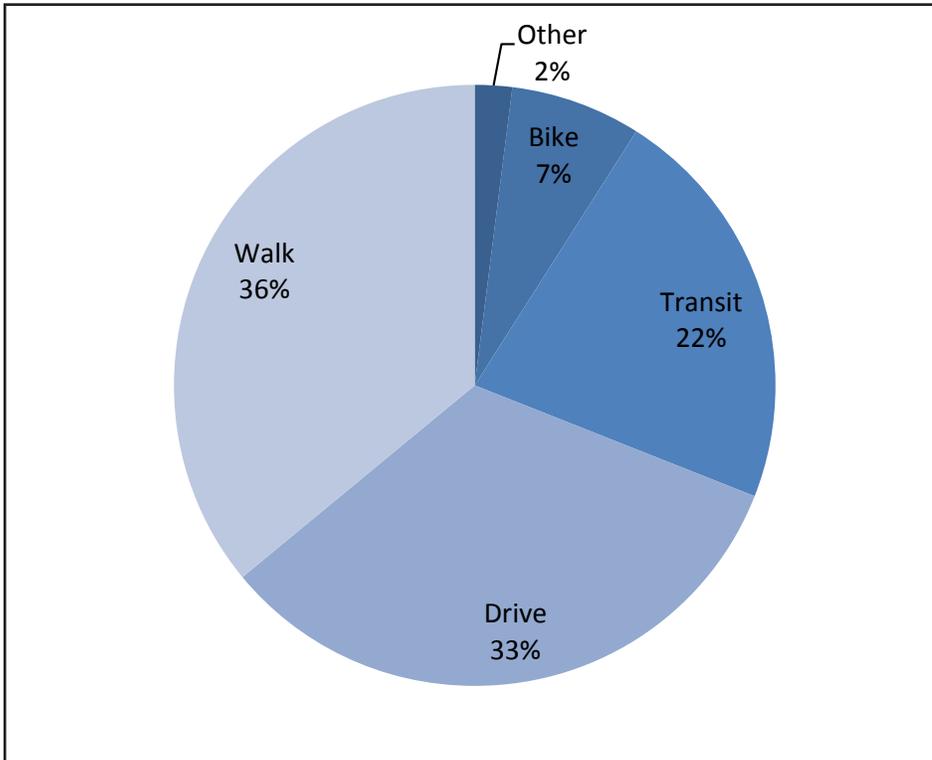


Just under two-thirds of respondents (64%) indicated that they had previously used a bike share system.



The survey also asked respondents their primary mode of transportation for destinations in Hudson County (see Figure A1.8); 36% indicated that they primarily walk, followed by 33% indicating that they primarily drive.

Figure A1.8. Primary Transportation Mode





OPINIONS ON BIKE SHARING AND ITS FEASIBILITY IN HUDSON COUNTY

A significant majority of survey respondents (93%) were of the opinion that a bike share system is a good idea for Hudson County, and approximately 7% did not think a bike share system was a good idea.

When asked why bike share was a good idea, some of the responses included the following:

- Reduce traffic congestion and carbon footprint
- Provide low-cost transportation alternatives to lower income population
- Greater connectivity to Hudson County's centers and destinations
- Provide opportunities for physical activity
- Supplement transit and increase connectivity to transit
- Opportunity to enhance Hudson River Walkway and connect to Citi Bike bike share

