CREATING BICYCLE FRIENDLY UNIVERSITIES: AN ANALYSIS WITH RECOMMENDATIONS FOR THE UNIVERSITY OF FLORIDA

By

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To believing in the future

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LIST OF ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
APBP	Association of Pedestrian and Bicycle Professionals
BFU	Bicycle Friendly University
FDOT	Florida Department of Transportation
GHG	Greenhouse Gas
LAB	League of American Bicyclists
LEED	Leadership in Energy and Environmental Design
MUTCD	Manual on Uniform Traffic Control Devices
NACTO	National Association of City Transportation Officials
PedBike SRC	Florida Pedestrian & Bicyclist Safety Resource Center
PM	Particulate Matter
PPD	Physical Plant Division
RTS	Gainesville Regional Transit System
SG	Student Government
UF	University of Florida
UFPD	University of Florida Police Department

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The United States is overwhelmingly dependent upon the personal automobile for transportation, and travel on the average university campus is no different. Indeed, much like the larger communities in which they often reside, many American universities have struggled to alleviate congestion while providing safe and accessible transportation options for all users. However, in this time of rising overweight and obesity, pollution and climate change, it is more important than ever that universities, as fitting places to communicate innovative transportation practices to the rest of society, invest in alternative modes of transportation. One such mode is bicycling.

This study examines how universities encourage bicycling for transportation by exploring those features of the built and social environments that impact the potential for individuals to cycle on campus, while taking into account the historical reasons for America's car-dependent transportation system and its subsequent impacts on public and environmental health. Using a prospective descriptive case study design, this thesis assesses how well the University of Florida (UF) promotes and provides for cycling on campus, and identifies those areas in need of greatest improvement.

Results indicate that enhancements to existing bicycle infrastructure on campus, such as special accommodations for cyclists at intersections, as well as increased encouragement of cycling and education for bicyclists, could improve bicycle-friendliness at UF and ultimately encourage greater rates of cycling for transportation. Ultimately, providing a better understanding of how universities can increase rates of bicycling is essential to promoting both public and environmental health while furthering the goals of sustainability for communities at large.

CHAPTER 1
INTRODUCTION

Sustainable UF

In 2006, University of Florida (UF) President J. Bernard Machen signed the American College and University President's Climate Commitment, in which he pledged to both reduce UF's carbon footprint and educate the university community about climate change ("Energy and Climate Change", n.d.). Three years later, UF solidified this commitment to addressing energy use and climate change by creating a Climate Action Plan, in which it set a goal of carbon neutrality by 2025 ("Energy and Climate Change", n.d.). Traditionally, transportation is one of the largest contributors to anthropogenic greenhouse gas (GHG) emissions and, subsequently, climate change (Shaheen & Lipman, 2007). Indeed, in the United States, approximately one-third of GHG emissions are produced by the transportation sector, with this figure expected to rise in coming decades (Shaheen & Lipman, 2007). However, at the University of Florida, it is estimated that approximately 16% of the university's GHG emissions are the result of transportation ("Energy and Climate Change", n.d.). This relatively low share of emissions is the result of UF's commitment, as specified in The Transportation Element of its Campus Master Plan, 2005-2015, to reducing dependence on single occupant vehicles as a primary mode of travel to campus, and encouraging multiple modes of transportation, including public transit, walking, and bicycling, within the university context area (University of Florida, 2006).

Across the United States, many universities are exploring a range of solutions to alleviate congestion and improve traveler safety on campus in response to high levels of single-occupancy automobile use, limited parking availability, and constrained financial

resources (Balsas, 2003). Many of the solutions involve market prices for parking and increased transit service, bicycle use, and pedestrianism on campus (Balsas, 2003), and the University of Florida is no different. At UF, the consequence of this commitment to reducing single-occupant automobile use is illustrated by 2009 campus travel mode data. In that year, only 24.3% of travel to the University of Florida was done via personal automobile, compared with 39.2% via transit, 18.7% via walking, 10.3% via bicycling, and 8.5% via other modes of travel (University of Florida Office of Sustainability, n.d.). Considering that 83.4% of all trips in the United States made in 2009 were done by personal automobile (U.S. Department of Transportation Federal Highway Administration, 2011), UF's comparatively low rate of automobile use is especially impressive. However, in spite of these accomplishments, there is still latent opportunity to decrease transportation-related GHG emissions at the University of Florida by increasing the role of bicycling on campus, and in doing so improve the health of the campus community.

Building Healthy Communities

Unlike most automobiles, including transit vehicles, walking and bicycling do not emit greenhouse gases. However, unlike walking, bicycling offers a greater potential substitute for automobile trips due to its faster speed and ability to cover longer distances (Dill, 2009). Indeed, because less than one mile is generally considered a walkable distance, while less than 5 miles is considered a bikeable distance, and national data indicates that only 14% to 27% of trips made are within walking distance while 63% of trips made are within biking distance (Sallis, Frank, Saelens, & Kraft, 2004), it appears that there is considerable potential to decrease GHG emissions through cycling. What's more, cycling offers a potential panacea for the high rates of

physical inactivity and associated increases in overweight and obesity currently plaguing the United States. Unlike time spent in the car, which is positively associated with obesity (Frank, Andresen & Schmidt, 2004), bicycle commuting allows cyclists to meet their daily needs for physical activity while lowering their risk of overweight and obesity (Dill, 2009).

