5-14-2010

Completing the Network: Exploring Cyclist Desires and Advocate Priorities for Bicycle Parking

Nicole McCall
University of New Orleans

Completing the Network: Exploring Cyclist Desires and Advocate Priorities for Bicycle Parking

A Thesis

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Master of Urban and Regional Planning
Specialization in Transportation and Land Use

by

Nicole S. McCall

B.A. Tulane University, 2001

May, 2010

Acknowledgement

I would like to thank my graduate thesis committee: Dr. John Renne AICP, Dr. Michelle Thompson, Dr. Billy Fields, and Dr. John Pucher. I would also like to thank my husband, Lando, who has been patient and supportive while I pursue my graduate education.

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Abstract

The intent of this thesis is to increase local government and bicycle advocacy awareness of the importance of end of trip facilities in a transportation network, primarily bicycle parking. The research was motivated by a debate about the worthiness of bicycle parking as an advocacy objective. The thesis begins by reviewing existing end of trip facility research and projects at a national scope. Two surveys were conducted, the first identifies how advocates prioritize bicycle parking as an advocacy objective and the second determines how cyclists in New Orleans perceive bicycle parking. At the most narrow geographic scope an observation of bicycle parking patterns is completed on Magazine Street in New Orleans. The thesis finds that bicyclists desire bicycle parking and that bicycle parking facilities can mitigate chaotic bicycle parking patterns that may interfere with pedestrians. Recommendations are offered for bicycle advocates, local governments, and the City of New Orleans.

Keywords

Bicycle facilities, bicycle parking, end of trip facilities, geographic information systems; transportation planning.

Chapter 1. Prologue

Bicycling provides society as well as individual riders with many benefits ranging from improved health to reduced environmental impacts from transportation. Forty percent of all trips in urban areas are within two miles of the traveler's home; many of these trips could be bicycled with proper encouragement and accommodation (Pucher and Renne, 2003). Programmed improvements to the built environment can extend bicycling beyond a recreational pastime and enable it to be recognized as a mode of transportation. However, the built environment cannot be relied upon alone to change behavior and encourage bicycling; complementary policies are required as well. Bicycle programs are frequently evaluated with a framework called the "5 E's" which holistically considers: engineering, encouragement, enforcement, education, and evaluation (Safe Routes to School National Partnership, 2007; League of American Bicyclists, N.D.). For cycling to be recognized as a mode of transportation, police should enforce traffic laws that apply to and protect cyclists, driver education should include sharing the road, and bicyclists should be provided with end of trip facilities. End of trip facilities are amenities designed for the beginning and ending of trips made by bicycle and may include secure bicycle parking, showers, and changing rooms.

This thesis will focus on emerging trends of end of trip facilities with an emphasis on bicycle parking. Bicycle parking fills three needs: it increases the convenience of bicycling; it counters bike theft; and reduces clutter from randomly parked bikes (Pucher and Buehler, 2008). Moreover, without adequate bicycle parking facilities, people will not be able to bicycle for non-recreational trips.

Purpose

The purpose of the thesis is to help local government agencies and bicycle advocates consider how end of trip facilities, primarily bicycle parking, play a part in the bicycle network and recognize the importance of providing end of trip facilities to encourage bicycle use.

Research Questions

Research Question (RQ) 1: Are end of trip facilities an important aspect of a complete transportation network that local governments and advocacy organizations should pursue?

RQ1A: What is the status of research on bicycle parking?

RQ1B: What types of bicycle parking projects have been implemented across the nation?

RQ1C: How do advocates perceive and prioritize bicycle parking relative to other types of improvements for cycling?

RQ2: What is the status of bike parking in New Orleans?

RQ2A. What is the perception of end of trip facilities by those familiar with cycling in New Orleans?

RQ2B: What is the state of bike parking on Magazine Street in New Orleans?

Contents and Methodology

This thesis consists of 6 chapters. Following this prologue, a literature review is provided. Existing research pertaining to each of the research questions is reviewed. While there are relatively few academic and journal articles on bicycle parking, a plethora of information was found by searching through the popular press. Consequently, a blend of sources is used to inform and provide background information for the research questions. While several of the research questions are resolved in the literature review, including, RQ1, RQ1A, RQ1B, and RQ2) additional, original research presented in subsequent chapters was required

to answer the questions about advocate priorities (RQ1C) and the status of bike parking in New Orleans (RQ2A, 2B).

The third chapter presents a survey completed at the 2009 National Bicycle Summit that was designed to help answer RQ1C. Whether on a strategic or ad hoc basis, advocates set priorities and goals. Successful bicycle advocacy campaigns can secure facility improvements. The survey was designed to obtain information about what advocates are doing, how they prioritize campaigns, and what opinions they hold about bicycle parking. Nearly six percent of the National Bike Summit registrants participated in the survey.

The geographic scope of the research shifts to New Orleans with Chapter 4. The results of an intercept survey designed to identify the perceptions of end of trip facilities by those familiar with cycling in New Orleans (RQ 2A) is presented. This chapter is a response to the debate that triggered the concept for this thesis: whether or not cyclists (and potential cyclists) in New Orleans need and/or desire end of trip facilities.[1] Ninety-nine individuals were surveyed from March 15 to 22, 2009 at various cycling destinations across the City of New Orleans.

At its most narrow geographic scope, the thesis assesses the state of bike parking on Magazine Street in New Orleans (RQ 2B). Chapter 5 moves beyond stated preference surveys and utilizes geographic information system (GIS) analysis to evaluate existing short term bike parking (bicycle racks) and cyclists parking behavior along a corridor. An inventory of existing bicycle racks as well as assessment of bicycle parking patterns is presented. Some individuals argue that bicycle parking is not necessary because bicycles can be attached to preexisting architectural elements. This observation attempts to reconcile whether or not bicycle parking is of importance when architectural elements are present and can be adaptively used. This is the

[1] During a community meeting for cyclists held in December 2008, a participant expressed a concern over a lack of bike parking at parks as well as commercial districts located within the City of New Orleans. An inventory of current parking facilities was recommended. Another participant interjected with a comment that bike parking was not critical because given the right equipment (chain and lock), one could lock to trees, parking meters, fences, and other architectural elements that already exist in the urban environment. This individual felt cyclists might benefit if bicycle advocates focused their energy elsewhere.

first time GIS systems are used to consider end of trip facilities in bicycle planning, in the past, GIS techniques have been primarily used to analyze crash data and locate bicycle facilities[2].

The conclusion, chapter 6, revisits the original research questions. Recommendations for advocates, local governments, the City of New Orleans, and Magazine Street are offered. Additional lines of research relative to bicycle parking are also proposed.

[2] Geographic information systems (GIS) are information technology platforms comprised of geodatabases, maps, and data analysis tools. Appendix B reviews studies that have utilized GIS in Bicycle Planning.

Chapter 2. Literature Review

The role of end of trip facilities for bicycles

Enormous public health, economic, and environmental costs are some of the consequences for cultures that prioritize the automobile. Americans pay for their reliance on automobiles through a tremendous amount of time and money. On average, Americans spend more than an hour a day in automobiles (Hu and Reucher, 2004). Transportation accounts for an average of 18% of family expenditures (Bureau of Transportation Statistics, 2009). Although individuals may focus on the impacts to their daily routines and pocketbooks, the consequences are greater. When Americans depend solely on automobiles to travel they bypass an opportunity to obtain health benefits from walking or bicycling: two-thirds of American adults are overweight or obese (National Center for Health Statistics, 2004). In fact, the odds of being obese increase by 6% with each hour per day spent driving (Frank, L., et al, 2004). In addition to health impacts, there are many environmental consequences of our dependence on automobiles. In 2007, the United States was responsible for nearly one quarter of global oil consumption. The transportation sector alone used over two-thirds (Bureau of Transportation Statistics, 2009). In 2006, approximately 29% of total U.S. greenhouse gas emissions were produced by transportation. Despite improvements in engine efficiency, the Environmental Protection Agency (2008, 2009) projects a continual increase in emissions due to continued growth in personal travel, among other factors. Technology and science alone cannot rebalance the public health, economic, and environmental costs; land use strategies and behavioral incentives also play critical roles. Over 60% of trips are five miles or less (Federal Highway Administration, 2009). Many of these trips could be shifted to more sustainable modes of transportation, including the bicycle.

Bicycling serves those who are unable to afford the expense of automobile ownership and provides a choice for those who are attracted to an environmentally friendly mode of transportation and desire health benefits from active transportation. Despite its low cost and numerous benefits, only a small portion of the population in the United States use bicycles as a form of transportation. Only 1% of U.S. trips are made by bicycle (Federal Highway Administration, 2009).

A complete network is needed to accommodate bicyclists from one end of their trip to another. There are a number of initiates and a growing amount of research aimed at developing environments conducive to non-motorized transportation including walking and biking. The Complete Streets National Partnership is calling for the adoption of policies and laws to institutionalize the design, operation, and maintenance of a transportation network that enables safe access for all users. One of the main principles behind Complete Streets is that pedestrians, bicyclists, motorists, and transit riders of all ages and abilities must be able to safely move along, across, and through the network. While these policies have the potential to provide a more equitable transportation network across users, they tend to focus on the transportation corridor.

During each trip a cyclist must retrieve their bicycle from storage, briefly check it over, navigate the transportation network, and finally park and store their bike until the next trip. Dialogue about bicycle facilities often emphasizes routes, lanes, sharrows, and paths; these can be classified together as bikeways. However, a complete system requires secure parking as well as a safe transportation corridor. End of trip facilities, particularly bicycle parking, are integral components for bicycles to be used as a mode of transportation. Bicycle parking results in several positive outcomes, including the following:

(1) Secure bicycle parking removes a barrier to cycling. When secure bicycle parking is not available and building management or employers are unwilling to allow bicycles to be brought inside, cyclists may be unwilling to leave their bike outside a building in order to

complete a trip for a practical purpose, such as shopping, picking up a book from a library, or even commuting to work. In 1999, the New York City Department of City Planning (NYDCP) study found that safe storage was the most frequently named reason for not commuting by bicycle. More recent studies conducted by the NYDCP have confirmed that the lack of safe and secure bicycle parking is a leading factor preventing people from cycling to work (2007, 2006). By providing secure parking, an impediment to using a bike for transportation is removed (The Daily Telegraph, 2009; Steptoe, 2007; Priebe, 2005). And when impediments are removed, it becomes easier to persuade individuals to try bicycling for transportation (Saffron, 2008). Secure parking is needed for bicycles to be used for utility (Association of Pedestrian and Bicycle Professionals, N.D.). This concept is not new; John Forester stated it clearly in 1983: a lack of parking prevents cycling because you cannot leave a bicycle where there is nothing to which it can be properly secured.

(2) Secure bicycle parking reduces clutter created when cyclists randomly park. When there is an increase in bicycle ridership without an increase in bike parking, the outcome is a jumble of parked bicycles. The Danish Cyclists Federation (Federation) recently addressed the issue of erratically parked bicycles. In 2008, the Federation released a Bicycle Parking Manual and noted that a lack of good parking can lead to chaotic, haphazard parking patterns (Celis and Bolling-Ladegaard, 2008). When there are only a few bicycles that are randomly parked, it may not be noticeable but when there is a significant increase in the mode share a mess can result. This mess can hinder pedestrian flow. Chaotic parking patterns can evolve gradually over time or be attributed to single events[3]. When bicycle racks are full, inconvenient, or unavailable, cyclists will lock to anything that is available. In Philadelphia, this resulted in bikes being locked to Rittenhouse Square's wrought-iron fence (Saffron, 2008.) In Boston, Kush described the numerous bicycles locked to railings leading into the Boston "T", the City's light

[3] In New Orleans, many people choose to ride bicycles to the French Quarter Festival, rather than driving in congested conditions and becoming frustrated with traffic. This results in bicycles being parked to anything that a lock can fit around.

rail system, as “giant charm bracelets” (2008). Proactively planning for bicycle parking can both encourage cyclists and alleviate their impact on others.

(3) Secure bicycle parking symbolizes that cyclists are welcome. The provision of bicycle parking indicates the acknowledgement and acceptance of cyclists. Like parking for automobiles, parking for bicycles explicitly conveys that bicycles are expected. It underscores that bicycling is encouraged.

Status of Research on Bicycle Parking

Despite the clear connection between promoting bicycling as a form of transportation and providing bicycle parking, little research has been conducted on this aspect of bicycle infrastructure. Another discrepancy is found when comparing the amount of research on parking in general to bicycle parking. This is not a surprise considering there is limited research in general on bicycles as a mode of transportation. Advocates, including the Alliance for Biking and Walking have called for improvements to the quality and quantity of data collection related to bicycling (Steele, 2007, 2010).

Search results from the Transportation Research Information Services (TRIS), demonstrate research emphasis on transportation corridors versus end of trip facilities. A subject word search of TRIS revealed only one article about “bicycle parking” for every four articles about “bicycle lanes” (see table 1). Also of interest, “bicycle parking” accounts for only one percent of all articles related to “parking” tracked by TRIS. Over the last five years, the amount of research on bicycle parking has increased relative to all research on parking. Table 1 demonstrates that two percent of research on parking during the five years focused on bicycle parking.

TABLE 1. EXISTING BICYCLE FACILITY AND PARKING RESEARCH (TRIS)

Subject Word	All TRIS Results	TRIS Results Published within the Last Five Years (2004 to Present)
Bicycle Lanes	232	89
Bicycle Parking	58	26
Parking	5422	1100
Ratio of Research on Bicycle Parking to Bicycle Lanes	1 : 4	1 : 3
Percent of Parking Research focused on Bicycle Parking	1%	2%

Source: Transportation Research Information Services (TRIS) bibliographic database, October 12, 2009.

The two main topics include how bike parking influences bicycle use and the intersection of bike parking and transit. Several of the articles described policies and programs to provide bike parking. While not listed in TRIS, John Pucher, Jennifer Dill, and Susan Handy's September 2009 "Infrastructure, programs, and policies to increase bicycling: An international review" considered the results of 139 studies of the effect of various interventions on levels of bicycling, including bicycling parking. Another valuable review, "Commuting by Bicycling: An Overview of Literature," by Evan Heinen, Bert van Wee, and Kees Maat was published in December 2009 and surveys current literature about the determinants of commuting to identify what can promote commuting by bicycle. Research noted by TRIS, Pucher et al, and Heinen et al that is relevant to this thesis is summarized below.

Learning about the potential influence of bicycle parking on cycling provides valuable information for those interested in growing bicycle mode share. There is likely a two-way relationship between bicycling parking and increased bicycle use: improved bicycle parking may encourage more bicycling but increased amounts of bicycling may also lead to the installation of bicycling parking (Pucher et al, 2009). Both Pucher et al and Heinen et al completed literature reviews to evaluate evidence that different interventions can encourage bicycle commuting. While Pucher et al conclude that improved bicycle parking can encourage more bicycling, Heinen et al conclude that parking facilities are valued but do not appear to affect bicycle mode

share or cycling frequency. Both reviews acknowledge there is relatively little empirical research in this area.

The following studies suggest that bicycle parking has an important impact on the decision to commute by bicycle. In 2009, Akar and Clifton completed a study to understand travel behavior and opportunities and challenges to cyclists at the University of Maryland (UMD). The bicycle mode share at the UMD is low relative to other University campuses. Conducted through a web-based survey, questions were posed about bicycle infrastructure improvements, policy, and program innovations. A few questions asked about the sufficiency of secure or covered bicycle parking, as well as convenient bicycle parking. Although few respondents indicated that a lack of adequate bike parking prevented them from cycling, many agreed that more secure or covered bicycle parking and convenient bicycle parking would encourage them to ride. Akar and Clifton concluded that the bicycle network should be complemented with adequate bicycle parking facilities. In 2007, Wardman et al performed a multivariate analysis using data from the United Kingdom's National Travel Survey. This data was complimented with stated preference surveys. The team found that outdoor parking was likely to raise the bicycle mode share from 5.8 to 6.3%. The mode share could be additional raised to 6.3% with indoor parking and 7.1% with indoor parking and showers. Wardman et al concluded that interventions, including bicycling parking, could help bicycling reach a significant mode share and reduce automobile mode share. In 2007, Hunt and Abraham conducted a stated preference experiment in Edmonton, Canada to determine influences on bicycle use. Respondents were presented with two different scenarios and asked which was preferred. The alternatives required respondents to make choices about the amount of time on different bicycle corridors and various end of trip facilities. Hunt and Abraham found that secure parking at the destination has a significant positive effect on the attractiveness of cycling. Respondents were willing to trade up to twenty-seven minutes in bicycling time for the provision of secure parking at the destination. Stinson and Bhat (2004) constructed an ordered-response model to analyze

factors affecting a person's frequency to commute by bicycle utilizing data from a 2002 survey. A positive relationship between commuting and a presence of bicycle rack or locker is found. Stinson and Bhat recommend installing bicycle racks or lockers at workplaces as an easy, low-cost policy to encourage bicycling commuting. In 1995, Noland and Kunreuther conducted a survey directed at both bicyclists and the general population in counties located in the Philadelphia metropolitan area. Noland and Kunreuther found that respondents with safe bicycle parking had higher perception of the convenience of biking; these individuals were more likely to bike to work than those without parking. Dickinson et al (2003) studied the commuter habits of employees at three companies in Hertfordshire, United Kingdom. After accounting for distance to work, forty-three percent of respondents indicated that improved changing facilities and security for cycles would encourage them commute by bicycle, a higher frequency of men reported secure bicycle facilities as important.

Several researchers are interested in bicycle parking as a means to create synergy between transit and cycling. A 2007 study by Debrezion modeled the choices of Dutch railway users comparing utility of departure stations for non-motorized modes versus transit and auto users. Findings included that bicycle parking has a positive effect on the choice of departure railway stations accessed by bicycle. Schwartz, Rodriguez, and Golden (2009) investigated the environmental determinants of bicycling to rail stops through regressional analysis. While controlling for neighborhood demographics, Schwartz et al found an association between the increased use of bicycle parking at rail stations and higher station boarding, more bicycle parking facilities, lower residential density and crime, and fewer bus options. In 2007, Martens completed a case study investigating The Netherlands efforts to promote bike-and-ride. Describing the development and implementation of bike and ride programs, Martens explained that measures generally produced favorable results including an increase in user satisfaction, a growth in the number of parked bicycles, and an increase in bicycle use for access trips among regular bike-and-ride users. Taylor and Mahmassani (1996) conducted a stated preference

survey in which respondents were asked to rank preferences for their journey to work (automobile only, park and ride, or bike and ride) based on hypothetical scenarios. The scenarios were developed to see how on-street bicycle facility type, bicycle parking facility type, and bicycle access distance to transit might influence mode choice. Among their conclusions, Taylor and Mahmassani found that bicycle lockers are the preferred parking facility to increase bike and ride use. In 2000, in reviewing the potential of railway services to be linked with bicycles, Reitveld explained how the quality of the entire trip from residence to activity site can influence bicycle use. Reitveld recommends railway companies and municipalities provide bicycle parking facilities as a means to encourage bicycling to and from rail stations. Several other studies have considered how public transit and bicycling can complement each other. In each case, whether providing parking at a rail station to reduce automobile parking demand or bike lockers at a bus stop to ease rack capacity limitations, bicycle parking was considered a necessity to link biking and walking (Hegger, 2007, Hagelin, 2005, 2007; Schneider, 2005).

A lack of easily accessible data can hinder research efforts. The Alliance for Biking and Walking's *2010 Bicycling and Walking in the U.S. Benchmarking Report* collects and analyzes bicycle data for 50 states and 50 largest cities (Steele, 2010). Twenty-five of fifty-one[4] officials in the cities included in the report indicated they were unable to determine the number of bicycle parking spaces per 10,000 people in their community. In contrast, only four officials were unable to report on bicycle facilities[5]. The inability of officials to obtain bicycle parking data may indicate these cities have not established programs supporting bicycle parking, find it less important to track bicycle parking, or simply do not have access to this data. The lack of research has not prevented cities from adopting bicycle parking programs. According to the

[4] The City of New Orleans was included in the first Benchmarking Report, complete in 2007. Following Hurricane Katrina, the city's population dropped below the top 50 but the research team elected to keep New Orleans in the analysis to maintain consistency in cities report.