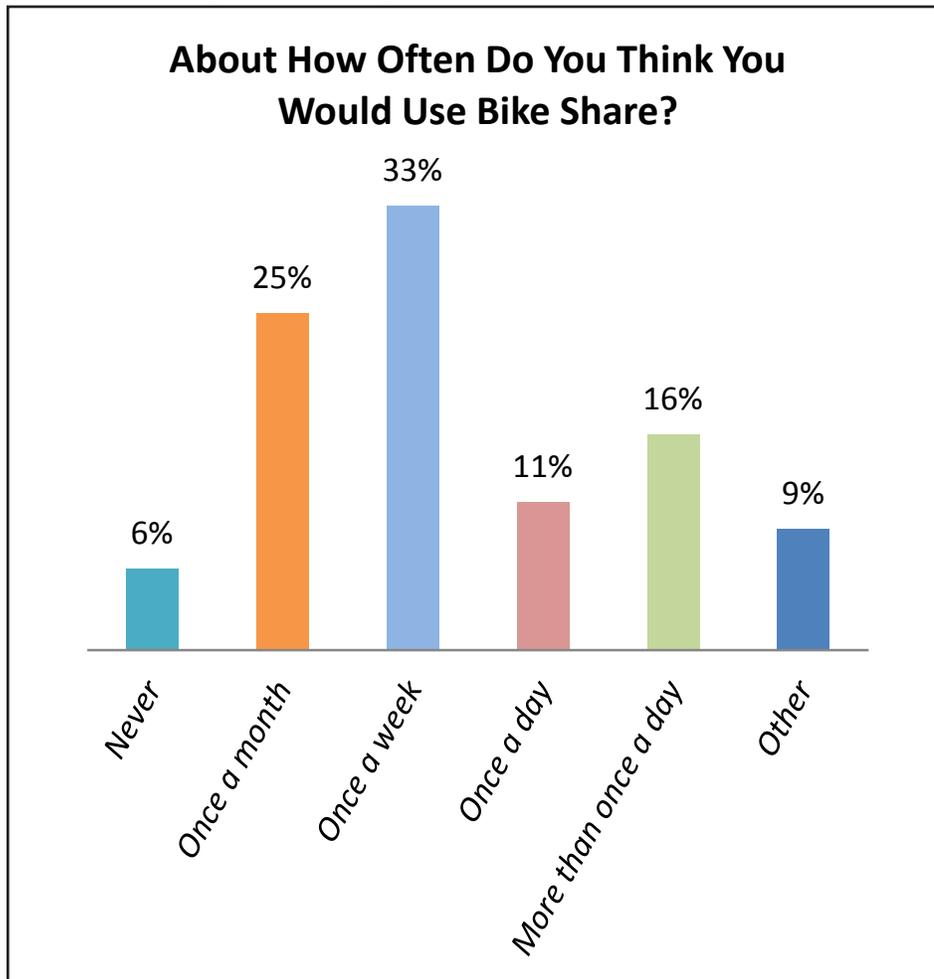
Respondents who indicated that they did not think bike share was a good idea for Hudson County included the following reasons:

- Safety concerns due to lack of infrastructure and education for drivers and cyclists
- Bike share would impede vehicle traffic into/and out of Hoboken
- There is not enough demand to move between locations

Approximately 20 respondents stated that they would use a bike share program at least once a week (33%), while only 6% stated that they would never use the program (see Figure A1.9).



Figure A1.9. Potential Frequency of Bike Share System Usage



Over half of respondents stated that the most likely trips for which they would use a bike share system included running errands, riding to the PATH, light rail, commuter rail or bus, shopping or eating out, and meeting family or friends.

When asked about what prices they would likely pay for annual, weekly, and daily memberships, the average of responses showed that respondents would be willing to pay \$87, \$21, and \$11 respectively.

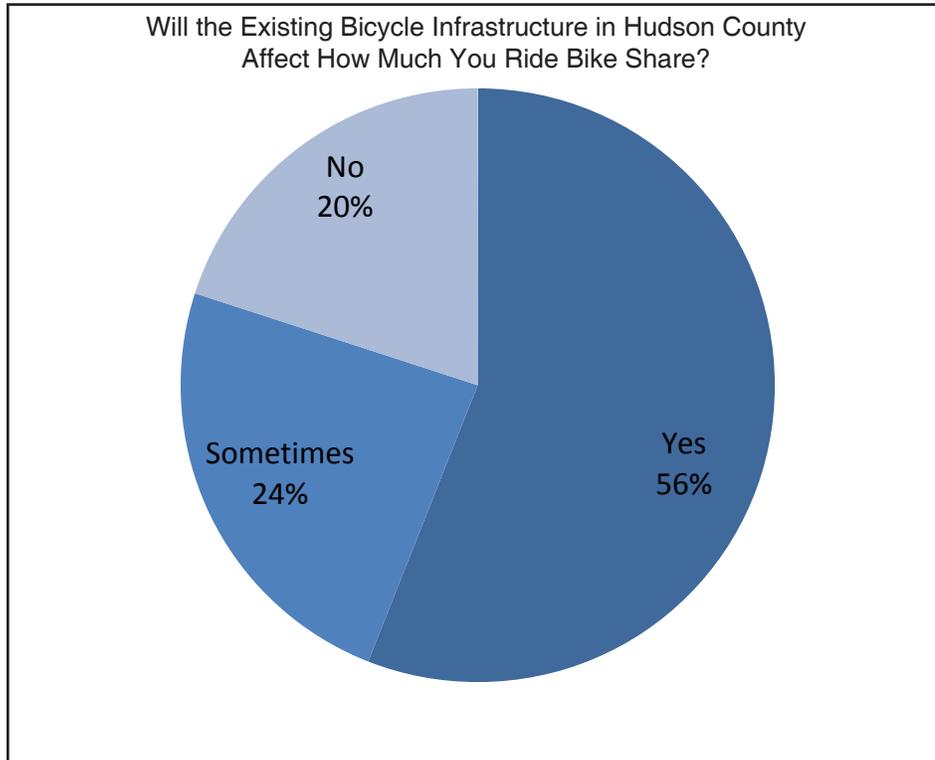
About 52% of respondents stated it would be very important to integrate the bike share system of Hudson County with the Citi Bike bike share system, and 30% stated it would be slightly important. Only about 7% said it would not be important to integrate with the Citi Bike system.