Despite its frequent mention in both public health circles and the popular press, the obesity epidemic is a growing problem in the U.S. Indeed, health researchers at Harvard University recently projected that 42% of Americans will become obese before the epidemic plateaus in 2050 (Hill, Rand, Nowak & Christakis, 2010). This increase in the obesity rate over the next three-plus decades foretells a grim future: at the current rate of approximately 36% (Ogden, Carroll, Kit & Flegal, 2012), the estimated cost of treating obesity-related illness is already $147 billion annually, and accounts for almost 10% of all medical spending in United States (Cawley, 2009). Undoubtedly, this enormous and preventable expense places a huge burden on the American economy. Even when education and cognitive ability are controlled for, obesity is associated with lower wages, greater job absenteeism, and lower productivity while at work (Cawley, 2009). However, the economic cost of obesity is clearly not the only negative consequence of the disease; obesity greatly impacts human health and quality of life. Both overweight and obese individuals are at greater risk for certain diseases and health problems, including coronary heart disease, type 2 diabetes, certain types of cancer, high blood pressure, high cholesterol, stroke, liver and gallbladder disease, and certain respiratory problems (National Center for Chronic Disease Prevention and Health Promotion, 2010).

Concerns regarding obesity and health are not immune from the University of Florida campus. According to the *Healthy Gators Student Survey Report 2008*, three of students' top five general health concerns relate to obesity (Healthy Gators Coalition, 2011). As described in the report, these concerns are overweight/obesity (17.2%), nutrition/diet issues (10.9%), and fitness/exercise (6.2%) (Healthy Gators Coalition, 2011). Additionally, the report reveals that over half of the student body does not meet the minimum standard for moderate physical activity (i.e. 30 minutes for five to seven days per week) set by the American College of Sports Medicine and the Centers for Disease Control and Prevention (Healthy Gators Coalition, 2011). Given the association between physical inactivity, obesity, and such chronic conditions as heart disease and diabetes (Powell & Blair, 1994), these survey results are concerning. Nonetheless, these problems have a potential solution, which would not only improve public health at UF, but would also help the university achieve its goal of carbon neutrality by 2025: increasing rates of bicycling on campus. However, in order to increase these rates, the University of Florida must first identify those features of its campus community that discourage cycling, so that it may make the improvements necessary to become a truly bicycle-friendly university.

Creating a bicycle-friendly University of Florida. In the spring of 2012, the University of Florida's Office of Sustainability indicated an interest in applying to the League of American Bicyclists' Bicycle Friendly University program. The League of American Bicyclists (LAB) is a non-profit bicycle advocacy and education organization that "provides incentives, hands-on assistance, and award recognition for communities, universities and businesses that actively support bicycling" (League of American

Bicyclists, 2012a). LAB was founded in 1880 to defend the rights of cyclists, and since 1965 its primary focus has been bicycle advocacy and educational programming (League of American Bicyclists, 2012c). LAB's programs include Bicycle Friendly State, Bicycle Friendly Community, Bicycle Friendly University (BFU), and Bicycle Friendly Business, all of which recognize their respective entity (state, community, university, or business) for supporting bicycling (League of American Bicyclists, 2012c). Additionally, LAB's advocacy work includes organizing the annual National Bike Summit in Washington, D.C., supporting bicycle-friendly federal legislation[1], and advising the National Highway Traffic Safety Administration on various bicycle-related transportation issues (League of American Bicyclists, 2012c).

This thesis intends to contribute additional research into how universities encourage bicycling for transportation by exploring those features of the built and social environments that impact the potential for individuals to cycle on campus, while taking into account the historical reasons for America's car-dependent transportation system and its subsequent impacts on public and environmental health. This study employs a prospective descriptive case study design, and uses the LAB's Bicycle Friendly University application[2] as a tool to analyze the bicycle-friendliness of the University of Florida in order to assess how well UF promotes and provides for cycling on campus.

[1] E.g., the "Conserve by Bike" amendment to the 2005 Energy Policy Act, which used education and marketing to encourage individuals to commute by bike,

[2] The University of Florida's Office of Sustainability is managing an effort to apply to the League of American Bicyclists to receive the Bicycle Friendly University designation for the University of Florida. Due to time constraints, the Office of Sustainability asked me, the researcher, to collect the relevant data necessary to fill out the BFU application. The application was subsequently completed by the researcher, and will be submitted by the University of Florida for consideration by the LAB in the fall of 2013. Most of the collected data and the completed application were also used as the basis of the methodology for this thesis. A detailed explanation of the methodology used by this study can be found in Chapter 3: Methodology.

The assessment of UF's bicycle-friendliness is based upon its performance relative to five distinct, bicycle-related categories, which are identified by the BFU application and are known to influence cycling rates. These five categories, termed "The Five E's" by the LAB, are engineering, education, encouragement, enforcement, and evaluation and planning. The author intends for the results of this study to provide insight into how the University of Florida can increase rates of bicycling on campus through specific modifications to its built and social environments.