[5] The Alliance for Biking and Walking defined bicycle facilities as on street bike lanes, multi-use paths, and signed bike routes. End of trip facilities, like bike parking, were not included. It is not clear why end of trip facilities were not counted as a part of bicycle facilities.

same report, twenty-three of the cities either require or are developing programs to require bicycle parking in new buildings, fifteen cities require bicycle parking in buildings/garages, and eight cities require bicycle parking at public events.

Types of bicycle parking improvements that have been implemented across the nation

The number and breadth of bicycle parking programs that have been initiated exceeds the amount of research conducted on this field. Basic tools and approaches have been developed to design and place bicycle parking. Initiatives to increase bicycle parking may be associated with green building guidelines (LEED), desires to obtain Bicycle Friendly Community Awards, or desires to reduce nuisance bicycle parking. There are a variety of forms and designs for bicycle parking: sheltered and unsheltered parking, guarded and unguarded parking, bike lockers, and facilities with and without showers. Programs range from installing sculptural bike racks to establishing bike stations to offering bike valet at events. More and more local governments are adopting ordinances and finding other ways to support bicycling through the provision of secure parking. Following an overview of the basic considerations in implementing bicycle parking, the programs in Minneapolis, Minnesota, Oakland, California, and New York City will be described.

GUIDELINES

An important starting point when providing bicycle parking is how to design for function. A number of guidelines have been written for designing and placing bike parking including the International Bicycle Fund's *Bicycle Parking Planning Criteria* (N.D.), Litman et al's section on bike parking in the *Pedestrian and Bicycle Planning: A Guide to Best Practice* (2006), the Pedestrian and Bicycle Information Center's *Bicycle Parking* guide (N.D.), and the Association of Pedestrian and Bicycle Professional's (APBP) *Bicycle Parking Guidelines* (N.D.)[6]. These

[6] The APBP's guidelines provide recommendations on rack element, rack, rack area, rack area site, and creative designs as welll as detailed pictures of bicycle. They can be easily accessed online at http://www.apbp.org/link.asp?ymlink=17534. They were used to inform the data selection of bicycle rack

guidelines are valuable resources for selecting and placing bicycle parking. They detail specific dimensions and layouts for the rack area as well as define rack elements.

SITE AREA

Identifying the best area for bicycle parking is a relatively simple feat while selecting a location is a larger challenge. As a baseline, it is fair to assume that bicyclists would like to have parking at the same facilities that provide car parking (Forester, 1983). When bicycles are "flyparked" or locked to parking meters, fences, and railings, it is clear that there is not enough existing bike parking but it may also mean that the existing bike parking is not correctly placed or maintained (Kush, 2008; Johnson et al, 2008). Recommendations include placing the rack area immediately adjacent (within 50 feet) to entrances and along a major building approach line. The bicycle parking area should be as close as the nearest car parking. Rather than serving multiple buildings with a combined, distant rack area, it is preferable to provide a smaller, more convenient rack area closer to each individual destination.

RACK ELEMENT

Once locations are selected, the rack element must be determined. Short-term parking generally provides more choice and flexibility in terms of design. Some of the more pragmatic designs include: inverted "U", "A", Post and Loop, Comb, Wave, and Toast[7]. Many artistic designs have also been installed. The concept for an artistic bike rack program emerged from Louisville, Kentucky. Local artists submitted proposals and were selected to create the bike racks. Artists were compensated for their supplies and paid with increased exposure through the installation of the racks in the City. Louisville ensures an adequate number of bicycle racks are installed by complementing the artistic racks with basic racks. Following the success of

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inventory variables collected for the Magazine Street Bike Parking Assessment (Chapter 5). The APBP began revising their Bike Parking Guidelines in 2009 and plan to release new guidelines in 2010.

[7] ibid

ILLUSTRATION 1. THREE RIVERS BIKE RACK IN PITTSBURGH, PA

Photo Credit: Nicole McCall, December 2010

Louisville's artistic bike rack program, many other cities have executed similar programs that serve both public art and transportation goals (Bierman, 2008; Martin, 2008; Saffron, 2008). Wall Street has a bike rack that is shaped as a dollar sign, Eastpoint, Michigan has 30-foot long sea serpent that provides parking for eighteen bikes, and Longport, Colorado has a bike rack that looks like a spider (Martin, 2008). Bike racks in the City of Pittsburgh display the three rivers that flow through the city. It is important that creative designs balance form with function so as not to lose capacity or durability.

For a site that anticipates longer term parking sturdier designs, including sheltered parking and guarded parking are recommended. A long term bicycle parking facility should be designed to protect the entire bicycle, including its components and accessories, from theft as well as shelter it from weather. Three common forms of secure long term bicycle parking are: a) fully enclosed lockers accessible only by the user -- generally involving a charge; b) a continuously monitored facility that provides at least medium term type bicycle parking facilities -- generally available at no-charge; and c) restricted access facilities in which short term type bicycle racks are provided and access is restricted only to bicycle owners. Many transit

agencies provide bicycle lockers at transit stations including CalTrains (serving Santa Clara, San Mateo, and San Francisco Counties, California), MetroTransit (serving Minneapolis / St. Paul, Minnesota), and the Washington Metropolitan Area Transit Authority (serving Washington, DC, Maryland and Virginia).

BIKE VALET

Bicycle parking programs are not limited to providing racks on streets; innovative programs, like bike valet are evolving. Bike valet is very similar to car valet service and is generally offered at events. The service can also conserve space. At the Santa Monica Farmers' Market, 120 bicycles are squeezed into eight parking spaces on a weekly basis (Pondel, 2008). Bicycle valet service is available at festivals and events across the country (Seligman, 2005; Brown, 2008; Pondel, 2008). This service is usually volunteer run and services are normally free. Perhaps the clearest signal that this service is becoming more mainstreamed is that it was offered during the 2009 Presidential Inauguration (Goff, 2009).

BIKESTATIONS

BikeStations are bike-transit centers that offer secure bicycle parking and complementary services for bicyclists. Added amenities include repair services, bike valet, showers, and changing rooms. The majority of these centers are run by BikeStation, a non-profit organization based in Long Beach, California. The non-profit's goal is to enable bicycling to be an integral part of the transportation system. Bike parking is frequently offered for free during operating hours while members are provided with 24-hour access to secure parking. BikeStations have been funded by local governments that want to encourage cycling as well as advocacy groups and entrepreneurs (Steptoe, 2007). These facilities can be found in Berkeley, Claremont, Covina, Embarcadero, Long Beach, Palo Alto, Santa Barbara, Seattle, and Washington D.C. (BikeStation, 2010). The Washington D.C. BikeStation has generated a great deal of attention: the National Public Radio (NPR) (Shapiro, 2009), Reuters (Jones, 2009), the

Examiner.com (Voiland, 2009), and AIArchitect (Mortice, 2009) are a few of the dozens of media sources that have positively covered BikeStation Washington, D.C. Studies completed by Mobis, the consulting and management that operates BikeStation provide evidence that service and convenience provided by BikeStations can help shift individuals out of cars and onto bicycles and help cyclists bicycle more (Stocker, 2009). It also seems that the publicity generated by high profile projects, such as BikeStation Washington, D.C. can build awareness of the need for bicycle parking.

ILLUSTRATION 2. BICYCLE CORRALE, NEW ORLEANS JAZZFEST, 2009

Photo Credit: Nicole McCall, Spring 2009

Repurposing Car Parking

Car parking has been repurposed for bicycles. In several cities minimum parking requirements have resulted in underused parking lots, which are ripe for repurposing (Specht, 2008). Car parking may also be repurposed to support bicycling in congested urban neighborhoods. Although a car parking space would be lost, repurposing the space opens it up to many more cyclists. Retailers could benefit from several customers rather than the expected one or two per car. Car parking has been repurposed for bike parking in Seattle, New York City, and Washington D.C.

Penalizing Chaotic Parking

Although most bicycle parking strategies are designed as incentives, penalties for chaotic bicycling parking patterns were also identified. Bikes are usually fined or seized when there are concerns or complaints that bicycles are creating safety hazards by blocking sidewalks, entrances, or handrails. These kinds of management practices are frequently seen on but not confined to College and University Campuses. In September 2009, San Francisco State University began issuing $58 tickets for illegally parked bicycles. Students that locked their bicycles to architectural elements rather than parking at racks or utilizing the University's central bike storage facility were targeted (Codd, 2009). The University of Idaho recently began a campaign to try to get students to use bicycle racks. The University will tag bikes for possible impound if they are inappropriately parked. If bicycles are found more than once a day in an illegal space, they will be impounded and students must pay a $20 fee. The University wants students to use the current bicycle racks so that it can determine which racks are in highest demand and where more need to be installed (Turner, 2009). Flagler College is also adopting a similar policy. Bikes that are parked in restricted areas such as trees, sign poles, and handicap ramps will be confiscated. There will be a $25 fine to retrieve and $50 for repeat offenses (Scheufler, 2009). These kinds of policies are found at most every college and university

campus. Examples outside of college campuses include an incident in which an aggressive New York City Parks Department officer impounded more than 30 bicycles locked illegally to railings around trees (Hays, 2007). Enforcement programs are often (and best) accompanied with improvements in existing bike parking to assist those who previously may not have been able to find legal spaces.

Bicycle Parking Ordinances

Many cities have adopted bicycle parking ordinances. There is quite a bit of variance from city to city. Bicycle parking ordinances may apply to residential or commercial buildings, new construction, schools, or park and ride lots. Many of these ordinances help to gradually increase bicycle parking over time as buildings are constructed and renovated. In 2002, Paul Schimek compared existing bicycle parking requirements in 145 jurisdictions in North America. He collected a wide range of data including: (1) what triggers the requirement of bike parking, (2) the minimum and maximum requirements for bike parking, and (3) how requirements vary across land uses. Growing numbers of cities have adopted bicycle parking ordinances since Schimek's 2002 comparison. For example, on September 1, 2009, the Pittsburgh Planning Commission unanimously passed a Bicycle Parking Ordinance which set up minimum bike parking standards and allows developers to replace up to 30% of their car parking requirement with bicycle parking clearing the way for City Council approval (Bike Pittsburgh, 2009). Cincinnati's Planning Commission adopted a bicycle parking ordinance on February 23, 2010 that requires new or expanded parking garages to provide one bicycle parking space for every 20 motor vehicle spaces (Simes, 2010).

Cities that want to encourage bicycling are adopting a variety of programs to implement bicycle parking. Examples of coordinated approaches include the programs in Minneapolis, Minnesota, Oakland, California, and New York City, New York.

MINNEAPOLIS, MINNESOTA

The Bicycling and Walking in the 2010 United States Benchmarking Report reported more bike parking spaces per resident in Minneapolis than in any other city (Steele, 2010). At the time of the report, there were 430 spaces per 10,000 people. Credit for the ample supply of bicycle parking belongs to Minneapolis Bike Parking Project, which was funded as a part of the City's participation in the Nonmotorized Transportation Pilot Program (NTPP) (S-LU Sec. 1807)[8]. Between June 2007 and July 2009, $200,000 was directed at bicycle parking through the Minneapolis Bike Parking Project. Although less than one percent of the funding from the NTPP ($25 million) went to bicycle parking, it had an enormous impact. The project included a 50/50 cost share program with local businesses, expansion of public bike racks, including 100% of the cost for bike racks and installation, old bike rack replacement, development of a Bicycle Planning Guide and Bicycle Incentive program, and covered bicycle parking and bike lockers (Bike Walk Twin Cities, 2010). Despite the end of the Minneapolis Bike Parking Project, the City is continuing with many programs. Minneapolis continues to offer a 50/50 cost share program to entice property owners at eligible locations to install racks and to pay the full cost of bicycle rack installation at public locations. An ongoing inventory of all public bicycle parking is conducted. Results from the inventory are available in a downloadable map on the City's website. The map identifies bicycle racks at schools, businesses, government buildings, transit centers, parks, and other publicly accessible locations. Lockers are provided by the Department of Public Works in downtown Minneapolis, by the University of Minnesota Parking and Transportation Services Department on the University of Minnesota Campus, and by Metro Transit at both bus and rail transit stations. The City is continuing to allocate funding for bicycle parking improvements in its budget (Steele, 2010). Evidence that the City has made a deliberate effort to increase the

[8] Nonmotorized Transportation Pilot Program (NTPP) (S-LU Sec. 1807) was created to demonstrate how improvements to walking and bicycling infrastructure can increase mode share for walking and bicycling. Minneapolis and three other Cities, including Columbia, MO; Marin County, CA;; Sheboygan County, WI each received $25 million to improve their walking and bicycling networks.

supply of bicycle parking includes its new bicycle parking ordinance, adopted in January 2010. With the exception of non-residential uses of less than 1,000 square feet and residential buildings with four or fewer units, all other new buildings are required to provide at least three spaces. For example, schools are required to provide three spaces per classroom, general retail sales and services are required to provide one space per 5,000 square feet of general floor area, and community centers are required to provide six spaces (City of Minneapolis, 2009). In conjunction with ensuring an adequate supply of bicycle parking, the City also manages parking. Bicycles that are illegally attached to trees, parking meter posts, street light posts, traffic signal posts, or hand railings are subject to impoundment. Bicycles may be attached to sign posts. Artistic and pragmatic bicycle racks can be found across the City of Minneapolis (City of Minneapolis, 2010). The City of Minneapolis is a leader in terms of bicycle parking programs.

OAKLAND, CALIFORNIA

Approximately 83 racks per 10,000 people were reported for the City of Oakland in the Bicycling and Walking in the 2010 United States Benchmarking Report (Steele, 2010). Like Minneapolis, Oakland has adopted a series of programs to support bicycle parking. Funding from the Alameda County Congestion Management Agency's Transportation Fund for Clean Area and Alameda County's Measure B, has helped the CityRacks Bicycle Parking Program install over 1,300 public bicycle parking racks and lockers in commercial districts since 1999. Together this parking can serve over 3,000 bicycles. Requests for racks on public property can be submitted with an Online Request Form. After noting a huge supply of adaptive-use bike parking would be lost after Finance and Management Agency replaced over 4,400 parking meters with "pay and display" parking kiosks in 2008, the City developed a strategy. The old meter poles were left in place until 398 bike racks that accommodate 850 bikes were installed by the Transportation Services Division in December 2009. A total of 16 bicycle lockers are

available in downtown Oakland and they are reasonably priced: after five free hours of use they lockers cost $0.05 per hour. Bike Link cards must be used to operate the lockers. The City also has a bike parking ordinance that became effective on July 15th, 2008. The ordinance sets up requirements for long-term and short-term parking as well as showers/lockers for each land use. For example, office buildings must provide one long-term space per 12,000 square feet, one short-term space per 2,000 square feet, two showers for each gender for the first 150,000 square feet plus one for each gender for each additional 150,000 square feet, and four lockers must be provided per shower. In addition to requiring parking in new development and building renovations, the ordinance also requires bike valet at public events with over 5,000 attendees. The service must be mentioned in all outreach and advertising and placed in an accessible location at the event (City of Oakland, 2008). Oakland recommends that bicycle racks be used when available but do not penalize the adaptive use of other architectural elements, such as parking meters (City of Oakland Public Works Agency, 2010). The City also provides information packets and resources for private and public developments considering providing bicycle parking facilities.

NEW YORK CITY, NEW YORK

While New York City had fewer spaces per person (7.5 per 10,000 people) than Minneapolis or Oakland, it is described here because of several unique approaches to obtain bicycle parking. Like Minnesota, the City has performed an inventory of free sidewalk bicycle parking racks provided through its CityRacks Program. An online interactive map displays locations. One can zoom to the street they plan to visit and then click on a bicycle icon to learn the capacity and exact location of the nearest bicycle parking. Requests for new racks can be placed online or submitted using a downloadable form. For bike rack requests, the City prioritizes requests from Business Improvement Districts, civic associations, and groups of community members. David Byrne designed nine bike racks that were placed in Manhattan,

Williamsburg, and Brooklyn as a part of the DOT's Urban Art program. They were initially only placed temporarily through the public art program but the City's Design Commission eventually voted to allow the racks to become permanent. The Department of Transportation also worked with CompUSA, a street furniture vendor to install sheltered bicycle parking structures. New York City plans to install 26 of these structures that provide sheltered parking for eight bikes. The shelters display a NYC Cycling Map and other bicycle promotional materials. (New York City Department of Transportation, N.D.) In 2008, the Department of Transportation held a design competition for a new indoor and outdoor bicycle parking design: a round rack with a horizontal crossbar was selected and will replace black U racks as the main form of outdoor parking (City Rack Design Competition, 2009). There are several ordinances that support bicycle parking. In April 2009, the City Council approved a zoning amendment to require bicycle parking in new construction (Fried, 23 Apr 2009). In July, an ordinance was approved to require commercial parking facilities with more than 50 car parking spaces to provide one bike parking space for every 10 car parking spaces (Fried, 3 Aug 2009). On December 11, 2009, the Bicycle Access to Office Buildings Law went into effect. It requires building managers to implement and post a Bicycle Access Plan that allow tenant's to bring bikes into their work space. (New York City Department of Transportation, 2009). Like Oakland, anticipating the loss of bicycle parking when parking meters are replaced with pay kiosks, New York is transforming 225 parking meters into bike racks (Karni, 2010). The City's boldest move to encourage bicycling and provide bicycling racks was made in July 2007. Three car parking spaces were replaced with bike racks in Williamsburg; thirty bicycles can now be parked where once only three cars could be parked (Eckerson, 2007). Like Minneapolis, there are penalties for illegally parked bicycles in New York. There is a $1000 fine for parking a bike to a tree and bikes locked to subway entrances are subject to removal (New York City Department of Parks and Recreation, N.D.; Metropolitan Transportation Authority, N.D.)

Minneapolis, Oakland, and New York are pursuing bicycling parking through a range of creative programs. Despite the varied number of spaces per residents, each of these cities has adopted coordinated programs to support the installation of bicycle parking. In addition, information about locations is available to residents and there are policies in place to manage illegal bicycle parking. Table 2 provides a summary of the bicycle parking programs in Minneapolis, Oakland, and New York.

TABLE 2. BICYCLE PARKING PROGRAMS

City	Minneapolis	Oakland	New York City
Spaces (per 10,000 people)[1]	430	83	7.5
Parking Ordinance	√	√	√
Businesses Resources	√	√	√
Funding Stream	√	√	
Online Inventory	√		√
Penalties	√		√
Request Process		√	√
Mitigate Lost Parking		√	√

[1] Alliance for Biking and Walking. (2010). *Biking and Walking in the United States 2010 Benchmarking Report.*

To an increasing extent, cities are aware of the intersection between supporting bicycling and providing secure bicycle parking. Innovative programs are being used to genuinely encourage bicycling by easing the transition on and off of bicycles.

The status of bike parking in New Orleans

A discussion of bike parking in New Orleans is not complete without a discussion of the City's overall bicycle planning status. The City of New Orleans has been known for its poor transportation infrastructure. Even before Katrina, residents lived with crumbling streets and a debilitated public transit system (New Orleans Community Support Foundation, 2006). While those dependent on public transportation found it onerous to navigate the city, the historic districts provided traffic calming features including narrow roads, small blocks, and grid-like

streets for bicycles and pedestrians. However, as the City has recovered from Katrina, investments are being made in bicycle infrastructure and the city's bicycle network is growing.