INFLUENCE OF EXISTING INFRASTRUCTURE ON BIKE SHARE USAGE

About 80% of respondents stated existing bicycle infrastructure would or would sometimes influence how much they rode bike share in Hudson County (see Figure A1.10).

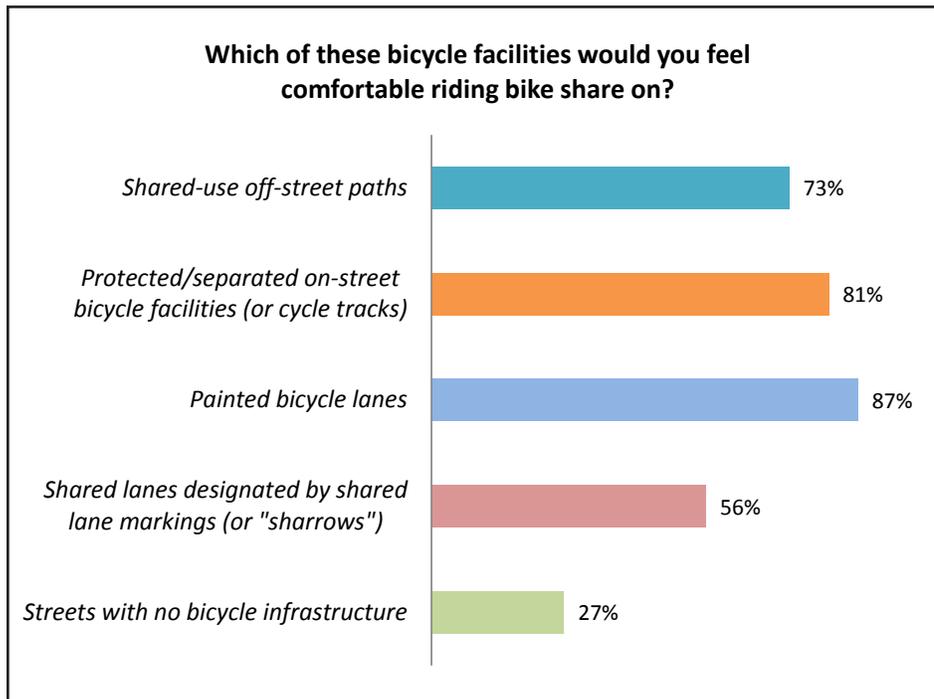
Figure A1.10. Influence of Bicycling Infrastructure on Bike Share Usage





In addition, survey participants were asked to select the types of facilities they would feel comfortable riding bike share on. About 14 respondents (27%) said they would be comfortable riding on streets with no bicycle infrastructure, while 45 respondents (87%) stated they would feel comfortable riding on streets with painted bicycle lanes (see Figure A1.11).

Figure A1.11. Bicycle Facility Comfort¹⁴



¹⁴ Because survey respondents were able to select more than one option, the total percentage is greater than 100%.



APPENDIX 2. FINANCIAL ANALYSIS OF BNR PROPOSAL





During the course of the study, the municipalities of Jersey City, Hoboken and Weehawken issued a request for proposals (RFP) and awarded a contract for bike share implementation and operation in those three urban municipalities with the condition of using no public funding. The contract was awarded to a collaboration of the companies E3Think, Bike N Roll, nextbike and P3 Global Management. The project team for this feasibility study was asked to undertake a financial analysis of the proposal that was put forth in response to the RFP. At the time of writing this report, and subsequent to the initial proposal, the number of stations that will be provided by BNR has increased to 102, from the proposed 45¹⁵; this memorandum does not include a comparison to updated membership and ridership projections based on the revised station numbers as such projections were not provided by BNR.