This document contains five chapters, the first of which provides a justification for this research. The second chapter examines the literature as it pertains to automobile-dependency in the United States and its impact on public and environmental health, as well as those factors that contribute to the creation of bicycle-friendly universities. The third chapter outlines the methodology used in this study, while the fourth chapter presents the findings from this research in detail. The fifth chapter presents a discussion of this research, paying particular attention to those areas of bicycle-friendliness that the University of Florida needs the most improvement on as revealed by the assessment tool. This chapter also includes a discussion of the limitations of this study. Finally, the fifth chapter offers a conclusion to this research, making connections between bicycle-friendliness at the University of Florida and the larger contexts of sustainability and public health, as well as offering suggestions for future research.

CHAPTER 2
LITERATURE REVIEW

As outlined in the introduction to this thesis, the second chapter examines the literature as it pertains to automobile-dependency and its impact on public and environmental health, as well as those factors that contribute to the creation of bicycle-friendly universities. The chapter begins with an overview of automobile-dependency in the United States and its connections with urban sprawl. Next, it describes the many negative impacts that such automobile-dependency has on public and environmental health. Finally, the chapter describes those features of the built and social environments that create communities (particularly universities) that are especially bicycle-friendly, including trip distances, the presence of bicycle infrastructure, the perception of safety, an encouraging social environment, and bicycle-friendly plans and policies.

Automobile-dependency in the United States

In the United States, where suburbanization and decentralization of development is widespread, automobile ownership often ensures ease of movement between destinations. Indeed, the importance of the automobile is evidenced by the 91.3% rate of automobile ownership by households in the nation, and the 83.4% rate of daily trips made by automobile (U.S. Department of Transportation Federal Highway Administration, 2011). However, the prevalence of automobile use is not a random feature of American society; it is the result of deliberate policies and practices that have overemphasized automobile infrastructure at the expense of walking and bicycling infrastructure (McCann, 2006).

During the first half of the twentieth century, a majority of Americans lived and worked in close proximity of the city center; however, since the end of World War II, there has been a marked decentralization of housing, jobs, and services from the central city (O'Sullivan, 2009). This trend was made possible by a number of factors, including innovations in transportation, building, and communication technologies, as well as particular government housing and transportation policies, which have conspired to support decentralization. For example, federal housing policies, such as tax provisions that lower the cost of owning a home, have encouraged housing "consumption", often at suburban locations where there is land available for development (Knaap, Talen, Olshansky, & Forrest, 2000). Additionally, federal subsidies for transportation have made the cost of owning and operating an automobile lower than both its "real" cost and its cost relative to other modes (Knaap, Talen, Olshansky, & Forrest, 2000).[1] Together, these policies have enabled many Americans to live in newer homes at lower density suburban locations, where they drive longer distances to access the goods and services they need, all for a relatively low price (Knaap, Talen, Olshansky, & Forrest, 2000). As a result, many American communities today are characterized by urban sprawl.

Sprawl development. The term "sprawl", which generally has a negative connotation, is used to describe the phenomenon of low-density urban development, with density being defined as the number of residents per until of land (O'Sullivan,

[1] To explain, travel has a cost in terms of the amount of time and money spent in traveling, and automobiles are typically expensive to own and operate (Clifton, 2004). However, by artificially lessening the cost of automobile use through federal subsidies, alternative options such as transit, bicycling, and walking become relatively more "expensive" because they typically take more time to use and may or may not be available at a given location, thereby lessening their convenience compared to the car, and therefore increasing their comparative "cost".

2009). Sprawl is frequently described as a bad thing because it promotes an inefficient use of finite resources, such as land (through development) and fuel (which becomes necessary to transport oneself from place to place by personal automobile). Even if most Americans did not prefer to drive an automobile for transportation, current sprawling land development practices make it difficult, if not deadly, to travel by alternative means. As Sallis, Frank, Saelens, and Kraft attest (2004), "land uses and transportation policy and infrastructure . . . since World War II favor automobile use so heavily that most people have little or no ability to walk or cycle for transportation" (p. 255).

Besides federal housing and transportation policies, the widespread use of Euclidean zoning has contributed to the sprawling land development and automobile-dependency present in the U.S. today (Frumkin, Frank & Jackson, 2004). Zoning was originally implemented with the intention of separating incompatible land uses, such as industrial and residential, which could harm public health by exposing populations to the sometimes-toxic outputs of industry, such as localized air, water, or land pollution. However, zoning has evolved to separate land uses that are not necessarily incompatible, such as residential and commercial, with the result being to, "create the long distances between different uses that are fundamental characteristics of sprawl . . . [and] contribute to heavy reliance on automobile travel" (Frumkin, Frank & Jackson, 2004, p. 38). One result of Euclidean zoning is longer trip distances, which result in greater vehicle miles traveled and greater vehicle hours of travel. As Pucher and Dijkstra (2003) confirm:

> In the United States, the separation of residential from commercial land uses increases trip distances and makes the car a necessity. Suburban cul-de-sacs further discourage walking and bicycling by making trips circuitous and excessively long. Residential roads often feed directly into high-speed traffic arteries, increasing the danger of any trips outside the neighborhood. (p. 1513)

These practices of subsidizing homeownership and automobile use, segregating land uses, and increasing distances between destinations affects travel behavior. According to Sallis, Frank, Saelens and Kraft (2004), "[t]wo fundamental concepts of urban form that impact travel choice in general, and active transport in particular, are the proximity (land use density and mix) and connectivity (route directness) between complimentary activities (e.g. work, shop, play)" (p. 252). Research confirms the importance of proximity and connectivity to active transportation by showing that land use mix and route directness is related to greater walking and bicycling, and that walking and bicycling for transportation is approximately five times more common in high density versus low density areas (Sallis, Frank, Saelens, & Kraft, 2004). The typical sprawl development, where density is discouraged, land uses are kept separate, and routes are poorly connected due to 'loop and lollipop street networks' (Frumkin, Frank & Jackson, 2004), therefore discourages active transportation, which harms public health, in two ways. "First, it increases air pollution through increased trip lengths, usually by automobile. Second . . . separated land use reduces walking and cycling for transportation and contributes to low population levels of physical activity" (Sallis, Frank, Saelens, and Kraft, 2004, p. 263).

Public Health Concerns

Physical Inactivity

Getting enough exercise is literally a matter of life and death; in the United States, physical inactivity is responsible for approximately 200,000 deaths per year, which is second only to tobacco, which kills approximately 400,000 individuals each year (Sallis, Frank, Saelens & Kraft, 2004). Physical inactivity increases the likelihood of suffering from chronic diseases like coronary heart disease, stroke, certain cancers, diabetes and depression, and is believed to be partly responsible for the current overweight/obesity epidemic (Sallis, Frank, Saelens & Kraft, 2004). One method of increasing physical activity is through cycling for practical, daily travel (Pucher & Dijkstra, 2003). In fact, "[s]everal articles and editorials in the leading medical and public health journals have explicitly advocated more . . . cycling for daily travel as the most affordable, feasible, and dependable way for people to get the additional exercise they need" (Pucher & Dijkstra, 2003, p. 1509). Such support for increased rates of bicycling is the result of research indicating that cyclists can achieve adequate levels of physical activity necessary for health through daily travel alone (Dill, 2009).

Traditionally, transportation planners and engineers have focused much of their attention on facilitating the safe movement of automobiles within and between communities. However, this dogged focus on automobile safety has become slightly myopic. If automobile deaths per year in the United States can be estimated to be roughly 35,000 (National Highway Traffic Safety Administration, 2010), that would still be less than one-fifth of the 200,000 deaths per year in the US attributable to physical inactivity (Sallis, Frank, Saelens & Kraft, 2004). Clearly, physical inactivity is the deadlier health concern, and the link between sedentariness and automobile use means

that health and physical activity should be a major focus of transportation planning. What's more, as research confirms, "[a]chieving physical activity levels that provide substantial health benefits is realistic for almost all adults" (Sallis, Frank, Saelens and Kraft, 2004, p. 250). Studies in Asia and Europe have shown a statistically significant relationship between active transportation and positive health outcomes, healthier blood lipid profiles and lower body mass index and blood pressure (Sallis, Frank, Saelens, & Kraft, 2004). Studies have also shown that an increase in the use of active transportation to work results in improved cardio-respiratory fitness, which protects individuals from heart disease and premature death (Sallis, Frank, Saelens, & Kraft, 2004). However, the improved health outcomes mentioned thus far are not the only positive health outcomes that may result from an increased use of active transportation, such as bicycling; respiratory and environmental health would be improved as well.

Air Pollution

According to the Department of Energy, the transportation sector accounts for one-third of all energy consumed in the United States (Pedestrian and Bicycle Information Center, 2010). It is also responsible for approximately one-third of carbon dioxide emissions, three-quarters of carbon monoxide emissions, half of volatile organic compound (VOC) emissions, one-third of air toxics, and one-fifth of particulate matter output (Pedestrian and Bicycle Information Center, 2010; Frumkin, Frank and Jackson, 2004). Such air pollution is significant in a human health context because it is associated with both human respiratory damage and death. Automobiles contribute to air pollution through the processes of combustion and evaporation, which release particulate matter (PM) that contain nitrates, sulfates, ammonium, carbon, metals, and other substances into the air (Frumkin, Frank & Jackson, 2004). PM is especially

damaging to respiratory health and can result in death; indeed, “approximately 64,000 people die prematurely each year due to PM exposure – a higher number than die from motor vehicle crashes and homicides combined” (Frumkin, Frank & Jackson, 2004, pg. 82) . Nevertheless, respiratory disease is the more common outcome of exposure to air pollution. For instance, elevated PM levels are associated with increased hospital admissions for strokes, congestive heart failure, and ischemic heart disease, and studies have shown that children’s’ lung growth is significantly reduced when exposed to high levels of PM (Frumkin, Frank & Jackson, 2004).