The most recent data from the Federal Highway Administration's National Household Travel Survey was collected in 2009. Approximately twelve percent of the 42 respondents that resided in New Orleans Metropolitan Statistical Area (MSA) reported one or more bike trips in the last week[9]. This is up from approximately eight percent of the 275 individual's that were sampled and reported one or more bike trips in the last week in the 2001 National Household Travel Survey. The American Community Survey includes questions about mode of transportation used to commute to work. According to the 2008 American Community Survey 1-year estimates, approximately 1,183 of the estimated 105,685 workers sixteen years and over commuted to work on a bicycle (U.S. Census Bureau, 2009).

TABLE 3. MEANS OF TRAVEL TO WORK, CITY OF NEW ORLEANS

Mode	Estimate	Percent
Car, truck, or van	105,685	80%
Drove alone	88,112	67%
Carpooled	17,573	13%
Public transportation (excluding taxicab):	9,651	7%
Taxicab	1,284	1%
Motorcycle	438	<1%
Bicycle	1,183	1%
Walked	8,202	6%
Other means	1,214	1%
Worked at home	3,960	3%
Total	131,617	100%

Source: U.S. Census Bureau, 2008 American Community Survey

The Alliance for Biking and Walking's 2010 Benchmarking reports compares facility miles to bicycling levels as well as bike parking spaces per 10,000 people. Only one city, Memphis, had fewer bicycle facilities per square mile. The Benchmarking report indicates that the official submitting data for the City of New Orleans was unable to access data about the

[9] While data is not specifically provided for the New Orleans, it is possible to search by state and then by the MSAs with population over 1 million. Considering the New Orleans MSA is the only MSA in Louisiana with a population over 1 million, an assumption was made that the results from this search were based on responses from individuals residing in New Orleans.

number of bicycle parking spaces. However, New Orleans is an anomaly. The level of bicycling in New Orleans exceeded 44 of the 51 sampled cities' mode shares. Some of the cities with the greatest miles of bicycle facilities per square mile had a lower bike to work mode share: Miami, San Diego, Las Vegas, and Philadelphia (Steele, 2010).

When comparing New Orleans approach to bicycle parking with the cities with identified with leading bicycle parking programs (Minneapolis, Oakland, New York City), it does not fare well. As exhibited in table 4, the City simply has no programs supporting bicycle parking. There is no bicycle parking ordinance, no resources offered to businesses considering installing bicycle parking, no dedicated funding stream, and no online inventory. There is also no formal system set up to manage illegal bicycle parking.

Investments are beginning to be made for bicycle improvements. In May 2008 the Parish's first bike lane opened (Koenig, 2008). Five months later the Wisner bike path was opened (Williams, 2008). Robert Mendoza, Director the New Orleans Public Works has indicated that many more bike lanes will appear as streets are repaired (Stroud, 2008). The City received honorable mention from the League of American Bicyclists' Bicycle Friendly Community Program in 2008 and 2009.

Table 4. New Orleans versus Leading Cities with Bicycle Parking programs

City	**New Orleans**	**Minneapolis**	**Oakland**	**New York City**
Spaces (per 10,000 people)[1]	Unreported[2]	430	83	7.5
Parking Ordinance		√	√	√
Businesses Resources		√	√	√
Funding Stream		√	√	
Online Inventory		√		√
Penalties		√		√
Request Process			√	√
Mitigate Lost Parking			√	√

[1] Alliance for Biking and Walking. (2010). *Biking and Walking in the United States 2010 Benchmarking Report.*

2 *Biking and Walking in the United States 2010 Benchmarking Report* indicated that the official could not access this data

ILLUSTRATION 3. EXISTING AND PROPOSED BICYCLE FACILITIES, CITY OF NEW ORLEANS

Source: *Plan for the 21st Century: New Orleans 2030*
Map 11.6: Potential 2030 Bicycle Routes

According to the Dan Jatres, the Director of Pedestrian and Bicycle Programs at the New Orleans Regional Planning commission, the number of on street bicycle lanes, multi use paths, and signed bicycle routes grew from 11.25 miles before Katrina to the current 23.75 miles as of January 2010.

Many more miles are proposed in the latest draft of the 2030 master plan for the City*: Plan for the 21st Century: New Orleans 2030* (November 13, 2009). It also describes existing and proposed bicycle parking facilities. It reports 100 bicycle racks mostly along Canal Street.[10]

[10] Dan Jatres explained the discrepancy between the number reported in the master plan and in the Alliance Report. The number of bicycle racks reported in the master plan includes racks that are downtown and is not comprehensive. No number was reported to the Alliance for Biking and Walking because the information is unavailable. At this time no complete inventory exists.

Proposals specific to bicycle parking include providing ample bike racks, lockers on public rights of way at key activity nodes, and requiring on-site bicycle facilities and locker rooms in development projects (City of New Orleans, 13 Nov 2009).

A local advocacy group is also pursuing bicycle parking. The Young Leadership Council's Where Ya Rack? Program (WyR) is a community improvement program that works to provide unique and secure bicycle parking racks throughout the New Orleans community. Racks are sponsored by citizens, businesses or property owners and installed by YLC member-volunteers. Launched at the end of 2008, the program's intent is to encourage cycling as an environmentally friendly and healthy transportation option for commuting, short trips and errands (Where Ya Rack?, N.D.)

There is a growing movement in New Orleans towards obtaining a future more conducive for cycling. Advocacy groups and state and local government agencies are working to improve facilities and encourage cycling and bicycle parking is being considered in these plans.

The perception of end of trip facilities by those familiar with cycling in New Orleans

Only one other study has focused on understand the perceptions of end of trip facilities by those familiar with cycling in New Orleans. In 2003, the Regional Planning Commission (RPC) and the Louisiana Safe Kids, an agency of the Louisiana Department of Health and Hospitals (DHH), conducted a survey to obtain input of possible impediments to cycling and the potentially important role bicycle parking plays in deciding whether to utilize a bicycle for transportation. Conducted online, the survey was directed at employees, employers, and clients of facilities in the Central Business District and French Quarter. It attempted to obtain input from actual and potential bicyclists as well as building managers. The survey was placed online for two months. A total of 328 responses were obtained. Nearly a third of the respondents commuted regularly by bicycle. Responses relative to bicycle parking included: (1) half of the respondents had a specific area allotted to secure bikes at work, (2) over three-quarters of

respondents would like bicycle racks installed in a secure fenced area, (3) almost half said having security equipment and installation of bicycle bins[11] would encourage them to bike to work, (4) a third would pay for bike parking, and (5) nearly two-thirds would support making bicycle parking facilities a required feature for their organization. Data from this study was utilized to prepare and submit a LDOTD transportation Enhancement application for bike rack funding which was subsequently funded (Regional Planning Commission, 2005).

The state of bicycle parking on Magazine Street in New Orleans

No studies were found that reviewed the state of bicycle parking on Magazine Street in New Orleans. However, in 1993 an informal inventory of bicycle racks in downtown New Orleans was completed by the New Orleans Bicycle Awareness Committee (NOAC), a now defunct non-profit organization dedicated to educating the public about bicycle-related issues. Twenty-one bicycle racks were located with a total capacity of 229 bicycles. Seven of the racks were on private property and restricted to employee use (Regional Planning Commission, 2005).

The underlying principle throughout this literature is that the role bicycle parking plays in supporting bicycling is under recognized. If municipalities and advocates want to support cycling, bicycle parking improvements should be included as a part of their plan. Many cities are building integrated plans to provide bicycle parking.

[11] Bicycle bins is not defined in the literature. It is likely another term for bicycle locker.

Chapter 3. Bicycle Advocate Priorities

Purpose

This survey was conducted to learn about the priorities of advocates for bicycle improvements, including bicycle parking. It was developed to answer research question 1C: How do advocates perceive and prioritize bicycle parking relative to other types of improvements for cycling?

Survey Design

Attendees were interviewed during the 2009 National Bicycle Summit from March 10 to 12, 2009. Organized by the League of American Cyclists, the event is open to bicycle advocates, including League members, the media (print, online and broadcast news media, as well as health, advocacy and industry reporters), and industry leaders. Surveys collection occurred during breaks between speakers, during meals, and at receptions. With the exception of one individual who kept the survey form, all subjects responded. A total of 34 surveys were collected during the three-day period. Nearly six percent of the 580 registrants were surveyed.

Survey questions were developed to determine respondents' views about advocacy priorities and opinions about bicycle parking, relative to other bicycle facilities. Overall the survey consisted of four main sections. The survey asked respondents about their experience with bicycle research, experience with bicycle advocacy, transportation habits, and opinions about bicycle facilities. A copy of the survey can be found in Appendix C. Only those questions and responses that directly relate to bicycle parking are presented in this Chapter. Appendix D provides findings for all other inquiries. Questions took several different forms. Whenever possible, questions were made more open-ended by including responses marked "other" along with a line for a description. Respondents were asked to rank research areas, advocacy goals, and advocacy priorities. In another section respondents were asked to indicate the extent to

which they agreed or disagreed with a statement on a four-point scale (1=strongly agree, 2=agree, 4=disagree, 5=strongly disagree). An open-ended section was provided at the end of the survey allowing respondents to add additional comments about bicycle facilities.

The survey included seven questions about bicycle advocacy activities, including pursuit of bicycle parking. Respondents were first asked if they represent a bicycle advocacy group and to provide the name and location. If respondents answered no they were directed to proceed to the next section. Respondents were also asked to rank goals, bicycle improvements, and to indicate what types of campaigns they lead. Respondents were also asked where they live and if there is a bike parking ordinance for their city.

Fifteen questions were asked to gauge opinions about bicycle facilities. These question asked respondents on a four-point scale to strongly agree, agree, disagree, or strongly disagree about the extent they agree with different statements. Questions related to (1) how different bicycle facilities impact the portion of travel completed by bike; (2) if research is needed on different types of facilities; (3) who should provide secure bike parking; and (4) if the respondent perceived that their city government cares about providing adequate bike facilities. Questions were asked about bicycle parking, bikeways, and, more generally, bike facilities, to contrast opinions across varying facilities.

Results

Respondent Characteristics

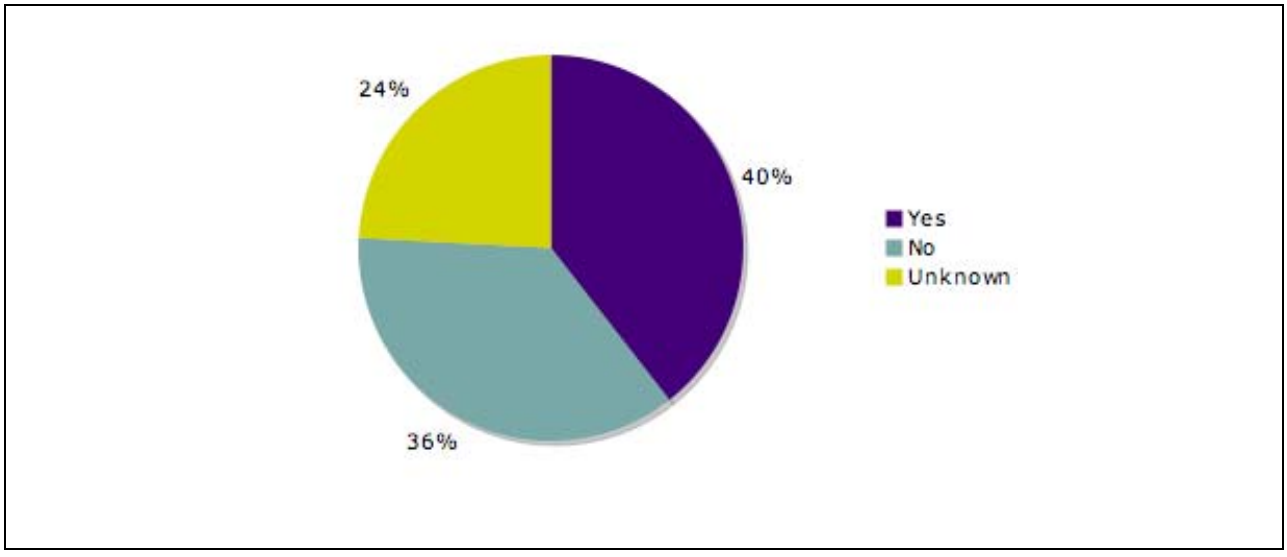
Respondents were geographically diverse; they came to the National Bike Summit from across the nation. Respondents represented sixteen different states. (See table 5).

TABLE 5. RESPONDENTS BY STATE

State	Respondents
CA	5
DC	4
CO	3
MD	3
MO	2
MS	2
NY	2
UT	2
IL	1
LA	1
MA	1
MN	1
OH	1
Ontario, CA	1
PA	1
SC	1
TN	1

Only forty percent of the respondents were able to confirm that a bike parking ordinance exists in their city. Approximately the same number of respondents indicated that bike parking ordinance did not exist. Nearly twenty-five percent of the respondents, who traveled to a national event to lobby for bicycle improvements, were not aware if their city had a bike parking ordinance. (See figure 1).

FIGURE 1. EXISTENCE OF BIKE PARKING ORDINANCE IN RESPONDENT CITY OF RESIDENCE



There is a large variety of bicycle parking ordinances and they might apply to residential or commercial buildings, new construction, schools, or park and ride lots. Not a single respondent asked for clarification about what types of bike parking ordinances applied to this question.

Bicycle Advocacy Group Representatives

Twenty-seven of the respondents indicated that they represented bicycle advocacy groups. Some advocacy groups are represented more than once in the sample.

Half of the respondents representing groups organized for teen or more years stated that safety was their number one goal. These representatives also ranked increasing the portion of travel by bike over increasing facilities. Individuals representing groups organized for ten or fewer years found the goals of improving safety and increasing facilities equally important. (See table 6, next page). Representatives from groups that have been organized ten or more years wrote many additional goals including: improve state cycling law, education, sustainable mountain bike trails, access for mountain bikes to land, trail construction, protect natural resources, clean air, and congestion relief. These responses indicate that advocacy groups are not necessarily focused on physical improvements.

TABLE 6. RANK THE FOLLOWING GOALS

	Goal		
Rank	Improve Safety	Increase Facilities	Increase Portion of Travel by Bike
All Groups			
1	48%	37%	37%
2	19%	37%	22%
3	26%	19%	26%
10 or more years organized			
1	50%	33%	39%
2	11%	44%	17%
3	28%	11%	22%
10 or fewer years organized			
1	44%	44%	33%
2	33%	22%	33%
3	22%	33%	33%

Advocacy group representatives were asked to rank bicycle improvements by advocacy priorities. This section was intended to identify what strategies the advocacy groups are using to pursue their goals. To simplify this analysis, the top three advocacy priorities are contrasted. Regardless of the number of years an advocacy group was organized, representatives ranked education/awareness of cycling as the top advocacy priority. Individuals with groups organized for ten or more years ranked establishing a network of bike lanes as their second priority. This is interesting to compare with individuals representing groups organized for ten or fewer years as there was an even distribution of responses indicating that secure bike parking, a network of bike lanes, and dedicated bike paths was their second priority. The majority of respondents ranked dedicated bike paths as their third priority. However, there were an equal number of respondents from groups organized for ten or fewer years who considered education/awareness of cycling their third priority. Representatives from groups with more than ten years of experience wrote in many additional priorities. These additional priorities included: setting world speed and endurance records, rail-trails, better on street/streets, shared use (hikers, equestrians), negotiate land access, new bike master plan, social events, shared lane markings, and volunteer support. (See table 7).

TABLE 7. RANK THE FOLLOWING BICYCLE IMPROVEMENTS BY YOUR ADVOCACY PRIORITIES

Rank	Secure Bike Parking	Network of Bike Lanes	Dedicated Bike Paths	Bikes on Buses/Transit	Education/ Awareness of cycling	Other
All Groups						
1	4%	22%	15%	11%	**56%**	11%
2	15%	**52%**	19%	0%	4%	4%
3	15%	7%	**33%**	11%	22%	0%
10 or more years organized						
1	6%	17%	17%	11%	**61%**	17%
2	6%	**61%**	11%	0%	6%	6%
3	17%	6%	**33%**	11%	17%	0%
10 or fewer years organized						
1	0%	33%	11%	11%	**44%**	0%
2	**33%**	**33%**	**33%**	0%	0%	0%
3	11%	11%	**33%**	11%	**33%**	0%

The most common campaigns involved acquiring bike lanes and educational programs about cycling. Many additional kinds of campaigns were added by the respondents, including: law improvements, federal aid to local level, bike routes, traffic laws, active transportation infrastructure, sharrows, and bike friendly businesses. (See table 8).

TABLE 8. MOST COMMON BICYCLE IMPROVEMENT / PROGRAM CAMPAIGNS

Group	Secure Bike Parking	Bike Lanes	Dedicated Bike Paths	Bikes on Buses/Transit	Educational Programs About Cycling
All Groups	63%	**81%**	74%	67%	**81%**
10 or more years organized	61%	78%	78%	67%	**83%**
10 or fewer years organized	67%	**89%**	67%	67%	78%

Opinions about Bicycle Facilities

The respondents were also asked their opinion of different bicycle facilities and improvements. There were four general categories of questions: (1) What factors can increase the total portion of transportation by bike; (2) what factors can deter individuals from using bikes; (3) if research is needed; (4) and who should provide bike parking. See table 9 to review respondents' opinions about bicycle facility improvements.

All respondents agreed that it is important to increase the total portion of trips by bike. Ninety-seven percent strongly agreed and three percent agreed.

When asked about what factors might increase the total portion of trips by bike, bicycle facilities received the strongest response. For the more specific improvements, bicycle lanes and paths received a stronger agreement than bicycle parking. Over ninety-percent of respondents agreed that bicycle lanes and paths can increase the mode share while less than eighty percent of the respondents agreed that secure bike parking can increase the mode.

TABLE 9. BICYCLE FACILITY OPINIONS

	Strongly Agree	Agree	Disagree	Strongly Disagree
It is important to increase the total portion of transportation completed by bike.	97%	3%	0%	0%
The following factor can increase the total portion of transportation by bike				
Bicycle facilities	94%	6%	0%	0%
Bicycle lanes and paths can increase it	91%	9%	0%	0%
Secure bike parking can increase it	79%	21%	0%	0%
Factors that Can Deter Individuals from Using Bikes				
Bike theft	47%	41%	0%	12%
A lack of bicycle amenities	56%	44%	0%	0%
A lack of secure bike parking	47%	50%	0%	3%
A lack of bike paths/lanes	74%	18%	0%	9%
Research is Needed On				
How different facilities/improvements can increase the mode share of bicycles	47%	44%	0%	9%
How bike paths/lanes can increase the mode share	53%	32%	0%	15%
How bike parking can increase the mode share of bicycles	47%	41%	0%	12%
Who Should Provide Bike Parking				
Employers	85%	15%	0%	0%
Merchant associations	76%	21%	0%	3%
My city government	79%	15%	0%	6%
My city government cares about providing adequate bike facilities	56%	24%	0%	20%

The responses to factors that might deter individuals from using bikes also seemed to elevate bike paths and lanes. While three-quarters of respondents strongly agreed that a lack of bike paths and lanes could deter individuals from using bikes, only forty-seven percent strongly agreed that a lack of secure bike parking could deter individuals from cycling. However, ninety-seven percent of respondents agreed that a lack of secure bike parking could deter cycling while a lower share of respondents, ninety-one percent, felt that a lack of bike paths/lanes could deter cycling. Opinions about the impact of bike theft and a lack of bicycle amenities were similar to opinions about bike parking.

As for research, again more respondents strongly agree that research is needed on bike paths/lanes. However, by combining those in the strongly agree and agree categories, a slightly greater portion of respondents think research is needed on bike parking. A sizable portion of

respondents did not think that research was needed on how different facilities and improvements, bike paths/lanes, or bike parking can increase the mode share.