¹⁵ "Jersey City to join Hoboken, Weehawken in bike-share program", April 23, 2014, http://www.nj.com/jjournal-news/index.ssf/2014/04/jersey_city_to_join_hoboken_an.html



MEMBERSHIP AND RIDERSHIP PROJECTIONS

Table 4.1 showed the comparison cities to the BNR proposal. The table shows that the proposed system has reasonable, if not conservative, assumptions compared with similar bike share systems around the country. Some numbers that could be adjusted are:

- Annual member-to-bike ratio in the proposal is 6.3 whereas the average of comparable systems is 9.5, and Boston, Washington, D.C., and New York average 11.8 annual members per bike. This ratio, and therefore the total number of annual members could be increased.
- Casual member-to-station ratio in the proposal is 288 whereas the average of comparable systems is 841, and Boston, Washington, D.C., and New York average 998 casual members per station. Although the number of annual visitors in Hudson County is likely to be less than these cities, this ratio, and therefore the total number of casual members could be increased.



REVENUE AND COST PROJECTIONS

Although the membership and ridership assumptions are conservative, the financial projections may be aggressive. Minimal financial information is provided in the proposal, as it was not required, and the system will be privately owned and operated. However, the following information from the proposal was used to extrapolate membership and usage fee revenue projections using the model developed from the performance of comparable cities:

- Annual and casual membership projections of 5,000 and 23,000, respectively.
- Annual and daily membership fees of \$95 per year and \$9.95 per day, respectively.
- Usage fees 1.5 times those of Boston, Washington, D.C., and Minneapolis.

Using these assumptions and a 3% annual growth rate on the number of annual and casual members, the membership and usage fees shown in Table A2.1 were derived from the membership projections put forth in the proposal.



Table A2.1. Projected Revenue Based on Membership Levels included in the BNR Proposal

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|-------------------------|-----------|-----------|-----------|-----------|-----------|
| Annual Growth | 3% | | | | |
| Annual Membership Fees | \$475,000 | \$489,250 | \$503,928 | \$519,045 | \$534,617 |
| Casual Membership Fees | \$228,850 | \$235,716 | \$242,787 | \$250,071 | \$257,573 |
| Usage Fees ¹ | \$111,263 | \$114,600 | \$118,038 | \$121,580 | \$125,227 |
| Total | \$815,113 | \$839,566 | \$864,753 | \$890,695 | \$917,416 |

¹ Assumes 35% of casual rides incur a \$7.50 fee.

A range of operating costs was derived based on the lowest known operating costs on a low ridership system (Minneapolis) and an urban high-ridership system (Washington D.C.) for an 800-bicycle system:

- Potential Annual Operating Costs – Minimum: \$1,040,000 (based on Nice Ride Minnesota).
- Potential Annual Operating Costs – Maximum: \$2,000,000 (based on Capital Bikeshare in Washington, D.C.)

Depending on the operating costs that can be achieved by BNR, these numbers show a system that may break even on membership and usage fees if operating costs (and therefore service levels) are kept to a bare minimum. If operating costs are similar to Washington D.C., then the system will be in deficit of approximately \$1,100,000 during the first year using the proposal's membership estimates. Any deficit may be closed by either surpassing the membership estimates or bringing in sponsorship and advertising.

However, as mentioned above, the annual and casual membership projections are conservative when compared to the performance of the comparison cities. If the average of these cities' annual member-to-bike and casual member-to-station ratios are used, the revenues increase significantly, as shown in Table A2.2.



Table A2.2. Projected Revenue Based on Membership Levels of Comparable Cities

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|-------------------------|-------------|-------------|-------------|-------------|-------------|
| Annual Growth | 3% | | | | |
| Annual Membership Fees | \$725,396 | \$747,158 | \$769,572 | \$792,660 | \$816,439 |
| Casual Membership Fees | \$669,672 | \$689,763 | \$710,456 | \$731,769 | \$753,722 |
| Usage Fees ¹ | \$325,582 | \$335,349 | \$345,410 | \$355,772 | \$366,445 |
| Total | \$1,720,650 | \$1,772,270 | \$1,825,438 | \$1,880,201 | \$1,936,607 |

¹ Assumes 35% of casual rides incur a \$7.50 fee.

It is noted that the higher membership and ridership estimates would likely imply higher operating costs at the higher end of the range because of increased member servicing, more usage, system balancing and bike maintenance. These projections show a system that could potentially break even based on membership and usage fees alone.



PROFIT SHARE

The BNR proposal projects a \$400,000 - \$800,000 profit share to the cities based on a 10% profit sharing rate. Using the midpoint of this range, this implies that the profit to BNR is projected at \$6 million over the 5-year life of the contract, or an average of \$1.2 million per year. Based on the revenue and operating cost estimates above, it does not seem feasible that such profit can be generated from membership and usage fees alone. Therefore, the profit share must also include sponsorship and advertising revenues.