Ozone, which is considered a ‘secondary pollutant’ that results from chemical reactions involving oxides of nitrogen and hydrocarbons in the presence of sunlight and heat, is another air pollutant that can result from automobile transportation, and is considered an irritant to respiratory airways (Frumkin, Frank & Jackson, 2004). Research shows that people experience shortness of breath, coughing and wheezing within hours of exposure to ozone, school absenteeism rises with increasing levels of PM and ozone, and visits to emergency rooms are shown to increase within days of rising ozone levels (Frumkin, Frank & Jackson, 2004). For example:

> [d]uring the Atlanta Olympic games in 1996, morning peak traffic flow decreased by 22 percent, one-hour peak ozone levels decreased by 28 percent . . . and various measures of acute asthma decreased between 11 percent . . . and 44 percent . . . . These outcomes, too, are clearly related to motor vehicle traffic”. (Frumkin, Frank & Jackson, 2004, p. 84)

Adverse health outcomes associated with automobile use also include lung cancer, premature birth, and low birth weight (Frumkin, Frank & Jackson, 2004).

Although driving is not the only source of air pollution, it is certainly a significant and potentially avoidable one. Indeed, "[i]f sprawl leads to more driving, and if driving contributes to air pollution, then alternatives to sprawl offer a way to reduce air pollution exposure" (Frumkin, Frank & Jackson, 2004, p. 77). One alternative is density and land use mix, which encourage active modes of transportation, such as bicycling. Of course, bicycling does not contribute to air pollution, nor does it negatively affect health. Rather, as previously cited research demonstrates, physical activity such as bicycling has numerous positive health effects.

Climate Change

Increased air pollution from transportation is also problematic in an environmental health context because it is believed to contribute to climate change. The use of fossil fuels for transportation is a major source of human-caused greenhouse gas emissions (Shaheen & Lipman, 2007). Greenhouse gases, or GHGs, include carbon dioxide (CO2) and other emissions, like methane and nitrous oxide, which trap heat in the earth's atmosphere and result in a number of negative environmental effects (Frumkin, Frank & Jackson, 2004). For example, possible effects of climate change include, "rising ocean levels, more severe tropical storms and hurricanes, more pronounced heat waves, droughts and wildfires, and a wide range of other potential impacts on humans and wildlife in environments that are likely to feel the strongest effects. . ." (Shaheen & Lipman, 2007, p. 8). According to Frumkin, Frank & Jackson (2004), the United States is the world's biggest contributor to greenhouse gases. Although it contains only 5% of the world's population, the U.S emits over 20% of greenhouse gases globally, of which approximately one-third is the result of transportation (Frumkin, Frank & Jackson, 2004). Unfortunately, greenhouse gas emissions have been increasing with population growth

and development around the world, and transportation sector emissions are expected to continue rising over the following decades (Shaheen & Lipman, 2007)

These increases in GHG emissions are the result of both increases in personal travel and the movement of goods, and the over-reliance on fossil fuels for transportation energy (Shaheen & Lipman, 2007, p. 6). Clearly, a change in the transportation sector away from dependence on energy sources that emit greenhouse gases is needed. While Shaheen & Lipman (2007) focus almost solely on new transportation technologies, like intelligent tolling systems and "green" engine and fuel technologies, in the effort to reduce greenhouse gases, there is a logical role for active transportation to meet this need. For instance, Stockholm, Sweden has a long-term plan to reduce CO2 emissions through the improvement of its bicycling infrastructure (Shaheen & Lipman, 2007). It is believed that by replacing 30 million short car trips with bicycling each year, and encouraging 2,000 individuals to cycle exclusively during the summer months, by 2050 the city can reduce its CO2 emissions by 2,900 tons per year (Shaheen & Lipman, 2007). Unlike the focus on new technologies mentioned above, Stockholm's encouragement of bicycling will most likely have the added benefits of saving energy, conserving land, and improving human health by reducing overweight and obesity.

Creating Bicycle-Friendly Communities

Land Use

Due to the prevalence of compact land use patterns in many European cities, and the popularity of bicycling for transportation in those communities, the relatively long distances between destinations in many American cities is often cited as a major reason for the insignificant role of bicycling for transportation in the United States. Indeed, it's

argued that American communities must utilize more compact, mixed land use patterns, which would reduce trip distances, in order for cycling to become a viable transportation mode. While there are many valid reasons to favor compact land use development, ascribing a cause-and-effect relationship between current land use patterns in the U.S. and the low level of bicycling is not a wholly accurate association. In the United States, 41% of all urban trips are shorter than 2 miles, and 28% are shorter than 1 mile (Pucher & Dijkstra, 2003). With 2 miles being considered an easy cycling distance, it seems clear that the 11% rate of trips made by walking or bicycling is the unusually low and should not be attributed solely to long trip distances. Indeed, "if distance were the overriding factor, one might expect more cycling than walking in American cities, since cycling covers longer distances faster and easier" (Pucher & Dijkstra, 2003, p. 1511). However, walk trips outnumber bike trips 11 to 1 (U.S. Department of Transportation Federal Highway Administration, 2011).