When asked who should provide bike parking, most respondents felt it should be the responsibility of employers. None of the respondents disagreed that employers should provide bike parking. While there was also support for merchant associations and city government to provide bike parking, it was not as strong. Some respondents strongly disagreed that bike parking should be provided by these entities.

Finally, approximately four-fifths of the respondents agreed or strongly agreed that their city government cares about providing adequate bike facilities. The remaining fifth strongly disagreed with this statement.

Sample Bias

The survey was not designed to measure the views of the average cyclist or individual but rather to obtain data about bicycling advocates priorities. Considering many of the respondents traveled across the nation to attend the Bike Summit they may be more committed or have more resources to use to promote bicycling than the average advocate. The survey was not a random sample of all attendees or attendees at a particular session. Instead, it was conducted as an intercept survey. Participation was requested from as many respondents as possible during all sessions, during breaks, and at social events that occurred during the summit. Respondents were unable to check their organizations records while they completed the survey and their responses may not be completely accurate. Nonetheless, conducting the survey at the National Bicycle Summit enabled easy access to many advocates and speeded the rate of data collection.

Findings

While advocates recognize bicycle parking as a legitimate advocacy goal, bikeways, not bicycle parking is a focus of advocacy. This may be because more of the respondents strongly

agreed that bicycle paths/lanes are more likely to increase the mode share of bicycle than end of trip facilities. Or, because more respondents strongly agreed that a lack of bicycle paths/lanes is more likely to deter cycling than a lack of bicycle parking. Almost a quarter of respondents were not aware if their city has a bike parking ordinances. While bicycle parking was not the focus of advocacy efforts, the majority of respondents strongly agree that employers, merchant associations, and city governments should provide secure parking.

Chapter 4. New Orleans Bicycle Facility Survey

Purpose

The debate that triggered the concept for this thesis centered on whether or not cyclists (and potential cyclists) in New Orleans need and/or desire bike parking. During a community meeting for cyclists held in December 2008, a participant expressed a concern over a lack of bike parking at parks as well as commercial districts located within the City of New Orleans. An inventory of current parking facilities was recommended. Another participant interjected with a comment that bike parking was not critical because given the right equipment (chain and lock); one could lock to trees, parking meters, fences, and other elements that already exist in the urban environment. This individual felt cyclists might benefit if bicycle advocates focused their energy elsewhere. The intent of the New Orleans Bicycle Facility Survey is to learn about the perceptions of bike parking by those familiar with cycling in New Orleans (Research Question 2A).

Methodology

Individuals familiar with cycling in New Orleans were surveyed from March 15th to March 22st at various cycling destinations across the City of New Orleans. Surveys were collected at formal and informal locations that bicyclists frequent. The total number of cyclists or individuals familiar with cycling in the City of New Orleans is unknown.[12] Therefore, a deliberate decision

[12] The most recent data from the Federal Highway Administration's National Household Travel Survey was collected in 2008. A total of 12% of the 42 individuals sampled across the New Orleans Metropolitan Statistical Area reported one or more bike trips in the last week. While this data could be extrapolated to project the total number of individuals across the New Orleans Metropolitan Statistical Area (or Urban Area) that completed one or more bike trips it is not appropriate for at least three reasons (1) an individual familiar with cycling in New Orleans may not necessarily complete a cycling trip during the week in which they participated in the survey; (2) the survey focuses on the City of New Orleans; the National Household Travel Survey's data is reported for the metropolitan statistical area; (3) New Orleans total population has been in debate ever since the City's levees breached following Hurricane Katrina. The American Community Survey includes questions about mode of transportation to work however mode of transportation to work does not necessarily correlate an individuals familiarity with cycling in New Orleans.

was made to collect as many surveys as possible over the course of a week, rather than try to collect a specific number of surveys. A total of 99 surveys were collected in person during the seven-day period in March, in contrast with the RPC and DHH survey which collected 328 surveys online over a two month period.

Survey Locations and Timing

Survey locations were selected to capture opinions from cyclists across the City of New Orleans. This could account for varied perceptions of end of trip facilities across the city. Informal locations included the Algiers Point Ferry (the main route cyclists use to get from the East to the West Bank of the Mississippi River), the Den of Discord (a community bike project in Bywater), and New Orleans Bike Polo's Grounds (beneath the Pontchartrain Expressway). Formal locations included three bicycle shops: Bicycle Michael's in the Marigny, Bayou Bicycles in Mid-City, and Gherkins Bicycle Shop in the Bywater. Approval was obtained from the bicycle shops before data was collected. A time was arranged with GNO Cyclery (Uptown) management but the store was closed upon arrival. A request to collect surveys at Mike the Bike Guy (Uptown) was declined by the store's management due to inadequate space in the store.

Surveys were collected in the middle of March, one of New Orleans most temperate months. The average high and low is 72 and 53°F, respectively. With an average rainfall of 5.24", March has slightly less rainfall than the median precipitation rate of 5.25" per month (The Weather Channel Interactive, Inc., 2009). Based on weather patterns, March is one of the most conducive months for cycling in the City of New Orleans. By choosing to collect surveys in March, ideally a range of system users would be encountered: from the most committed to the occasional recreational cyclists; from weekend warriors to those who ride bikes because they

Determining the bicycle mode share is an ongoing challenge faced by bicycle professionals (Association of Pedestrian and Bicycle Professionals, 2009).

have no other transportation option. Additional details about the survey method limitations are provided in appendix F.

TABLE 10. SURVEY COLLECTION BY LOCATION AND DATE

Date	Entire Sample	Bicycle Michaels	Bayou Bicycles	Gherkins	Ferry	Discord	Bike Polo
3/15/09	40	26	0	3	2	2	7
3/21/09	38	0	20	0	18	0	0
3/22/09	11	0	0	0	3	8	0
Packet	10	2	0	0	0	8	0
Total	99	28	20	3	23	18	7

Survey Questions

The Survey questions were designed to determine respondents' desires for and opinions about end of trip facilities. The first two sections asked about transportation habits and demographics. The third and forth section specifically relate to this thesis and asked for participants to indicate their opinions of bike facilities in New Orleans and identify areas where bicycle improvements are desired, including bicycle parking, and what would encourage them to ride more. A copy of the survey can be found in Appendix E. Only those questions and responses that directly relate to end of trip facilities are presented in this Chapter. Appendix F provides findings for all other inquiries.

Nine questions were asked to gauge opinions about bicycle facilities in New Orleans. These question asked respondents on a four-point scale to identify the extent to which they agree or disagree with different statements. Almost all of these questions related to bike parking including (1) ease to find it; (2) who should provide it; and (3) if New Orleans needs more bicycle parking. Respondents were also asked if they (or an acquaintance) have had a bike stolen.

In an open-ended section, questions asked about what areas would benefit the most from secure bike parking, what bicycle improvements are most important in New Orleans, and what would encourage them to ride more often. This section was designed to collect additional

insights respondents may have about bicycle facilities, including bicycle parking, in the City of New Orleans.

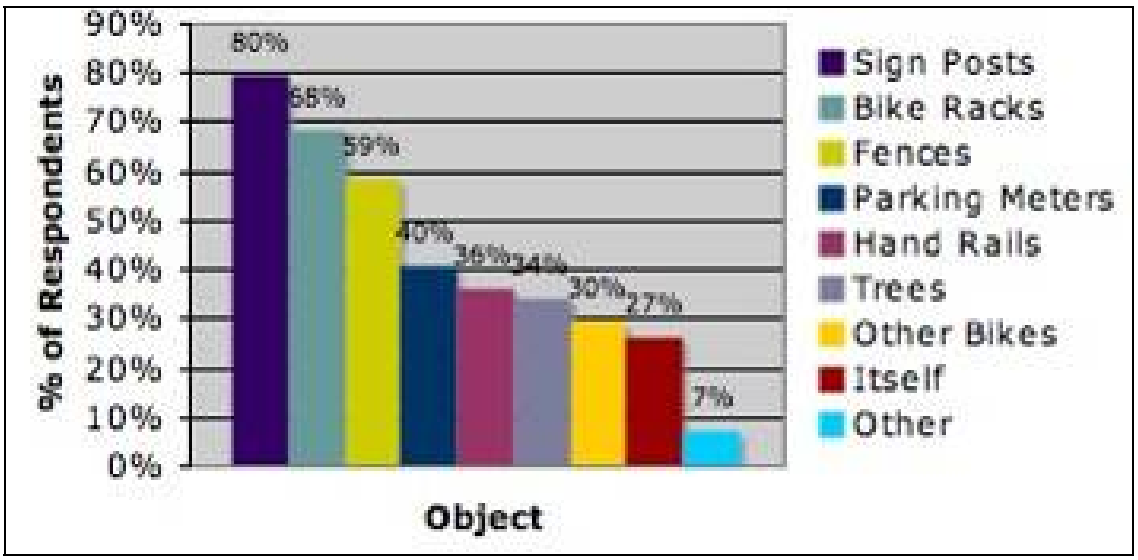
Results

Current Parking Habits

TABLE 11. WHAT DO YOU USUALLY LOCK YOUR BIKE TO?

Object	Respondents	% of Respondents
Sign Posts	74	80%
Bike Racks	63	68%
Fences	54	59%
Parking Meters	37	40%
Hand Rails	34	36%
Trees	32	34%
Other Bikes	28	30%
Itself	25	27%
Other	7	7%

FIGURE 2. WHAT DO YOU USUALLY LOCK YOUR BIKE TO?



Responses to the question, “What do you typically lock your bike to?” indicate that while many respondents lock their bicycles to bike racks, other kinds of objects are commonly used for parking. Some respondents indicated that they never leave their bicycle outside while others lock their bike to whatever is available (See table 11 and figure 2).

Opinions about Bicycle Facilities

Respondents were asked about their opinions of end of trip facilities. These question asked respondents on a four-point scale to strongly agree, agree, disagree, or strongly disagree about the extent they agree with different statements. Almost all of these questions related to bike parking, including (1) ease to find it; (2) who should provide it; and (3) if New Orleans needs more. Respondents were also asked if they (or an acquaintance) have had a bike stolen. See table 12 to review respondents' opinions about bicycle facilities.

TABLE 12. END OF TRIP FACILITY OPINIONS

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. It is easy for me to find secure bike parking in New Orleans.	5%	33%	52%	9%
2. Sometimes I don't ride my bike (to work, for errands, and/or for recreation) because of a lack of bike parking.	9%	25%	27%	40%
3. Well-designed and placed bike parking can deter theft.	59%	30%	7%	4%
4. Cyclists would ride more in New Orleans if there were more secure bike parking.	43%	46%	8%	2%
5. Employers should provide secure bike parking	63%	31%	4%	2%
6. The City of New Orleans should provide secure bike parking	62%	34%	2%	2%
7. Merchant associations / retail establishments should provide secure bike parking.	56%	40%	3%	1%
8. I (or an acquaintance) have (has) had a bike stolen.	72%	21%	0%	7%
9. New Orleans needs more well-designed and well-placed bike parking.	64%	33%	2%	1%

While over three-fifths of respondents do not think it is easy to find secure bike parking, only a third indicated that it interferes with riding their bike. The vast majority of respondents had experienced a bike theft incident, either personally or through an acquaintance, and felt that well-designed and placed bike parking can deter theft. As for a funding source, almost all respondents agreed or strongly agreed that employers, the City, and merchant association or retail establishments should provide bike parking. Eighty-five percent think cyclists would ride

more in New Orleans if secure bike parking was more readily available and that the city needs more well-designed and well-placed bike parking.

Open Ended Questions

The fourth part of the survey asked respondents open ended questions. Three questions asked about areas of New Orleans that would benefit from secure bike parking, what facility improvements are most important to the City, and what would encourage the respondent to ride a bike or ride more often. Answers are detailed by frequency (#) below in tables 13 to 15.

TABLE 13. WHAT AREAS OF NEW ORLEANS WOULD BENEFIT FROM SECURE BIKE PARKING

Areas	Frequency
All Areas	9
Downtown	5
Work places	1
French Quarter	30
Jackson Square	3
Riverwalk	2
Decatur	2
Erin Rose	1
Rouses on Royal	1
Marigny Triangle	1
Frenchman	9
Marigny	5
Franklin and Royal	1
Bywater	7
Bywater Retail Areas	2
Hi-Ho	1
St. Claude	1
St. Claude Art District	1
St. Roch	1
Royal and Louisa	1
Ninth Ward	1
Warehouse District	1

Areas	Frequency
CBD	7
CBD- Office Buildings	2
CBD- Restaurants	1
Canal Place	1
Superdome	1
Arena	1
Casino	1
Poydras	1
Central City	1
Lower Garden District	2
Garden District	2
Retail Areas	1
Uptown	8
Audubon Park	1
Oak Street	1
Midcity	7
City Park	3
Canal & Carrollton	2
Midcity Retail Areas	1
Fairgrounds	1
Lakefront	1
Lakeview	1

Areas	Frequency
Transit	
Bus stops	2
Streetcar Intersections	1
at Napoleon	1
at Louisiana	1
at Jackson	1
at Canal	1
Streets	
Magazine Street	11
at Whole Foods	1
in Uptown	1
Canal Street	4
St. Charles	3
Rampart	1
Tchoupitoulas	1
N. Broad Street	1
Levee Trail	1
General	
Grocery Stores	5
Commercial Areas	4
Bars	3
Post Offices	2
Universities & nearby areas	2
Theaters	1
Parks	1
Malls	1
Box Stores	1

Note: The above responses are likely based on the geographic sample distribution of those who completed the survey.

TABLE 14. WHAT BICYCLE FACILITY IMPROVEMENTS ARE MOST IMPORTANT IN NEW ORLEANS?

Improvement	Frequency
Routes	
Bike lanes	43
Wider bike lanes	3
On busy streets	2
for bridges	1
Magazine Street	1
Shared lanes	1
Road repair- repaving, pothole repair	14
Bike path	14
Clean streets, bridges, levee paths	5
Signage	3
Add stops signs in neighborhoods	1
Lighting	2
Connectivity across town	1
Traffic calming	1
Bike boulevard	1
Segregate modes- cars off smaller streets	1
Carfree zones	
Street closure	1
City Park	1
Pedestrian bridge access	1
End of trip facilities	
Bike parking	16
Covered bike parking	1
Parking near public buildings	1
Magazine Street	1
YLC Where Ya Rack	1
Enforcement	
Ban text messaging while driving	1
Encouragement	
Bike shops	
More	2
Extended hours	1
Culture of bike transportation	1
Plan B	1
Education	
Driver awareness	9
Law enforcement education	2
Transit Interface	
Ferry – improve	2
RTA end permit	1
River crossing	1
Safety	1
Security	2

TABLE 15. WHAT WOULD ENCOURAGE YOU TO BIKE OR RIDE MORE OFTEN?

Encouragement	#
Routes	
Bike lanes	37
On all roads	1
Prytania, Tchoupitoulas, Freret, Claiborne, Chartres, Galvez, Broad, Franklin	1
Cross town connectivity	1
Better roads	19
Bike paths	7
Clean roads, bike lanes, bike paths, levee paths, and/or bridges	6
Shared lanes	2
Signage	2
Bridge access for bikes	2
Lights	1
End of trip facilities	
Bike parking	13
Valet parking	1
Showers at work	1
Rest areas	1
Encouragement	
Driver awareness	17
City incentives	1
Tax leniency for bike commuters	1
Culture of bike transportation	2

Encouragement	#
Enforcement	
Police enforcement	3
Laws	2
Safety	
Safety	6
Less cars	2
Safer areas	2
Transit Interface	1
RTA permit	1
Reliable ferry	1
24/7 ferry to Algiers	1
Environment	
Weather	2
Pollen	1
Other	
Shorter commute	1
Better equipment	1

Sample Bias

This survey was not designed as a random, statistical sample of the general population or of individuals familiar with cycling in New Orleans. It is an intercept survey conducted at areas frequented by cyclists in the City of New Orleans. The respondents are familiar with cycling in the New Orleans and it is likely that they have an intimate knowledge of the City's bicycle network and infrastructure. Their concerns may not directly match those of the general population; however it seems safe to assume the factors that encourage and deter the respondents from cycling also affect non-cyclists decision of whether or not to ride.

Findings

While only a quarter of respondents are deterred from riding bikes due to a lack of secure parking or bike theft concern, over half think bike rack improvements would encourage them to ride more. A variety of street furniture is adaptively used for bicycle parking in New Orleans, with sign posts named most frequently. Respondents agree that bike parking should be provided by employers, the City of New Orleans, and merchant associations/retail establishments. Neighborhoods and corridors across the City were listed as areas that would benefit from secure bike parking. The most frequently mentioned locations included the French Quarter, Magazine Street, and the CBD. Respondents overwhelmingly agreed that New Orleans needs more well-designed and well-placed bike parking.

Chapter 5. Magazine Street Bike Parking Study

Purpose

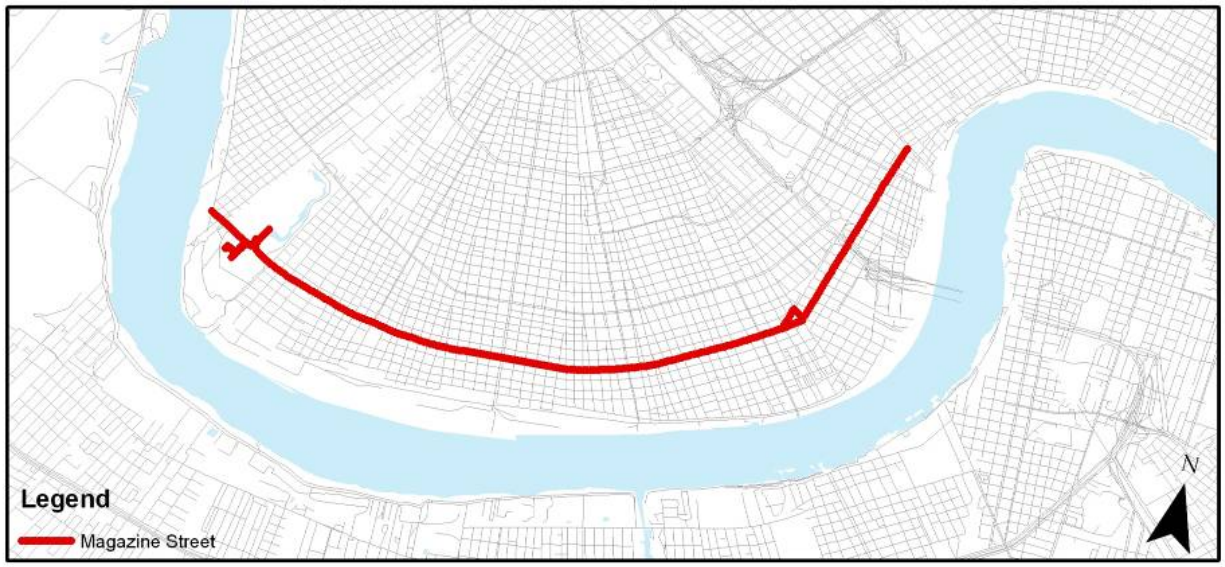
The purpose of this chapter is to assess the existing supply of and demand for short-term bike parking on Magazine Street in New Orleans, Louisiana. It is designed to answer Research Question 2B: What is the state of bike parking on Magazine Street in New Orleans?

The Magazine Street Bicycle Parking study develops and tests a methodology to measure demand for existing bike parking. Data collected during the study also responds to the Alliance for Biking and Walking's call for improvements to the quality and quantity of data collection (Steele, 2007; Steele 2010).

Background

Chapter 4 identified how individuals familiar with cycling in New Orleans perceive end-of trip facilities as well as other bicycle improvements across the City of New Orleans. Open-ended questions included, "What areas of New Orleans would benefit from secure bike parking?" Frequently named locations included the French Quarter, Central Business District, and Magazine Street. This study evaluates existing supply and demand of bicycle parking on Magazine Street (Corridor). The Corridor was selected because (1) it has a mix of land uses (while it is primarily commercial and residential some areas include institutional and industrial uses), (2) it is also a well-known destination for local residents as well as tourists, and, (3) rather than being one neighborhood onto itself, it runs through several neighborhoods (Central Business District (CBD), Warehouse District, Lower Garden District, Irish Channel, Uptown, Audubon, and Black Pearl).