Unlike the larger, sprawling communities in which they often reside, many traditional university campuses in the United States adhere to the principles of the neotraditional town, meaning that they concentrate a variety of functions, including housing, classrooms, offices, shopping areas, recreational spaces, and cultural centers in close enough proximity as to be easily accessible to pedestrians and bicyclists (Balsas, 2003). Yet despite their unique design, college campuses are often privy to the transportation trends present outside of the campus boundaries; although various goods and services may be accessible via bicycle on campus, many students, faculty, and staff do not reside on campus, but rather commute between campus and the larger community, often by car. Indeed, despite their relatively compact layout, rates of

bicycling on many university campuses are as low as cycling rates for the rest of the United States at large. As a result, many universities struggle with the same ill-effects of automobile-dependency as the rest of the United States. However, automobile-dependency does not have to prevail. Research shows that a comprehensive approach to bicycle planning, which features, "an integrated package of many different, complementary interventions, including infrastructure provision and pro-bicycle programs, as well as supportive land use planning and restrictions on car use" (Pucher, Dill & Handy, 2010, p. S122), is effective in facilitating substantial increases in bicycling within communities, including university campuses.

Bicycle Infrastructure

According to the League of American Bicyclists (2011), the most noticeable evidence of bicycle-friendliness is the existence of infrastructure for biking. This infrastructure comprises everything from bike lanes and cycletracks on roadways, to bicycle parking and showering facilities at destinations. The idea that bicycle infrastructure is a sign of a bike-friendliness is supported by research showing that, "[p]roximity of destinations, availability and quality of walking and cycling facilities, aesthetics, and perceiving difficulties parking near shopping areas" (Van Dyck et al., 2012, p. 7) are associated with cycling, and the more supportive the physical environment is with respect to these features, the more time individuals spend cycling for transportation (Van Dyck et al., 2012). Generally speaking, stated preference studies show that individuals feel encouraged to bicycle more often if their community has bike paths and lanes (Dill, 2009). However, findings from revealed preference studies regarding the influence of specific infrastructure treatments on bicycle ridership are less conclusive. At the city level, "two studies have found that bike lanes are

associated with higher rates of bicycle commuting. However, at an individual level, other studies have not found such a link" (Dill, 2009, S97). According to Dill (2009), multiple studies show that bicyclists will go out of their way to use bicycle facilities, while one study contradicts that conclusion in finding that bicycle commuters will most often take the shortest route, whether or not that route has bicycle facilities. Additionally, a national survey found that frequent bicyclists preferred bike lanes to bike paths, while infrequent bicyclists were more likely to prefer bike paths to bike lanes (Dill, 2009).

The discrepant nature of these findings is most likely the result of the variety present in potential cyclists' age, sex, and comfort level with bicycling. For example, "[a]t least three studies found differences in facility preferences between men and women, with women generally more attracted to infrastructure with less motor vehicle traffic" (Pucher, Dill & Handy, 2010, p. S111). However, that preference did not hold for off-street paths, with men feeling more comfortable using those facilities than women, most likely due to gender-specific safety concerns (Pucher, Dill & Handy, 2010). On the other hand, stated preference studies found that experienced cyclists preferred using on-street bicycle lanes to off-street bicycle paths, most likely due to the extra time required to access those paths and to the cyclists' confidence in their ability to cycle safely while in traffic (Pucher, Dill & Handy, 2010). Due to this diversity in bicycle facility preference, a one-size-fits-all approach to attracting individuals to cycling would most likely fail. Instead, "[a] network of different types of infrastructure appears necessary to attract new people to bicycling. Simply adding bike lanes to all new major roads is unlikely to achieve high rates of bicycling" (Dill, 2009, p. S106). This concept holds true for universities as well. As Balsas (2003) attests, "[d]espite the need to make every

road cycleable, a logical and well-identified bicycle network composed of different types of bikeways should be implemented with identifiable links to off-campus facilities" (p. 43). As a result, for both on- and off-campus communities, creating a well-connected network of bicycle paths, lanes, and boulevards, along with low-traffic neighborhood streets not requiring bicycle infrastructure, would couple the experienced cyclists' preference for minimal trip distance with the less confident cyclist's desire to ride in a safer, more protected environment (Dill, 2009).

Besides on-street facilities, end-of-trip facilities, such as bicycle parking, are essential to attracting more people to cycling (Van Dyck et. al, 2012). In countries where cycling for transportation is prevalent, such as most Dutch, Danish, and German communities, local governments, private developers, building owners, and public transport systems all provide bicycle parking facilities for riders (Pucher and Buehler, 2008). This is the result of government ordinances requiring minimum levels of bicycle parking within and adjacent to buildings and other likely destinations for cyclists (Pucher and Buehler, 2008), and it is essential to increased bicycling rates. Just as drivers are more or less likely to drive to their destination based upon the availability and convenience of car parking spaces, cyclists are more or less likely to bike to their destination based upon the availability and convenience of bicycle parking (Pucher and Buehler, 2008). Besides deterring bicycling, a lack of bicycle parking can result in the random parking of bicycles in public spaces. When chained to bus stop signs, fences, light poles, or any number of inappropriate places, this parking can not only cause property damage, but can obstruct pedestrians on sidewalks and be considered a visual nuisance (Pucher and Buehler, 2008). What's more, inappropriate bicycle parking may

easily result in theft, which further discourages cycling (Association of Pedestrian and Bicycle Professionals, 2002) for both on- and off-campus riders (Balsas, 2003). Indeed, bicycle theft on campus can be a major deterrent to increased ridership (Balsas, 2003); therefore it is vital that secure-bicycle parking be provided for riders at a variety of locations.