FIGURE 3. PROJECT AREA BASE MAP



Source: ArcGIS Map Created by Nicole S. McCall, February 2010

Data will provide information about bicycle parking patterns on Magazine Street between Canal Street and Leake Avenue (See figure 3, Project Area Base Map). This corridor is approximately 5.4 miles long. Data obtained begins to inform questions about the adequacy of current supply of bicycle parking and how to better respond to and manage demand.

Methodology

Design of the Study

An inventory of existing bicycle racks and assessment of existing demand for bicycle parking on Magazine Street in New Orleans, Louisiana was collected and analyzed. To obtain additional insight, existing land use data obtained from the Regional Planning Commission is compared with this data.

The inventory identifies existing bicycle racks that are visible and accessible to the general public from the Magazine Street public right-of-way (meaning streets and sidewalks). Although there are a number of other end of trip facilities that can encourage cyclists, such as indoor parking, workplace showers, and lockers, this inventory only considers existing racks that anyone can access. The APBP (N.D) has asserted that “Racks that are far from the entrance,

hard to find, or perceived to be vulnerable to vandalism will not be used by most cyclists." By limiting the inventory to locations that are visible and accessible to the general public from the Magazine Street public right-of-way an assumption is made that individuals looking for short-term bicycle parking along Magazine Street will be able to easily identify the bicycle racks and feel secure leaving a bicycle locked for a short period of time (up to a few hours). Bicycle racks that are visible from Magazine Street but located slightly up a side street or with a sign providing directions to bicycle racks that are available to the public are also included as a part of the inventory. However, bicycle racks that are behind buildings or otherwise not visible from Magazine Street will not be included[13]. For each bicycle rack identified, the following characteristics are collected: (1) address (2) capacity or the number of bicycles the rack can hold, (3) lighting, (4) shelter (if bicycles are sheltered from elements in any way), (5) closest business, (6) type of rack, and (7) condition, and (8) notes or any other information to describe the racks that might be helpful.

To assess demand, during the month of October 2009, the number of bicycles locked along the corridor was identified block by block. Bicycles locked to bicycle racks were tallied separately from those locked to other objects. Two site visits were conducted for each of the following periods of the day: Morning (7 to 11 am), Mid-day (11 to 6 pm), and Evening (6 to 10 pm). The assessments were completed on Friday evenings, Saturdays, and/or Sundays. The three time periods were selected to capture varying parking patterns across the day. The days were selected because of the focus on identifying demand for bicycle racks. According to the APBP, bicycle racks are suited for short-term parking. For longer term parking, the association recommends the use of more secure facilities such as indoor parking and bicycle lockers

[13] An exception is only made for the bike racks at Whole Foods Market. Whole Foods Market has racks located in front and behind its store. The grocer has made an effort to improve cycling in New Orleans. Aside from providing three racks at its store, on June 25, 2009, 5% of the stores proceeds were donated to the Young Leadership Council's Where Ya Rack Project. This project encourages cycling as an environmentally friendly and healthy transportation option by installing unique bike parking throughout the City of New Orleans. (Whole Foods, 2009). Due to its efforts to support cycling, an assumption is made that these racks are better known by the community.

(2002). According to the Bureau of Labor Statistics' 2008 American Time Use Survey, less than a quarter of the population engages in working and work-related activities on weekends and holidays. This data indicates that a large proportion of the population does not work on weekends. There is evidence that workers take a greater number of short trips when they have the day off (Bae, 2004). It was assumed that more short trips occur on weekends and, consequently, more informative data about bike parking patterns would be obtained on these days.

This assessment is intended to be a starting point to identify current bicycle parking patterns along the corridor. While it has been argued that bike parking can influence individuals to use bicycles as their mode of transportation, or induce demand, this concept is not treated as a part of the Magazine Street Bike Parking Study (Forester, 1983).

Limiting Conditions and Constraints

The scope for this study was deliberately narrow so that it could be completed within a month. This translates into several limiting conditions and constraints.

- First, the pattern of bicycle parking was observed but actual cyclists were not interviewed. Individual cyclists might be able to explain the nature of their trip and provide more information about why they selected the location to which they secured their bicycle. The location was selected based on responses to the New Orleans Bicycle Facility Survey (presented in Chapter 4). The assessment moves beyond a stated preference for bicycle parking and observes how bicyclists actually park along a corridor.
- Only bicycles that were parked within the public right-of-way were included in the study. It is possible that some businesses allow their customers to bring their bicycles inside for short periods of time or have private racks behind their business. It is unclear how well known these locations may be.

- The data collection occurred within a month. Extending data collection may have revealed more about bicycle parking patterns.
- Data was collected during daylight hours only. Bicycle parking patterns may differ in the evening hours. In addition, the presence of lighting fixtures was seen however, the study did not verify that the fixtures were actually operating.
- Data was only collected on weekends. Bicycle parking patterns may differ during weekdays.

Findings

Bicycle Rack Inventory

On September 26, 2009, a total of twenty bicycle racks with 166 bicycle parking spaces were identified between Canal Street and Leake Avenue along Magazine Street. Pictures and descriptions of the racks are provided in table 16. The APBP's "Bicycle Parking Guidelines" were used to determine the style of rack. The Bicycle Rack Locations and Capacities Map, figure 4, provides a map of the racks with capacity.

TABLE 16. BIKE RACK INVENTORY

#	Description	Picture
1.	Hale Boggs Federal Building This comb or schoolyard style rack is at the corner of Poydras and Magazine, on the north side of Magazine. It is designed to fit up to sixteen bicycles. There is nearby lighting and it is sheltered by an overhang.	

Table 16, continued

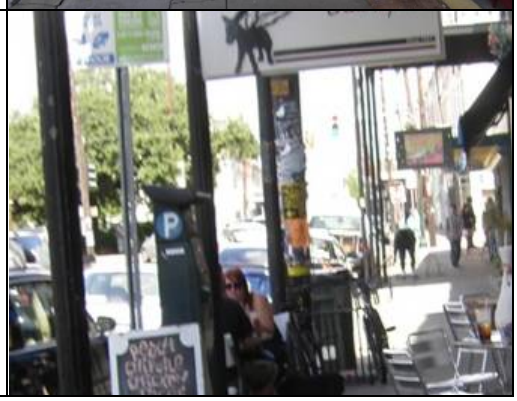
#	Description	Picture
2.	Surrey's Cafe and Juice Bar This comb style rack is at 1418 Magazine Street. It is in very poor condition. While it appears to be designed for more it appears, in its current state, it can only serve two bicycles. There is a street lamp on the other side of the street and no shelter.	
3.	Mojo's Coffee Shop This toast style rack is located on Race Street adjacent to Mojo's Coffee House at 1500 Magazine. It can fit up to thirteen bicycles. Street lamps are nearby and there is no shelter.	
4.	Darkroom Printing and Framing This comb style rack is located at 1929 Sophie Wright Place. It is across a small park from Magazine Street. It can serve up to five bicycles. Lighting is directly above the rack and an overhang shelters it.	
5.	Juan's Flying Burrito This comb style rack is located at 2018 Magazine Street between St. Andrew Street and Josephine Street. It is designed for up to four bicycles. Lighting is nearby but there is no overhead shelter.	

TABLE 16, CONTINUED

#	Description	Picture
6.	Rum House This comb style rack is located at the corner of 9th Street and Magazine Street in front of the Rum House (3128 Magazine Street). It can hold up to four bicycles. It is under the edge of an overhang. The bicycle rack is somewhat difficult to see due to bushes that act as a buffer between it and 9th Street	
7.	Walgreens This wave style rack is located in the Walgreen's Parking Lot (3227 Magazine Street) at the intersection of Magazine and Pleasant. It is designed fit up to six bicycles. There is nearby lighting. The rack does not have overhead shelter.	
8.	Harry's Ace Hardware Two post and loop or lollypop style racks were found on the side of Harry's Ace (3535 Magazine). Each rack is designed to serve two bicycles. There is no lighting or overhead shelter. There are three signs posted near the racks. Two are printed with "Bike Parking for Harry's Ace Customers" A third sign states "No Parking Bikes on Wrought Iron Fence."	
9.	The Club Ms. Mae's This comb style rack is located near The Club Ms. Mae's at 4336 Magazine Street. It is designed for up to four bicycles. There is no shelter but there is street lighting.	

TABLE 16, CONTINUED

#	Description	Picture
10.	Mike the Bike Guy This comb style rack is located in front of 4411 Magazine Street. Several streetlamps are nearby. It is not sheltered. It is designed for up to four bicycles.	
11.	Escape from New York Pizza This comb style rack, which is designed for up to five bikes, is in front of Escape from New York Pizza across the street from Mike the Bike Guy. There is a light illuminating the entrance and no overhead shelter.	
12.	Igor's Buddha Belly This comb style rack is located the corner of Jena Street and Magazine St, adjacent to Buddha Belly Bar-Grill. It can fit up to four bikes. There are nearby street lamps and no overhead shelter.	
13.	5109 Magazine Street This comb style rack can fit up to twelve bikes and is on the lawn in front of a house at 5109 Magazine. There is no lighting or shelter. It is not clear if the rack is intended for public use because it is set back from the street.	

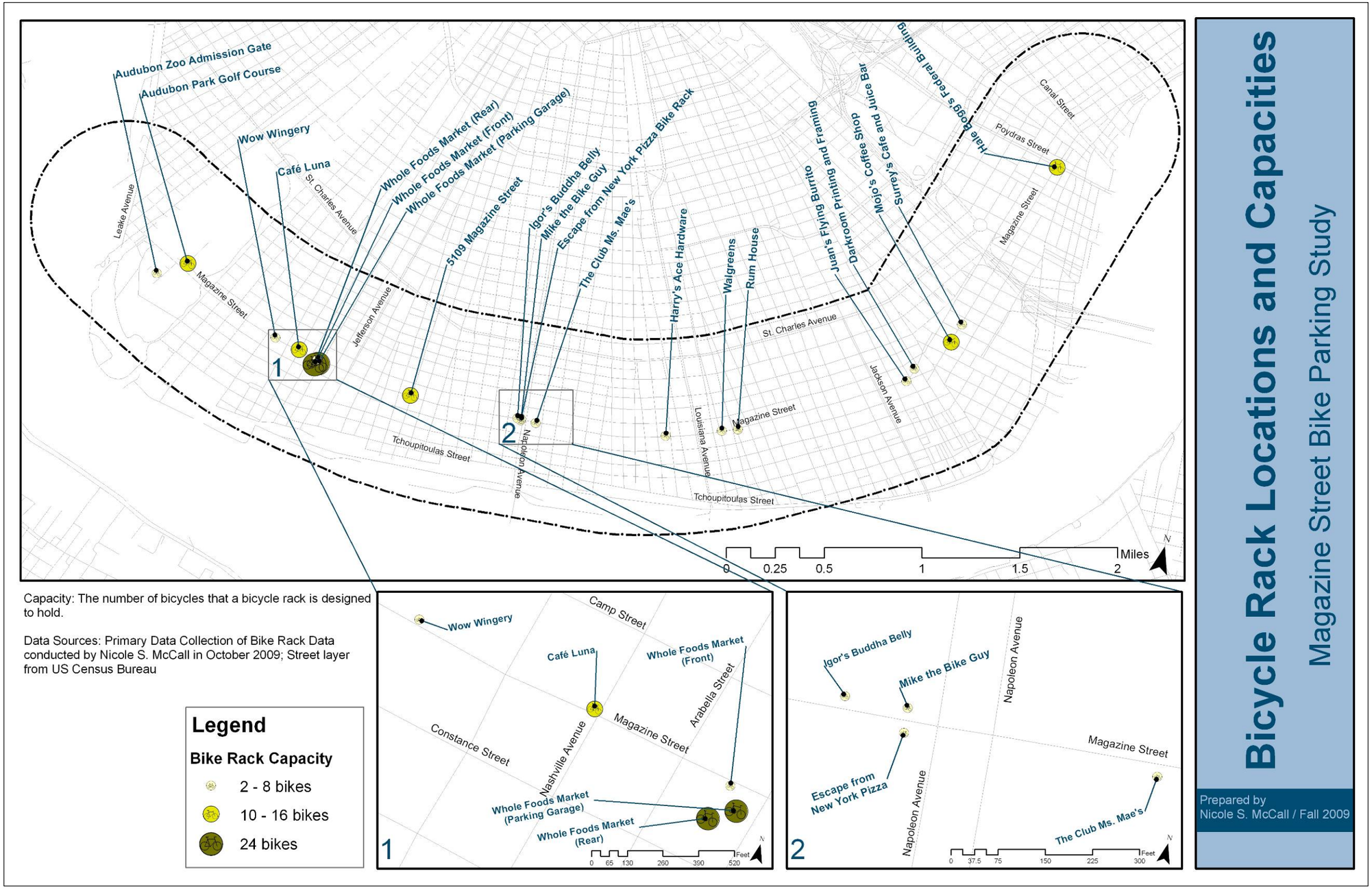
TABLE 16, CONTINUED

#	Description	Picture
14.	Whole Foods Market (Front) This hybrid comb/toast style rack is located in front of Whole Foods at 5600 Magazine Street. It is designed for four bicycles. The front of Whole Foods is illuminated with light posts. There is no overhead shelter.	
15.	Whole Foods Market (Parking Garage) This comb style rack is located in the Whole Foods parking garage at 5600 Magazine Street. It is designed to hold up to twenty-four bicycles. It is very close to the entrance to the store. The garage provides overhead shelter and is lighted.	
16.	Whole Foods Market (Rear) This comb style rack is located near the rear of the Whole Foods (5600 Magazine Street) on Constance Street. It is designed to hold up to twenty-four bicycles. In comparison to the other racks at Whole Foods it appears untended. There is no lighting or shelter.	
17.	Café Luna This comb style bike rack is located at the corner of Magazine and Nashville. It is behind a wrought iron gate one must enter to access Café Luna, Sweet Pea & Tulip, and Shebop Shops at 802 Nashville. It is designed to hold up to eleven bicycles. There is no lighting or overhead shelter.	

TABLE 16, CONTINUED

#	Description	Picture
18.	Wow Wingery This comb style rack is located at Magazine and State Street adjacent to Wow Wingery (5961 Magazine Street). It can hold up to four bicycles. Nearby street lamps provide some lighting and it has not overhead shelter.	
19.	Audubon Park Golf Course This comb style rack is located along the Audubon Park path near the entrance to the golf course parking lot. It is designed to hold up to ten bicycles. A lamp that is approximately ten feet away illuminates it. There is no overhead shelter.	
20.	Audubon Zoo Admission Gate Four post and loop style racks are located near the entrance to Audubon Zoo. Each rack can hold up to two bicycles. There is nearby lighting but no overhead shelter.	

FIGURE 4. BICYCLE RACK LOCATIONS AND CAPACITIES MAP



Capacity: The number of bicycles that a bicycle rack is designed to hold.

Data Sources: Primary Data Collection of Bike Rack Data conducted by Nicole S. McCall in October 2009; Street layer from US Census Bureau

Legend

Bike Rack Capacity

- 2 - 8 bikes
- 10 - 16 bikes
- 24 bikes

Bicycle Rack Locations and Capacities

Magazine Street Bike Parking Study

Prepared by
Nicole S. McCall / Fall 2009

Bike Parking Demand Assessment

BICYCLE PARKING PATTERNS

The assessment of the demand for existing bicycle parking was completed between October 2 and October 31, 2009. On average, 80 bicycles were found parked along the corridor with 26 bicycles at bicycle racks and 54 bicycles at other locations. Table 17 below shows the number of bicycles identified along the corridor through the collection process.

TABLE 17. MAGAZINE STREET SHORT TERM BICYCLE PARKING ASSESSMENT

Date/Time	Bicycles Parked in Bicycle Racks	Bicycles Parked in All other Areas	Total
Oct 2 / Evening	18	50	68
Oct 10 / Morning	27	67	94
Oct 11 /Morning	17	17	34
Oct 17 / Midday	41	62	103
Oct 18 / Evening	34	54	88
Oct 31 / Midday	20	71	91
Average	26	54	80

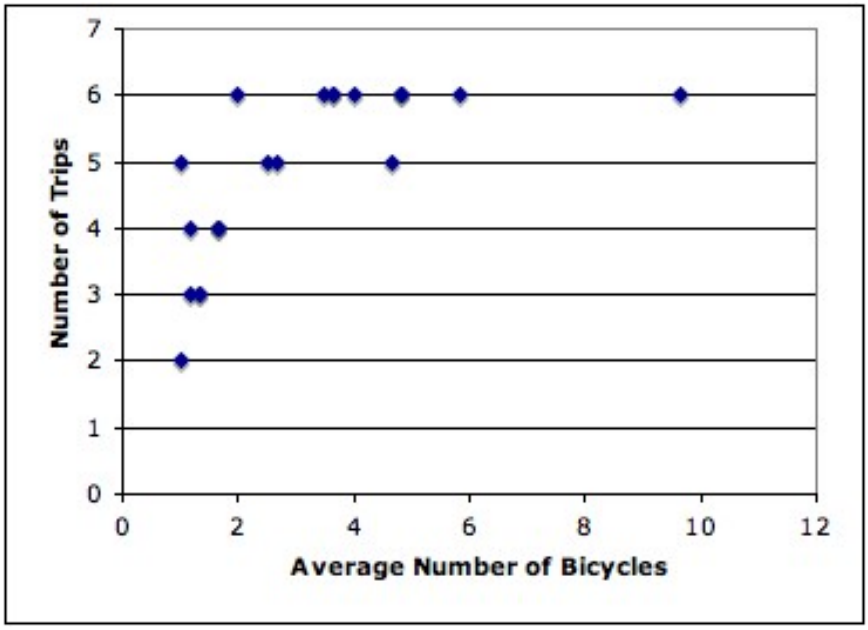
Bicycles were scattered across the corridor between Canal Street and Leake Avenue. After the six trips were completed, at least one bicycle was located at 48 of the 78 city blocks that comprise the corridor. There were two bicycles that were seen at the same location on a repeated basis, one parked between Toledano Street and Louisiana Avenue and another parked St. Andrew Street and Josephine Street. Both of these bicycles appeared to be in good repair. No bicycles appeared to be in disrepair, vandalized, or abandoned.[14] Overall, 22 blocks along the corridor had at least one parked bicycle on average (for all six trips).

The city blocks where parked bicycles were frequently found generally had a greater number of parked bicycles. A Pearson product-moment correlation coefficient was computed to assess the relationship between the average number of parked bicycles and number of trips where one or more bicycle was found per block. Only the 22 blocks with at least one parked bicycle, on average, were included in this analysis. There was a positive correlation between

[14] A bicycle was seen on the way to the corridor that appeared to be abandoned or in extreme neglect. It was increasingly vandalized. First the front tire was removed, followed by the seat, and then the rear tire.

the average number of parked bicycles per block and the number of trips where one or more bicycle was found per block, r = 0.69, n = 22, p < 0.01. The below scatter plot shows that those blocks that tended to be consistently used for bicycle parking also had more bicycles parked at them.

FIGURE 5. BICYCLE PARKING AT CITY BLOCKS (SCATTER PLOT)



The above analysis indicates that there is not a random pattern to parking on Magazine Street. The Bicycle Parking Patterns and Rack Use Map, figure 7, provides a map of the frequency and average number of bikes observed per block.

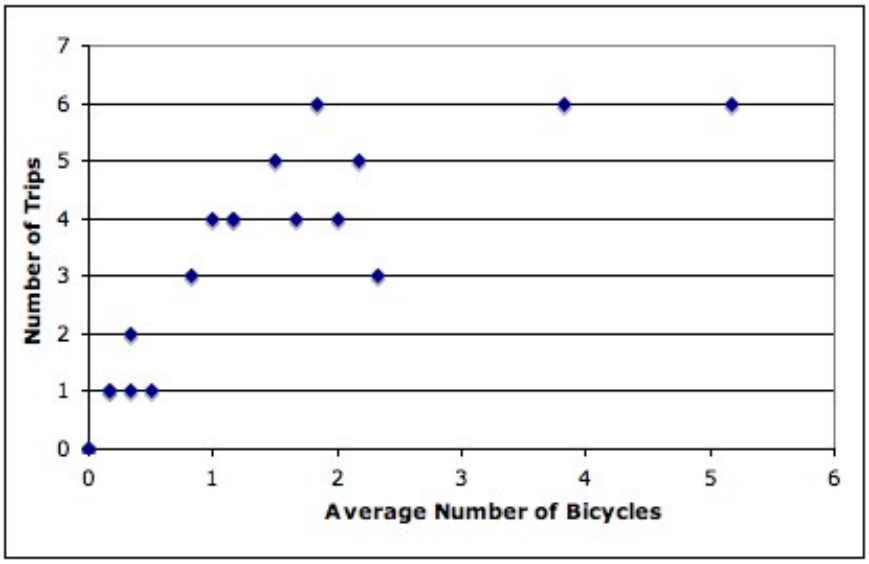
USE OF BICYCLE RACKS

The bicycle racks that were used frequently were generally utilized by a greater number of bicycles. Use of the twenty bicycle racks across the corridor varied dramatically. Some of the bicycle racks had bicycles consistently parked at them while other bicycle racks were never seen utilized. During the site visits, the greatest number of bicycles locked to any rack was nine; this was encountered at the bicycle racks in front of Audubon Zoo and at the bicycle rack in the Whole Foods parking garage. Three of the racks were not in use during the observation: 3535

Magazine (racks at Harry's Ace Hardware), 4437 Magazine (rack at Buddha Belly), and 5109 Magazine (rack near Henry's Bar). On average 1.5 bicycles were parked at the seventeen racks that were used by one or more parked bicycles at least once during the site visits.

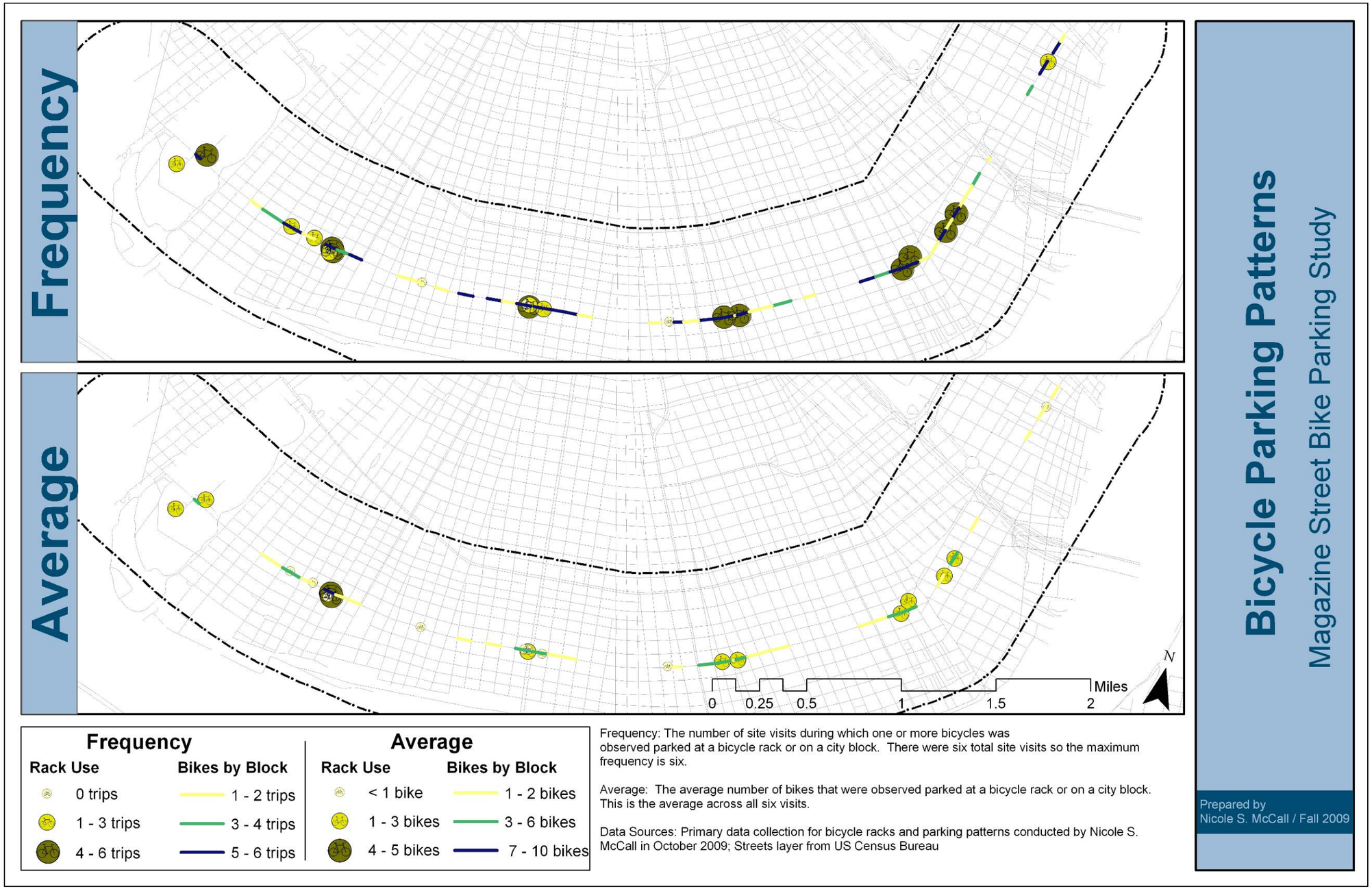
For the 20 bicycle racks, Pearson product-moment correlation coefficient was computed to assess the relationship between the average number of parked bicycles and number of trips where one or more bicycle was found per rack. There was a positive correlation between the average number of parked bicycles and the frequency of bicycles at each rack, $r = 0.82$, $n = 20$, $p < 0.01$. This indicates that there is not a random pattern for the usage of bicycle racks. A scatter plot summarizes the results below in figure 6.

FIGURE 6. BICYCLE PARKING AT BICYCLE RACKS (SCATTER PLOT)



The bicycle racks that were used frequently were generally utilized by a greater number of bicycles. Three of the racks were observed in use during every site assessment. This included the bicycle rack in front on Juan's Flying Burrito (2018 Magazine St), with an average of two parked bicycles, and two of the three bicycles racks at Whole Foods (5600 Magazine Street), with an average of four bicycles parked at the rack at the front of the store and five bicycles parked at the parking garage rack. The Bicycle Parking Patterns and Rack Use Map, figure 7, provides a map of the frequency and average number of bikes observed per rack.

FIGURE 7 BICYCLE PARKING PATTERNS AND RACK USE MAP



Frequency: The number of site visits during which one or more bicycles was observed parked at a bicycle rack or on a city block. There were six total site visits so the maximum frequency is six.

Average: The average number of bikes that were observed parked at a bicycle rack or on a city block. This is the average across all six visits.

Data Sources: Primary data collection for bicycle racks and parking patterns conducted by Nicole S. McCall in October 2009; Streets layer from US Census Bureau

BICYCLE RACK SUPPLY VERSUS EXISTING DEMAND

Bicycles were consistently observed parked at ten individual blocks along the corridor. Nine of these ten blocks also had the greatest average number of parked bicycles at them. Table 18 combines the ten blocks where parked bicycles were always observed with the ten blocks demonstrating the greatest average number of parked bicycles. These groups overlap each other; together they represent eleven blocks.

TABLE 18. BLOCKS WITH MOST FREQUENT AND GREATEST DEMAND

Block #	Street	Cross Street[1]	Frequency of Parked Bicycles	Frequency of Parked Bicycles at Rack(s)	Average # of Parked Bicycles	Average # of Parked Bicycles at Rack(s)
5600	Magazine	Joseph Street	6	6	9.7	9.5
2000	Magazine	St. Andrew Street	6	6	4.8	1.8
1900	Magazine	St. Mary Street	6	5	4.8	1.5
6454	Magazine	Natatorium Drive	5	5	4.7	4.0
4400	Magazine	Napoleon Avenue	6	5	3.5	2.5
3100	Magazine	8th Street	6	4	4.8	1.2
3200	Magazine	Harmony Street	6	4	3.7	1.0
4300	Magazine	Gen Pershing Street	6	3	5.8	0.8
3236	Magazine	Pleasant Street	6	N/A	4.0	N/A
3300	Magazine	Toledano Street	6	N/A	3.7	N/A
2200	Magazine	Jackson Ave.	6	N/A	2.0	N/A

As demonstrated in table 19 on the following page, the eleven blocks can be condensed into five destinations along Magazine Street. Existing land use data from the Unified New Orleans Plan (UNOP) process, provided by the Regional Planning Commission, indicates that land use in these areas is primarily commercial. The five destinations include three shopping districts: Lower Garden District (St. Mary Street to Philip Street), Irish Channel/Garden District (8th Street to Louisiana Avenue.), and Uptown (Gen. Pershing Street to Jena Street). The two other areas are Audubon Park and Whole Foods Market. The Popular Bicycle Parking

Destinations and Land Use Map, figure 8 on page 57, provides a map of the existing bicycle racks, most popular destinations, and land use.

TABLE 19. POPULAR BIKE PARKING DESTINATIONS

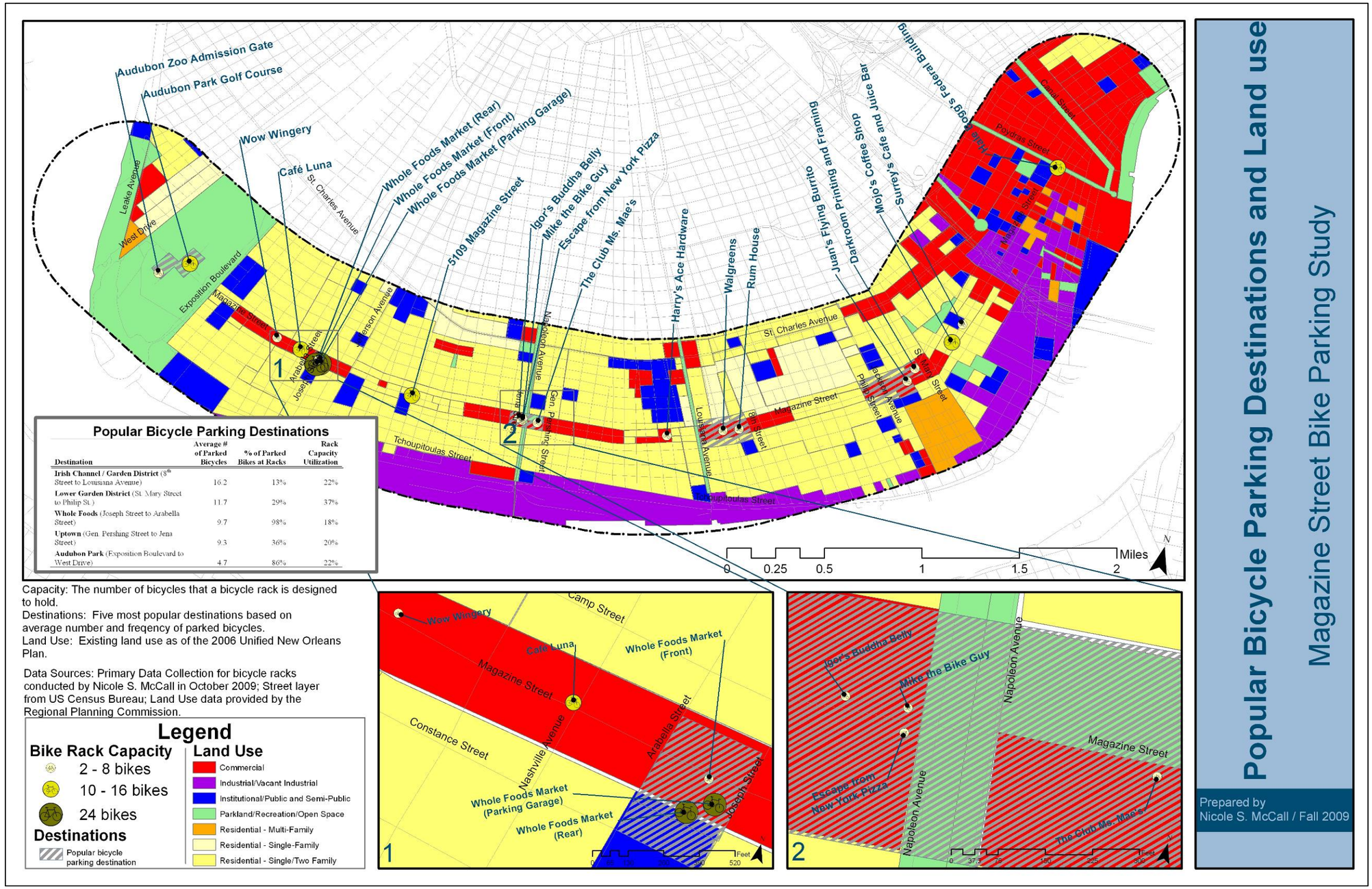
Destination	Average # of Parked Bicycles	% of Parked Bikes at Racks	Rack Capacity Utilization
Irish Channel / Garden District (8th Street to Louisiana Avenue)	16.2	13%	22%
Lower Garden District (St. Mary Street to Philip St.)	11.7	29%	37%
Whole Foods (Joseph Street to Arabella Street)	9.7	98%	18%
Uptown (Gen. Pershing Street to Jena Street)	9.3	36%	20%
Audubon Park (Exposition Boulevard to West Drive)	4.7	86%	22%

The percent of the total parked bicycles that were parked at racks was higher at Whole Foods Market and Audubon Park and lower at the three shopping districts. Easily accessible architecture elements, including balcony supports, are adaptively used as bike parking in the shopping districts.

ILLUSTRATION 4. BICYCLE LOCKED TO BALCONY SUPPORTS

Photo Credit: Nicole McCall, Spring 2009

FIGURE 8. POPULAR BICYCLE PARKING DESTINATIONS AND LAND USE MAP



These makeshift bike parking spaces may be closer to the users' destination than a bicycle rack or more convenient for another reason. At Audubon Park and Whole Foods, balcony supports and street signs are not readily available.

Summary of Findings

The inventory and assessment revealed valuable insight regarding the state of bicycle parking on Magazine Street. Magazine Street is a popular destination for bicyclists with eighty bicycles parked on the right-of-way on average. Although 20 racks exist along the corridor, architectural elements on Magazine Street also provide cyclists with areas that can be adaptively used as bike parking. The use of bicycle racks is higher in areas where there are fewer architectural elements that can be adaptively used as bicycle parking. In the highest demand areas bicycle racks and architectural elements are used for bicycle parking.

Chapter 6. CONCLUSION

The intent of the thesis is to assist local government agencies and bicycle advocates consider bicycle parking as a part of a complete transportation network. Research questions were developed in response to the December 2008 Metro Bicycle Coalition meeting in which participants questioned the role or importance of bicycle parking. In addition to reviewing existing research two surveys were conducted to identify how advocates and cyclists perceive bicycle parking. An observation of Magazine Street was also completed to distinguish how bicycle parking functions along a corridor. Conclusions for each of the research questions follow.

Research Question (RQ) 1: Are end of trip facilities an important aspect of a complete transportation network that local governments and advocacy organizations should pursue?

A complete network is needed to accommodate bicyclists from one end of their trip to another. During each trip a cyclist must retrieve their bicycle from storage, briefly check it over, navigate the transportation network, and finally park and store their bike until the next trip. End of trip facilities, particularly bicycle parking, are integral components for bicycles to be used as a mode of transportation. Bicycle parking results in several positive outcomes, including removing a barrier to cycling, reducing clutter of randomly parked bicycles, and symbolizing that bicyclists are welcome and expected.

RQ1A: What is the status of research on bicycle parking?

Relatively little research has been completed on bicycle parking. There are two main lines of research. The first line of research considers the potential influence of bicycle parking on encouraging bicycling. A consensus has not been reached regarding if bicycle parking is simply valued or if may actually encourage more bicycle. There is likely a two-way relationship between bicycling parking and increased bicycle use: improved bicycle parking may encourage

more bicycling but increased amounts of bicycling may also lead to the installation of bicycling parking (Pucher et al, 2009). The second line of research evaluates bicycle parking and transit. Bicycle parking is considered a means to improve the connection between bicycling and transit. Findings also include that bicycle parking can reduce demand for automobile parking and that bicycle lockers are preferred form of bicycle parking. There is a general acknowledgment that there is little empirical research in the area of bicycle parking

RQ1B: What types of bicycle parking projects have been implemented across the nation?

Despite mixed results reported in the 2010 Bicycling and Walking Benchmarking report in terms of cities that have an inventory of or our pursuing bicycle parking, bicycle parking is being implemented. Programs range from installing sculptural bike racks to establishing bike stations to offering bike valet at events and may be organized by nonprofits, businesses, or advocacy groups.

Numerous guidelines are available to help with the design and placement of bike parking. Different approaches are also recommended to accommodate Short-term and long-term bike parking needs. Short-term parking generally provides more flexibility in terms of design. Several programs exist across the country for artistic bike racks that effectively provide utilitarian public art. Longer-term parking requires sturdier designs to protect against theft of the entire bicycle and its components and accessories as well as protect the bicycling from weather. Lockers, continuously monitored facilities, and restricted access facilities are the three common approaches for long-term bicycle parking.

Several creative approaches were found for bicycle parking. Bike valet, or monitored bicycle parking at events, is becoming more common. BikeStations are bike-transit centers that offer secure bicycle parking and complementary services for bicyclists. Possibly the most politically bold move to provide bicycle parking involves the repurposing of car parking. Car

parking spaces have become bicycle parking spaces in Seattle, New York City, and Washington D.C

Bicycle parking programs are not always designed as incentives. Where there are concerns or complains that parked bicycle create safety hazards by blocking pedestrian flow, penalties have been developed. These programs are often (and best) accompanied with improvements in existing bike parking to assist those who previously may not have been able to find legal spaces.

To ensure that bicycle parking is provided when the built environment is development, bicycle parking ordinances can be adopted. There is a large variety of bicycle parking ordinances and they can apply to residential or commercial buildings, new construction, schools, or park and ride lots.

The Bicycle parking programs in Minneapolis, Oakland, and New York's were reviewed. Strategies found in the cities included a bicycle inventory along with a publicly available map, continuous funding to improve bicycle parking, formal processes to request bicycle racks, and bicycle parking ordinances that apply to almost all land uses. Funding from the Non-motorized Transportation Pilot Program (NTPP) (S-LU Sec. 1807) was instrumental in furthering bicycle parking in Minneapolis, despite the fact that less than one percent of the total grant was allocated to bicycle parking. There is also recognition that illegal parking must be managed and residents should be encouraged to use racks when they are present.

RQ1C: How do advocates perceive and prioritize bicycle parking relative to other types of improvements for cycling?

While advocates recognize that bicycle parking can encourage bicyclists, priority is being placed on bikeways. The survey at the National Bike Summit also revealed that many advocacy groups recognize bicycle parking as important and have campaigned for it.

RQ2: What is the status of bike parking in New Orleans?