Bicycle Safety

One of the main reasons infrastructure is so important to attracting new bicycle riders is because of real and perceived safety concerns. According to Pucher and Dijkstra (2003), it is much more dangerous to walk or ride a bike in American cities than to travel via automobile. Indeed per kilometer traveled, "pedestrians were 23 times more likely to get killed than car occupants in 2001 (140 vs 6 fatalities per billion kilometers), while bicyclists were 12 times more likely than car occupants to get killed (72 vs 6 fatalities per billion kilometers)" (Pucher and Dijkstra, 2003, p. 1511). In fact, when considered as a share of the total travelling population, pedestrian and bicycle fatalities make up over 13% of all traffic fatalities while accounting for less than 12% of all trips taken (Pedestrian and Bicycle Information Center, 2010). Unsurprisingly, safety concerns are one of the most frequently cited disincentives for cycling (Teschke et al., 2012). However, research shows that specific infrastructure treatments and transportation policies can increase real and perceived safety of bicycling by increasing their visibility on the roadway. As Dobbs (2009) attests, because bicyclists are intermittently present in traffic, "it is critical that roadway and bicycle path designers strive to improve the visibility of bicyclists and reduce unexpected motorist-bicyclist conflicts" (p. 13).

In terms of the inherent safety of bicycle infrastructure, research shows that cycle tracks, or an exclusive bicycle facility that functions like a conventional on-street bike lane but is separated from both motor vehicle traffic and sidewalks, have the lowest injury risk for bicyclists (Teschke et al., 2012). Bicycle lanes are also found to reduce injury risk for cyclists, as are quiet streets (Teschke et al., 2012). According to Dobbs (2009), "[t]he provision of bike lanes for bicycles . . . increases the visibility of bicyclists while enhancing motorists' turning movements and expectations of bicyclists" (p. 25). In the long run, increasing cyclist visibility reduces the number of rear-end and sideswipe crashes, and increases awareness of all transportation modes (Dobbs, 2009). Increased awareness of bicyclists makes bicycling safer, which encourages more bicycling and furthers awareness, thereby perpetuating a positive feedback cycle of awareness, safety, and increased ridership. As research by Pucher, Dill and Handy (2010) confirms:

> studies find that bicycling safety is greater in countries and cities with higher levels of bicycling, and that bicycling injury rates fall as levels of bicycling increase. As the number of cyclists grows, they become more visible to motorists, which is a crucial factor in bicycling safety. In addition, a higher percentage of motorists are likely to be bicyclists themselves, and thus more sensitive to the needs and rights of bicyclists. (p. S121)

While cycle tracks and bicycle lanes help to make cycling safer, research shows that shared bicycle infrastructure, meaning paths or lanes that are also used by pedestrians, such as sidewalks or multiuse paths, are less safe than bicycle-only paths and cycle tracks (Teschke et al., 2012). Fortunately, cyclists appear to favor the safer,

bicycle-specific infrastructure to the less safe, shared bicycle infrastructure (Teschke et al., 2012). Additionally, construction, downhill slopes, and streetcar or train tracks are all found to be associated with injury risk for cyclists (Teschke et al., 2012), as are pavement deficiencies and drainage grates (Dobbs, 2009). To accommodate these findings, it is suggested that detours be provided for cyclists when construction or broken pavement affects bicycle infrastructure, and that route infrastructure be designed for the primary prevention of injuries to cyclists (Teschke et al., 2012). These design features include the use of bicycle-specific facilities, like cycle tracks, bike lanes and paths, quiet streets, the absence of drainage grates with parallel bars, the absence of streetcar or train tracks, and the use of gently sloping changes in elevation (Teschke et al., 2012).

Two topics related to bicyclist safety that deserve special attention are roadway intersections and traffic speed. In reference to intersections, one English study reported that 74% of crashes involving bicyclists at intersections result in fatalities (Dobbs, 2009). Intersection safety is not just a concern for off-campus cyclists; it is relevant to on-campus safety as well (Balsas, 2003). In order to improve intersection safety, a variety of roadway modifications may be made, including, “special bike turn lanes leading directly to intersections, separate bike traffic signals with advance green lights for cyclists, [and] bicyclist activated traffic signals at key intersections” (Pucher & Dijkstra, 2003, p. 1513). Reducing traffic speed is another essential factor in increasing bicycle safety, not only because it helps motorists to avoid hitting pedestrians and bicyclists, but it also increases the rate of survival for non-motorists who are struck (Pucher and Dijkstra, 2003). As Pucher and Dijkstra (2003) report, “The British Department of