The City does not currently have a bicycle parking ordinance of any kind, a program to install bicycle parking, or an inventory of bicycle parking. The latest draft of the City's master plan, *Plan for the 21st Century: New Orleans 2030* (November 13, 2009), reports 100 bicycle racks mostly along Canal Street and proposes providing ample bike racks, lockers on public rights of way at key activity nodes, and for on-site bicycle facilities and locker rooms in development projects (City of New Orleans, 13 Nov 2009). The Young Leadership Council's Where Ya Rack? Program (WyR) is also working to provide unique and secure bicycle parking racks throughout the New Orleans community.

RQ2A. What is the perception of end of trip facilities by those familiar with cycling in New Orleans?

Individuals familiar with cycling in the City report that they lock their bicycles to whatever is available and desire more bicycle parking. Although a lack of bike parking does not necessarily deter individuals from riding, respondents would find it encouraging. The three most frequently mentioned locations that would benefit from bike parking include the French Quarter, Magazine Street, and the Central Business District (CBD). In parallel with National Advocates, cyclists in New Orleans were more concerned with obtaining bike lanes and paths and increasing driver awareness than obtaining bike parking.

RQ2B: What is the state of bike parking on Magazine Street in New Orleans?

Bicycles can be found locked to bicycle racks and nearly every other architectural element to which a bicycle can be attached along Magazine Street. While current bicycle parking patterns may be chaotic and sometimes impede pedestrian flow, they are not random. There are five popular bike parking destinations including three shopping districts, a grocer, and a park. The corridor benefits from those who choose to travel there on bicycle. If the bicyclists that parked along Magazine Street decided to drive to the corridor in a single-occupancy vehicle

instead, on average there would be an additional demand for 80 car parking spaces. On-street car parking has little excess capacity along this corridor.

Recommendations

Advocates

Advocate for a complete transportation network; one that includes bicycle parking. If there is not a place to securely lock a bike and building management is unwilling to allow bicycles to be brought inside, even the most advanced cyclists can be prevented from completing trips. Be aware of the laws in your community that impact the presence of bicycle parking. If laws and programs to improve bicycle parking consider launching a campaign to pursue them. In addition, considering funding constraints, push for expansions in programs like the Nonmotorized Transportation Pilot Program (NTPP) (S-LU Sec. 1807). Adequate funding can ensure that bicycle parking is implemented rather than sidelined.

Local Governments

Bicycling can combat obesity, reduce infrastructure costs, and reduce the transportation costs for residents. Elevating the safety, security, and aesthetic quality of the experience of cycling are important factors in increasing the numbers of individuals who bicycle. And, there is evidence that as the mode share for cycling increases the cyclist risk decreases (Rohl, 2009). Encourage bicycling by providing bicycle parking.

Consider the programs in Minneapolis, Oakland, and New York City and varied ways that bicycle parking has been implemented. Repurposing car parking may not be politically feasible but conducting a bicycle parking inventory should be more benign and may be a first step. If funding for an inventory is not available consider partnering with a local advocacy group or school. Consider adopting or revisiting a current bicycle parking ordinance. Festivals and public events may merit bicycle valet requirements. Identify processes and incentives for organizations, businesses, and individuals to install bicycle parking. If there are concerns about

illegal bicycle parking, after improving or adding to the existing supply, review possible penalties. To make penalties and fines more politically acceptable, funding raised from them can be dedicated to improving bicycle parking. Lastly, when improvements are made be sure to promote them. Results from the Magazine Street Facility Study finds that the "build it and they will come" theory is not universally applicable. New facilities require publicity, appropriate placement, and connectivity. If a bicyclist is unaware of the presence of a bicycle rack it will not be used and contextual factors must be considered when designing, constructing, and maintaining end of trip facilities.

New Orleans

Several improvements for bicycle facilities are scheduled to be implemented across the City of New Orleans. After these facilities are available, more individuals may begin riding bicycles. An increase in the bicycle mode share should benefit the City through reduced traffic congestion, infrastructure and residents' transportation savings, and environmental benefits. However, those who decide to begin using bicycles for transportation will need a place to store their bicycles. If bicycle mode share increases, without improvements to bicycle parking, more and more bicycles will be adaptively parked to architectural elements. Proactive planning and implementation can reduce the potential for clutter from randomly parked bikes.

Steps can be taken to improve bicycle parking. First, implement proposals for bicycle parking in the Master Plan. Support the WyR Program or institutionalize a program to provide bicycle parking. Policies used to increase and support bicycle parking could also be adopted in New Orleans. Adopt an ordinance that requires bicycle parking in new construction and renovations. Begin an inventory of bicycle parking and provide a map for residents. Data collected through the Magazine Street assessment can be a start. Consider means to fund bicycle parking improvements; this may require coordination with the Regional Planning Commission. Consider requiring bicycle parking for festivals in the City. Bicycle Parking is

provided at New Orleans Jazz Fest but not at other festivals. Lastly, adopt and enforce penalties for illegal bicycle parking.

Magazine Street

Currently, there are five popular bike parking destinations including three shopping districts, a grocer, and a park. Develop a policy towards bicycle parking. Any program to manage bicycle parking along the corridor should carefully balance improvements to existing bicycle parking with an enforcement program for those bicycles that block the path of pedestrians. Bicycle parking guidelines can be used to assess current bicycle parking. For example, existing information about site areas recommends providing smaller, more convenient rack areas closer to each individual destination. Community members may be able to help determine which businesses generate more bicycle traffic. If there is a desire to stop bicyclists from adaptively parking to architectural elements, it may be worthwhile to place racks as close as possible to bicycle traffic generators. Following improvements to bicycle parking, enforcement may also be required for those bicycles that are illegally parked. Both improvements and enforcement for bicycle parking will require coordination with the City of New Orleans. An effort should be made to design a bicycle parking program that caters to rather than deters bicyclists.

Potential future research

This thesis concludes with several suggestions for future research. At the national level, case studies can be completed to learn more about bicycle parking projects that have been implemented. These case studies may help identify funding sources, relay lesson learned to communities considering projects, and be shared with government and advocacy groups to advise them about the outcomes of successful projects. It is also important to distinguish how different kinds of bicycle parking (bicycle racks, sheltered, guarded, valet, BikeStations) impact

bicycle parking. It would also be helpful to follow up with bicycle advocacy groups to learn about the successes and failure of previous campaigns for bicycle parking.

As for the relationship between bicycle rack supply and demand, additional research is needed. The Magazine Street Study was completed over a short period of time. Extended study and inclusion of data from weekday parking can provide additional insight into the bicycle parking behavior. Study of bicycle parking supply and demand can also be extended to other corridors. Longitudinal studies for corridors that obtain bicycle parking investments can be completed. Studies conducted for various kinds of bicycle parking can identify how these different facilities impact cycling levels. In addition to surveying cyclists, survey individuals that do not regularly ride bicycles to learn how bicycle parking may influence them to ride bicycles.

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Appendix A. Glossary

The following terms are defined as follows:

- **Bicycle** - Typically defined as a human powered vehicle with two tandem wheels but this may be expanded to include vehicles with three wheels (tricycle), four wheels (quadricyle) or a single wheel (unicycle). This definition should not be expanded to include motorized mobility aids or travel devices such as Segways.
- **Bicycle facility** - A physical facility provided for the exclusive or semi-exclusive use of bicycles. Examples of bicycle facilities include shared roadways (no bikeway designation), marked shared roadways, bikeways (bicycle lanes, bicycle paths, shared use paths), and end of trip facilities (bicycle parking and storage facilities).
- **Bike frequency-** If one or more bicycles were encountered on a city block during a site visit, see Chapter 5.
- **Bicycle locker**- A locker in which a bicycle can be stored bicycle. It fully encloses the bicycle and protects it from weather, vandalism, and theft. Recommended for long-term bicycle parking. Many transit agencies provide these at transit stations including CalTrains (serving Santa Clara, San Mateo, and San Francisco Counties, California), MetroTransit (serving Minneapolis / St. Paul, Minnesota), and the Washington Metropolitan Area Transit Authority (serving Washington, DC, Maryland and Virginia).
- **Bicycle parking**- Places and structures that are designed to store and secure bicycles. The APBP recommends bicycle racks for short-term parking (a couple of hours at most). For longer-term parking, the APBP recommends more secure facilities such as indoor parking and bicycle lockers for long term. For the purposes of this Chapter 5, only short-term parking is evaluated.

- **Bicycle racks**- A structure that is typically metal and usually bolted to the ground that is designed so that bicycles can easily be locked to it. For the purpose of Chapter 5, bicycle racks must be visible and accessible to the general public from the Magazine Street public right-of-way (meaning streets and sidewalks).
- **Bikeway -** Any road, street, path or way which in some manner is specifically designated or intended for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. Examples include bicycle lanes, bicycle paths (or shared use paths), signed shared roadways, and bicycle routes.
- **Corridor**- The public right of way through which transportation moves. It can include sidewalks, bike lanes, motorized transportation lane. In Chapter 5, corridor is Magazine Street.
- **End of trip facilities-** Amenities designed for the beginning and ending of trips made by bicycle. Include but are not limited to bicycle racks, bicycle lockers, changing rooms, and showers.
- **Fly-parked**- securing of bicycles to street furniture not intended for that purpose. Cyclists may fly-park bicycles to railings, lampposts, parking meters, benches, street signs, and trees.
- **Land use-** How the land is currently used. In Chapter 5, Land use data from 2006 was obtained from the New Orleans Regional Planning Commission. It is symbolized by activity-dimension using the American Planning Association Land Based Classification Standards (LBCS), a consistent model for classifying land uses based on their characteristics.
- **Long-term bicycle parking** – A bicycle parking facility intended for long-term parking and protected against theft of the entire bicycle and its components and accessories. Three common forms of secure long term bicycle parking are: a) fully enclosed lockers accessible

only by the user -- generally involving a charge; b) a continuously monitored facility that provides at least medium term type bicycle parking facilities -- generally available at no-charge; and c) restricted access facilities in which short term type bicycle racks are provided and access is restricted only to bicycle owners.

- **Magazine Street-** The Street in the City of New Orleans that runs from Canal Street in the Central Business District to Leake Avenue in the Black Pearl Neighborhood. It is approximately 5.4 miles long. It is the corridor for Chapter 5
- **Right-of-way-** A general term denoting certain lands, properties or interest therein, usually in the form of a strip, acquired for or devoted to transportation purposes. This term usually applies to roadways, as well as adjacent areas devoted to pedestrian, bicycling, drainage or access control uses.
- **Short-term bicycle parking** – A stationary object to which the cyclist can lock the frame and wheels. Shelter from elements and lighting may or may not be provided. Cyclists must provide a cable and lock.
- **Site visit –** In Chapter 5, one of the six visits along Magazine Street from Canal Street to Leake Avenue conducted as a part of the demand assessment during October 2009.

Appendix B. GIS Applications in Bicycle Planning

Geographic information systems (GIS) are being used as tools for bicycle planning. Spatial data can help researchers analyze the relationship between land use and transportation as it relates to bicycling.

GIS applications are frequently used to analyze crash data. Moudon, Lin and Hurvitz (2008) geocoded 13,914 pedestrian and bike collisions that occurred between 1990 and 2004 across the state of Washington. The data was complemented with road characteristics and land uses to analyze correlates of collision frequency and severity. Scenario planning was developed based on the findings to improve safety along freight routes, transit hubs, and other areas of development. Bejleri, Steiner, and Kim (2007) used GIS techniques to analyze correlation between pedestrian and bicycle collisions and human, environmental, and socio-economic factors for various counties in Florida. Countywide and intersection crash analysis was used to identify areas with frequent crash rates so that limited resources could be focused on the areas that required the most assistance. Amsden and Huber (2006) geocoded bicycle and automobile collision that occurred in Wisconsin during 2003. The analysis was conducted to develop a better understanding of collisions. Ziari and Khabiri (2005) used GIS to create a contour map identifying areas of high crash occurrence based on crash data from police reports in Iran. They proposed to tool be used for improving traffic safety education, providing safer pedestrian facilities, and improving pedestrian road infrastructure.

Other studies have focused on the location and use of bikeways (improvements for bicycle travel to road, street, path or ways). Cordera et al (2009) proposed a methodology to locate bicycle lanes using multi-criteria evaluation with GIS techniques. The methodology was applied to the road network in northern Spain. Weissmann and Jannini (2008) developed two GIS tools to assist the Texas Department of Transportation San Antonio District. The survey

responses of nearly 800 cyclists were merged with a highway database to create two maps. One helped prioritize bicycle improvements along roads needing rehabilitation and the other informed the public about bicycle suitability of existing routes. Luedtke and Plazak (2003) utilized GIS to align the Mississippi River Trail through Iowa. The Mississippi river trail is a federal program for bicycle trail development along the Mississippi River between Minnesota and the Gulf of Mexico. The analysis was designed to balance proximity to amenities along the Mississippi river with safe cycling conditions. Wang, Urban, and Kalevela (2001) distributed origin-destinations surveys to residents within four miles of the Georgia Southern University's campus in Statesboro, Georgia. Responses were geocoded and travel demand modeling was utilized to develop a network of bicycle-compatible routes and multi-use trails. These studies have focused on the placement on bikeways.

Appendix C. Bicycle Advocate Priorities Survey

Bicycle Advocacy and Research Study

This survey is being used to learn about the bicycle facility priorities of Bicycle Advocates and Researchers.

Part 1: These questions are used to learn about your experience with bicycle research.

1. Do you conduct bicycle research?
   ☐ Yes ☐ No, skip to Part 2.

2. Rank the following research areas by interest:
   _____ Impact of bike facilities and improvements on mode share
   _____ Safety programs
   _____ Design of bike facilities
   _____ International comparisons
   _____ Other: _____
   _____ Other: _____
   _____ Other: _____

3. Have you written any articles/papers on the following topics? (Select all that apply.)
   ☐ Impact of bike facilities improvements on mode share
   ☐ Safety programs
   ☐ Design of bike facilities
   ☐ International comparisons
   ☐ Bike Parking
   ☐ Other: _____
   ☐ Other: _____

4. Has your research been published in an academic journal?
   ☐ Yes ☐ No

5. Does your research include bicycle facilities in the United States?
   ☐ Yes ☐ No

Part 2: These questions are used to learn about your experience with bicycle advocacy.

1. Do you represent a bicycle advocacy group?
   ☐ Yes ☐ No, skip to Part 3.
   If yes, name of group
   _____
   Location (City, State)
   _____

2. How long have you been organized?
   ☐ Less than 1 year ☐ 10- 15 years
   ☐ 1-5 years ☐ 15+ year
   ☐ 6-10 years

3. Does the organization have any full time staff?
   ☐ No ☐ 3 FTE
   ☐ Less than 1 FTE ☐ 4 FTE
   ☐ 1 FTE ☐ 5+ FTE
   ☐ 2 FTE

4. Approximately how many active members belong to the organization?
   ☐ Less than 25 ☐ 76-100
   ☐ 26-50 ☐ 101-125
   ☐ 51-75 ☐ 125+

5. Rank the following goals
   _____ Improve safety
   _____ Increase facilities
   _____ Increase portion of travel by bike
   _____Other 1: _____
   _____Other 2: _____
   _____Other 3: _____

6. Rank the following bicycle improvements by your advocacy priorities?
   _____ Secure Bike Parking
   _____Network of Bike Lane
   _____Dedicated bike paths
   _____Bikes on Buses/ Transit
   _____Education/Awareness of Cycling
   _____Other 1: _____
   _____Other 2: _____
   _____Other 3: _____

7. Have you campaigned for any of the following bicycle improvements/programs? (Select all that apply)
   ☐ Secure Bike Parking
   ☐ Bike Lanes
   ☐ Dedicated bike paths
   ☐ Bikes on Buses/ Transit
   ☐ Education Programs about Cycling
   ☐ Other 1: _____
   ☐ Other 2: _____
   ☐ Other 3: _____

Part 3: These questions are used to learn about transportation habits.

1. What motivated you to start riding a bike (Select all that apply)?
   - ☐ Saving money
   - ☐ Health
   - ☐ Environmental concerns
   - ☐ Influenced by friends
   - ☐ Faster than driving
   - ☐ No automobile access
   - ☐ Other, please explain _____

2. How much of the time do you estimate you use your bike for transportation?
   - ☐ Never
   - ☐ 61-80%
   - ☐ 1-20%
   - ☐ 81-99%
   - ☐ 21-40%
   - ☐ All (100%)
   - ☐ 41-60%

3. Select the modes of transportation you use during a typical week:
   - ☐ Automobile
   - ☐ Streetcar
   - ☐ Bus
   - ☐ Bicycle
   - ☐ Walk/Jog
   - ☐ Ferry

4. How often do you use your bike to commute to work?
   - ☐ Never
   - ☐ 2-3 day/week (40-60%)
   - ☐ <1x/month
   - ☐ 4-5 days/week (80-99%)
   - ☐ <1x/week (<20%)
   - ☐ Always (100%)
   - ☐ 1 day/week (20%)

5. How long have you used your bike for transportation?
   - ☐ Less than 1 year
   - ☐ 3-7 years
   - ☐ 1-3 years
   - ☐ 7+ years

6. What % of errands do you conduct on bike?
   - ☐ None
   - ☐ 61-80%
   - ☐ 1-20%
   - ☐ 81-99%
   - ☐ 21-40%
   - ☐ All (100%)
   - ☐ 41-60%

7. What % of your recreational activities include bicycling?
   - ☐ None
   - ☐ 61-80%
   - ☐ 1-20%
   - ☐ 81-99%
   - ☐ 21-40%
   - ☐ All (100%)
   - ☐ 41-60%

8. What do you typically lock your bike to (Select all that apply)?
   - ☐ Trees
   - ☐ Parking meters
   - ☐ Sign Posts
   - ☐ Bike Racks
   - ☐ Fences
   - ☐ Hand Rails
   - ☐ Other _____

9. Do any of the following conditions deter you from riding more (Select all that apply)?
   - ☐ Lack of bike lanes
   - ☐ Weather
   - ☐ Lack of secure parking
   - ☐ Flow of traffic
   - ☐ Lack of driver awareness
   - ☐ Bike theft concern
   - ☐ Personal safety concern
   - ☐ Lack of transit connectivity
   - ☐ Other, please explain_____

10. Where do you live?
    City, State _____

11. My city has a bike parking ordinance:
    ☐ Yes ☐ No ☐ Unknown

Part 4: This section is used to gauge opinions about bicycle facilities.

Circle the degree to which you agree or disagree with the following statements.		Strongly Agree	Agree	Disagree	Strongly Disagree
1)	It is important to increase the total portion of transportation completed by bike.	1	2	4	5
2)	Bicycle facilities can increase the total portion of transportation completed by bike.	1	2	4	5
3)	Bicycle lanes and paths can increase the total portion of transportation completed by bike.	1	2	4	5
4)	Secure bike parking can increase the total portion of transportation completed by bike.	1	2	4	5
5)	Bike theft can deter individuals from using their bikes.	1	2	4	5
6)	A lack of bicycle amenities deters individuals from using bikes	1	2	4	5
7)	A lack of secure bike parking can deter individuals from using bikes.	1	2	4	5
8)	A lack of bike lanes and paths can deter individuals from using bikes.	1	2	4	5
9)	Research is needed to document how different facilities and improvements can increase the mode share of bicycles.	1	2	4	5
10)	Research is needed on how bike paths and lanes can increase the mode share of bicycles.	1	2	4	5
11)	Research is needed on how bike parking can increase the mode share of bicycles.	1	2	4	5
12)	Employers should provide secure bike parking.	1	2	4	5
13)	Merchant associations and businesses should provide secure bike parking.	1	2	4	5
14)	My city government should provide more secure bike parking.	1	2	4	5
15)	My city government cares about providing adequate bike facilities.	1	2	4	5

Part 5: Please share any addition comments you may have about bicycle facilities.

_____

_____

Please return this survey to Nicole S. McCall, Secretary, Metro Bicycle Coalition, nicole.mccall@gmail.com

Appendix D. Supplemental Data from Bicycle Advocate Priorities Survey

Several of the survey questions asked in the Bicycle Advocate Priorities Survey do not directly correspond to end of trip facilities. The results for the survey questions not discussed in Chapter 3 are reported below.

Part 1.

1. Do you conduct bicycle research?

Conduct Bicycle Research	Respondents
Yes	12
No	22

2. Rank the following research areas by interest

	Rank			
Research Area	1	2	3	4
Impact of bike facilities and improvements on mode share	5	2	1	0
Safety Programs	5	1	0	2
Design of Bike Facilities	4	1	5	0
International Comparisons	0	1	1	2
Other	1	3	1	0

3. Have you written any articles / papers on the following topics? (Select all that apply.)

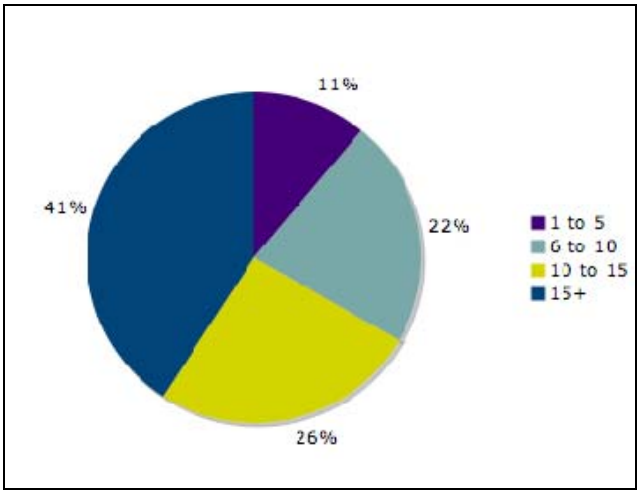
Topic	Existing Articles/Papers
Impact of bike facilities and improvements on mode share	3
Safety Programs	2
Design of Bike Facilities	3
International Comparisons	1
Bike Parking	3
Other	8

Part 2. Bicycle Advocacy Groups

1. Do you represent a bicycle advocacy group?

Represent Bicycle Advocacy	Respondents
Yes	27
No	7

2. How long have you been organized?



3. Does the organization have any full time staff?

	Number of Staff		
Age of Group	None	0 to 4	5+
1 to 5	67%	33%	0%
6 to 10	17%	50%	33%
10 to 15	29%	43%	29%
15+	45%	27%	27%

4. Approximately how many active members below to the organization?

	Members					
Group	<25	26 to 50	51 to 75	76 to 100	101 to 125	125+
All Groups	11%	15%	4%	4%	4%	67%
10 or more years organized	0%	17%	6%	0%	0%	83%
10 or fewer years organized	33%	11%	0%	11%	11%	33%

Part 3. Transportation Habits

1. What motivated you to start riding a bike? (Select all that apply.)

Motivation	Respondents	% of Respondents
Health	23	68%
Environmental Concerns	22	65%
Saving Money	13	38%
Faster than Driving	11	32%
Influenced by Friends	7	21%
No Automobile Access	5	15%
Other	13	38%

2. How much of the time do you estimate you use your bike for transportation?

% of Time Bicycle Used For Transportation	Respondents	% of Respondents
Never	0	0%
1 to 20	8	24%
21 to 40	3	9%
41 to 60	5	15%
61 to 80	3	9%
81 to 99	12	35%
All (100%)	3	9%

3. Select the modes of transportation you use during a typical week:

Mode of Transportation	Respondents	% of Respondents
Bicycle	32	94%
Automobile	22	65%
Walk/Jog	21	62%
Bus	5	15%
Streetcar/Light Rail / Train*	5	15%
Ferry	0	0%

*Streetcar was only printed on the survey. Respondents were informed to apply any trips by light rail or train to this category.

5. How Long Have You Used Your Bike for Transportation?

Years	Respondents	% of Respondents
Less than 1	1	3%
1 to 3	4	12%
3 to 7	9	26%
7+ yr	19	56%

8. What do You Typically Lock Your Bike to?

Object	Respondents	% of Respondents
Bike Racks	31	91%
Sign Posts	24	71%
Fences	17	50%
Parking Meters	17	50%
Hand Rails	16	47%
Trees	8	24%
Other	6	18%

9. Do any of the following conditions deter you from riding your bike more?

Deterrents	Respondents	% of Respondents
Weather	17	50%
Lack of Bike Lanes	8	24%
Lack of Driver Awareness	8	24%
Safety	7	21%
Flow of Traffic	6	18%
Lack of Secure Parking	5	15%
Transit Connectivity	3	9%
Bike Theft Concerns	3	9%
Other	4	12%

Part 4. Comments

Personal Transportation Habits

- I make more trips by bike in fall/summer/spring than winter.
- I'm a mountain bike advocate who is sympathetic to bike commute issues. I used to commute exclusively by bike many years ago.
- Improving Cycling
- Hardcore cyclists aren't deterred by much of anything, but to engage new cyclists we really need to improve & increase facilities.
- If you build it they will come
- Lowering the level of "stress" is one of our top priorities for increasing mode-share.
- There is too much emphasis on comfort rather than directness. Both are needed.
- Not everyone can be on the same path (bikes, strollers, rollerblades, etc.)
- Safety is very important.

Motorist/cyclist relationships

- Pucher has great research already about how different facilities and improvements can increase the mode share of bicycles.
- We need research on how bike paths and lanes can increase the mode share of bicycles in the U.S.

Bicycle Parking

- There are laws (bike parking ordinance) but they're only selectively enforced.
- Indoor parking ordinance under consideration.
- Bike Station - Andrea White

Government

- Decision makers and Government directors need to become enthusiastic about active transportation and become personally involved.

Research

- Research is sufficient, just needs to be implemented.

Appendix E. New Orleans Bicycle Facility Survey

New Orleans Bicycle Facility Study

This survey is being used to determine the demand for bicycling improvements in the City of New Orleans with an emphasis on parking.

Part 1: These questions are used to learn about your transportation habits.

1. Select the modes of transportation you use during a typical week (Select all that apply):
   - ☐ Automobile
   - ☐ Bus
   - ☐ Walk/Jog
   - ☐ Streetcar
   - ☐ Bicycle
   - ☐ Ferry
2. Do you own a bike?
   - ☐ Yes ☐ No, skip to question 11.
3. Do you primarily use your bicycle for recreation or transportation?
   - ☐ Recreation ☐ Transportation ☐ Both
4. What caused you to START riding/using a bike (Select all that apply)?
   - ☐ Saving money
   - ☐ Environmental concerns
   - ☐ Faster than driving
   - ☐ Fun
   - ☐ Other_____
   - ☐ Health
   - ☐ Influenced by friends
   - ☐ No automobile access
5. Do you currently depend on your bike for transportation?
   - ☐ Yes ☐ No
6. How often do you use your bike to commute to work?
   - ☐ Never
   - ☐ <1x/month
   - ☐ <1x/week (<20%)
   - ☐ 1 day/week (20%)
   - ☐ 2-3 day/week (40-60%)
   - ☐ 4-5 days/week (80-99%)
   - ☐ Always (100%)
7. What % of errands do you conduct on bike?
   - ☐ None
   - ☐ 1-20%
   - ☐ 21-40%
   - ☐ 41-60%
   - ☐ 61-80%
   - ☐ 81-99%
   - ☐ All (100%)
8. What % of your recreational activities include bicycling?
   - ☐ None
   - ☐ 1-20%
   - ☐ 21-40%
   - ☐ 41-60%
   - ☐ 61-80%
   - ☐ 81-99%
   - ☐ All (100%)
9. What do you typically lock your bike to (Select all that apply)?
   - ☐ Trees
   - ☐ Sign Posts
   - ☐ Fences
   - ☐ Other Bikes
   - ☐ Other _____
   - ☐ Parking meters
   - ☐ Bike Racks
   - ☐ Hand Rails
   - ☐ Itself
10. How long have you used your bike on a regular basis?
    - ☐ Less than 1 year
    - ☐ 1-3 years
    - ☐ 3-7 years
    - ☐ 7+ years
11. Do any of the following conditions deter you from riding a bike in New Orleans (Select all that apply)?
    - ☐ Lack of bike lanes
    - ☐ Lack of secure parking
    - ☐ Lack of driver awareness
    - ☐ Personal safety concern
    - ☐ Lack of transit connectivity
    - ☐ Other, explain_____
    - ☐ Weather
    - ☐ High flow of traffic
    - ☐ Bike theft concern
12. Would any of the following facilities encourage you to ride a bike?
    - ☐ Bike lanes
    - ☐ Bike paths
    - ☐ End permitting requirement on RTA busses
    - ☐ Other _____
    - ☐ Bike Racks
    - ☐ Bike Valet at Events

Part 2: The following questions are used to learn about respondents.

1. What is your sex? ☐ Male ☐ Female
2. What is your age range?
   - ☐ Less than 18
   - ☐ 18-24
   - ☐ 25-34
   - ☐ 35-44
   - ☐ 45-54
   - ☐ 55-64
   - ☐ 65-74
   - ☐ 75+
3. How would you rate your present neighborhood as a place to live?
   - ☐ Excellent
   - ☐ Fair
   - ☐ Good
   - ☐ Poor
4. How does your present neighborhood compare with the rest of New Orleans?
   - ☐ Better
   - ☐ Worse
   - ☐ About the same
5. What is your race/ethnicity (Select all that apply)?
   - ☐ American Indian or Alaska Native
   - ☐ Asian
   - ☐ Hispanic
   - ☐ Black or African American
   - ☐ Native Hawaiian or Other Pacific Islander
   - ☐ White
   - ☐ Other, explain _____
6. What is the last grade you completed in school?
   - ☐ Less than High School
   - ☐ High school / GED
   - ☐ Technical school/ Some college
   - ☐ Graduated College
7. Where do you live?
   State/Parish_____
   If Orleans, what is the closest intersection to your home
   _____

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Part 3: This section is used to gauge opinions about bicycle facilities in New Orleans.

Circle the degree to which you agree or disagree with the following statements.		Strongly Agree	Agree	Disagree	Strongly Disagree
1)	It is easy for me to find secure bike parking in New Orleans.	1	2	3	4
2)	Sometime I don't ride my bike (to work, for errands, and/or for recreation) because of a lack of bike parking.	1	2	3	4
3)	Well-designed and placed bike parking can deter theft.	1	2	3	4
4)	Cyclists would ride more in New Orleans if there were more secure bike parking.	1	2	3	4
5)	Employers should provide secure bike parking.	1	2	3	4
6)	The city of New Orleans should provide secure bike parking.	1	2	3	4
7)	Merchant associations/ retail establishments should provide secure bike parking.	1	2	3	4
8)	I (or an acquaintance) have (has) had a bike stolen.	1	2	3	4
9)	New Orleans needs more well-designed and well-placed bike parking.	1	2	3	4

Part 4: Open Ended Questions.

1. What areas of New Orleans would benefit the most from secure bike parking (please be specific with names of intersections, neighborhoods, shopping areas, parks, etc.)?

2. What bicycle facility improvements are most important in New Orleans?

3. What would encourage you to ride a bike or ride more often?

If you would like to receive future information about this study or about becoming a member of the Metro Bicycle Coalition please leave your email address:

Email _____

Please return this survey to Nicole S. McCall, Secretary, Metro Bicycle Coalition, nicole.mccall@gmail.com

FOR ADMINISTRATIVE USE ONLY
Study Zone _____
Date Dropped Off / Date Picked up _____/_____
Field Collection _____ Self-Administered _____

Appendix F. Supplemental Data from New Orleans Bicycle Facility Survey

This appendix includes additional information about and results from the New Orleans Bicycle Facility Survey. Additional details about the methodology are included. Some of the surveys questions and results do not directly correspond to end of trip facilities; rather than discussing this information in chapter 4, results are provided below.

Methodology

Information about the methodology may help inform the design of future intercept surveys directed at bicyclists in New Orleans. A recount of the survey process and constrains is provided below. Surveys were collected in person and by packet between March 15th and 22nd. On March 15th, all of the interception points were visited: the bike shops (Bicycle Michael's, Bayou Bicycle, Gherkins, and GNO Cyclery), community bike project (Den of Discord), New Orleans Bike Polo's Grounds, and the Algiers Point Ferry. Packets were left at Bicycle Michael's, Bayou Bicycle, Gherkins, and the Den of Discord. Covered with a request for participation, the packets included surveys, directions, and pens. The packets were not left on the ferry or at New Orleans Bike Polo grounds. Bike Polo participants only gather twice a week to play. The ferry has no secure place to leave a packet. On the same day, survey participation was solicited at Bicycle Michael's, Gherkin's, and Bike Polo; ninety minutes was spent at each location. Another forty-five minutes was spent obtaining responses at the Den of Discord. GNO Cyclery (Uptown) was closed upon arrival at the prearranged time. On Saturday, March 21st, ninety minutes was spent collecting surveys at Bayou Bicycles and on the Algiers Point Ferry. On Sunday, March 22nd, forty-five minutes were spent obtaining responses at the Den of Discord and packets were picked up from all locations. Throughout the week responses were collected on the ferry.

In order to obtain participation, it was necessary to be at the survey location. Out of the ninety-nine responses, only ten were obtained through the packets. When I returned to pick up the packets at most locations, except for the Den of Discord, they were covered with other materials and difficult to find. For the in person survey collection I encountered very few non-responses. Most occurred encountered at Bicycle Michael's. In the middle of a commercial district, fewer individuals were willing to stop and complete the survey. At this location, I found better response rate standing within the doorway as opposed to right outside of the threshold.

Survey Results

Transportation Habits

1. Select the modes of transportation you use during a typical week. (Select all that apply.)

Mode of Transportation	Respondents	% of Respondents
Bicycle	77	78%
Auto	61	62%
Walk/Jog	41	41%
Ferry	16	16%
Streetcar	8	8%
Bus	7	7%

2. Do you own a bike?

Yes	93	94%
No	6	6%

3. Do you primarily use your bicycle for recreation or transportation?

Recreation	21	21%
Transportation	14	14%
Both	59	60%

4. What caused you to start riding /using a bike? (Select all that apply.)

Fun	70	75%
Health	53	57%
Saving Money	42	45%
Faster than Driving	40	43%
Environmental Concerns	36	39%
No automobile access	24	256%
Influenced by Friends	20	22%
Other	12	13%

5. Do you currently depend on your bike for transportation?

Depend on Bike	Respondents	% of Respondents
Yes	57	61%
No	36	39%

6. How often do you use your bike to commute to work?

Frequency Commute to Work by Bike	Respondents	% of Respondents
Never	31	33%
<1x/month	1	1%
<1x/week	1	1%
1 day/week	0	0%
2-3 days/week	9	10%
4-5days/week	13	14%
Always	38	41%
Not Applicable	2	2%

7. What % of errands do you conduct on bike?

% errands on bike	Respondents	% of Respondents
Never	14	13%
1-20%	18	17%
21-40%	14	13%
41-60%	9	9%
61-80%	8	8%
81-99%	8	8%
100%	19	18%

8. What % of your recreational activities includes bicycling?

% recreation on bike	Respondents	% of Respondents
None	5	5%
1-20%	11	12%
21-40%	9	10%
41-60%	16	17%
61-80%	24	26%
81-99%	17	18%
100%	11	12%

10. How long have you used your bike on a regular basis?

Length of Use	Respondents	% of Respondents
Less than 1 year	7	8%
1-3 years	22	24%
3-7 years	22	24%
7+ years	42	45%

11. Do any of the following conditions deter you from riding a bike in New Orleans? (Select all that apply.)

Deterrent	Respondents	% of Respondents
Lack of bike lanes	47	47%
Lack of driver awareness	47	47%
Personal safety concern	35	35%
Weather	28	28%
High Flow of Traffic	27	27%
Lack of secure parking	25	25%
Bike Theft Concern	25	25%
Lack of transit connectivity	20	20%

12. Would any of the following facilities encourage you to ride a bike?

Improvement	Respondents	% of Respondents
Bike Lanes	79	80%
Bike Paths	72	73%
Bike Racks	50	51%
End permitting requirement on RTA busses	32	32%
Bike Valet at Events	23	23%
Other	13	13%

Respondent Characteristics

	Entire Sample	Bicycle Michaels	Bayou Bicycles	Ferry	Discord
Sample Size	99	28	20	23	18
1. Sex					
Male	66%	75%	50%	78%	61%
Female	34%	25%	50%	22%	39%
2. What is your age range?					
Less than 18	0%	0%	0%	0%	0%
18-24	26%	14%	25%	17%	28%
25-34	39%	54%	45%	26%	44%
35-44	20%	14%	15%	39%	17%
45-54	8%	7%	5%	13%	11%
55-64	6%	11%	10%	4%	0%
65-74	0%	0%	0%	0%	0%
75+	0%	0%	0%	0%	0%
3. How would you rate your present neighborhood as a place to live?					
Excellent	42%	46%	45%	39%	50%
Good	37%	39%	45%	35%	28%
Fair	14%	11%	10%	17%	11%
Poor	6%	4%	0%	9%	11%
4. How does your present neighborhood compare with the rest of New Orleans?					
Better	65%	61%	85%	70%	61%
About the Same	29%	32%	15%	17%	39%
Worse	6%	7%	0%	13%	0%
5. What is your race/ethnicity?					
American Indian or Alaska Native	2%	0%	0%	4%	6%
Asian	2%	0%	0%	0%	11%
Hispanic	9%	21%	5%	9%	0%
Black or African American	10%	4%	10%	17%	17%
Native Hawaiian or Other Pacific Islander	2%	0%	0%	4%	6%
White	78%	75%	80%	70%	78%
Other	0%	0%	0%	0%	0%
6. What is the last grade you complete in school?					
Less than high school	1%	0%	0%	4%	0%
High school / GED	17%	4%	0%	35%	33%
Technical school / some College	23%	29%	20%	26%	11%
Graduated College	59%	68%	80%	35%	56%
7. Where do you live?					
State	95%	82%	100%	100%	100%
Orleans	89%	86%	95%	74%	100%
Jefferson	7%	0%	5%	26%	0%
Other	4%	14%	0%	0%	0%

Appendix G. Human and Animal Subject Compliance

Gmail by Google

Nicole McCall <nicole.mccall@gmail.com>

IRB Application (N McCall)

Robert D Laird <rlaird@uno.edu> **Fri, Sep 4, 2009 at 12:03 PM**
To: Nicole McCall <nicole.mccall@gmail.com>
Cc: John L Renne <jrenne@uno.edu>

University Committee for the Protection of Human Subjects in Research

University of New Orleans

Campus Correspondence

Principal Investigator: John Reme

Co-Investigator: Nicole McCall

Date: October 4, 2009

Protocol Title: "A Complete Bicycle Network: Cyclist Desires and Advocacy Priorities for End of Trip Facilities"

IRB#: 01Oct09

The IRB has deemed that the research and procedures described in this protocol application are exempt from federal regulations under 45 CFR 46.101category 2, due to the fact that the information obtained is not recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects.

Exempt protocols do not have an expiration date; however, if there are any changes made to this protocol that may cause it to be no longer exempt from CFR 46, the IRB requires another standard application from the

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Nicole McCall** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 10/09/2008

Certification Number: 113718

Vita

Nicole S. McCall is a graduate student of Urban and Regional Planning at the University of New Orleans (UNO). Her specialization is Land Use and Transportation Planning, which as this thesis demonstrates, focuses on active transportation. She is a research assistant at the Gulf Coast Research Center for Evacuation and Transportation Resilience and planning intern and Burk-Kleinpeter, Inc. Nicole worked as a federal labor economist, in international trade development, and for a planning firm before attending graduate school. She holds a bachelors degree in studio art (printmaking) and economics from Tulane University. She hopes to use her education and passion to influence policymakers to support healthier, more equitable, environmental friendly and economical land use and transportation patterns.