Transport, for example, found that the risk of pedestrian death in crashes rises from 5% at 20 mph to 45% at 30 mph and 85% at 40 mph" (p. 1513). Reduced traffic speeds can be accomplished through the application of traffic calming. Traffic calming reduces motor vehicle speeds by narrowing roads, zigzagging routes, and imposing physical barriers in the roadway, such as raised intersections and crosswalks, and speed humps, which ultimately improves safety (Pucher & Dijkstra, 2003). Indeed, "[a] comprehensive review of traffic calming impacts in Denmark, Great Britain, Germany, and The Netherlands found that traffic injuries fell by an average of 53% in traffic-calmed neighborhoods." (Pucher & Dijkstra, 2003, p. 1513). In addition, traffic calming communicates the equal right of bicyclists to use the roadway by requiring that drivers yield to cyclists, thereby increasing the perceived legitimacy of cyclists on the roadway (Pucher & Dijkstra, 2003).

Encouraging Social Environments

A legitimate activity is one that is in agreement with established or accepted patterns or standards. Communities with high levels of bicycling tend to foster increased rates of cycling through a supportive social environment, whereas cities with low levels of bicycling tend to deter bicycling by portraying that activity as an illegitimate one (Pucher, Dill & Handy, 2010). This pattern appears to hold true even in communities with adequate bicycle infrastructure. In fact, research demonstrates that, in communities where adequate bicycle infrastructure is in place, social support for bicycling and an individual's self-efficacy (or belief in one's ability to obtain a goal or complete a task) related to bicycling will have a greater effect on rates of cycling than will additional infrastructure improvements (de Geus, De Bourdeaudjuij, Jannes, & Meeusen, 2008). Studies also show that individuals who report high levels of social

support for bicycling are more likely to cycle themselves (de Geus, De Bourdeaudjuij, Jannes, & Meeusen, 2008). In particular, support from significant others who accompany the individual in bicycling seems to be the most important social variable for increasing cycling (de Geus, De Bourdeaudjuij, Jannes, & Meeusen, 2008). Similarly, physical self-efficacy, or belief in one's ability to complete a physical task, appears to be an important direct correlate of physical activity behavior, like cycling (de Geus, De Bourdeaudjuij, Jannes, & Meeusen, 2008). As a result, it appears that increased rates of bicycling could result from program and policy interventions aimed at legitimizing cycling within communities by increasing individuals' belief in their ability to cycle for transportation successfully, and by raising rates of social support and acceptance for the activity.

Education

Cycling education is one way in which social support for bicycling and bicycling self-efficacy could be raised. For instance, classes geared towards enhancing the traffic skills or commuting techniques of would-be bicyclists could improve potential cyclists' knowledge of safe and effective bicycling behaviors, and therefore enhance their confidence in their ability to cycle successfully. Indeed, comprehensive bicycling education is implemented in other countries with just this result. For example, in The Netherlands and Germany, traffic education begins at a young age. As Pucher and Djikstra (2003) report, "[b]y the age of 10, all schoolchildren have received extensive instruction on safe walking and bicycling practices. They are taught not just the traffic regulations but how to walk and bicycle defensively, to anticipate dangerous situations, and to react appropriately" (p. 1514). Unsurprisingly, the rates of bicycling for transportation are much higher in The Netherlands and Germany (27% and 10%,

respectively) than they are in the United States (1%) (Pucher and Bueler, 2008). That sort of comprehensive and intensive education does not occur in the United States today. What's more, American drivers are not taught to coexist with bicyclists on the roadway. However, in The Netherlands and Germany, "[m]otorists are required by law to drive in a way that minimizes the risk of injury for pedestrians and cyclists even if they are jaywalking, cycling in the wrong direction, ignoring traffic signals, or otherwise behaving contrary to traffic regulations" (Pucher & Dijkstra, 2003, p. 1513-1514). Such educational practices undoubtedly raise awareness about the rights of cyclists within communities, and lower the risk of bicycle injury and death, thereby encouraging more bicycling.

However, education does not solely occur in the classroom. Instead, there are a number of promotional tools that can be utilized to advertise bicycling for transportation and educate the public as to its role in the transportation system. Such tools include news articles, bicycle program websites, maps, promotional brochures, cycling festivals and celebrations, and networking events with related interest groups (Balsas, 2003). The importance of promotional tools in encouraging cycling holds true for on- and off-campus communities alike. Indeed, according to Balsas (2003), bicycle maps that clearly display the necessary route-finding information are a priority for all riders.

Law enforcement

Law enforcement practices can also play an important role in legitimizing and increasing social support for cycling. For instance, in The Netherlands and Germany, both motor vehicle operators and bicyclists are strictly regulated for traveling in ways that do or might result in an accident. Indeed, even when an accident in these countries results from a cyclist performing an illegal move, motor vehicle operators are almost

always found to be at least partially responsible for the accident, due to their failure to anticipate unsafe cycling (Pucher & Dijkstra, 2003). By not giving priority to the automobile and requiring that drivers to be responsible for their role in an accident involving a bicyclist, Dutch and German law enforcement legitimize the role of bicycling on the roadway, and encourages safe and cautious driving. At the same time, Dutch and German law enforcement are stricter about ticketing cyclists who violate traffic regulations than are their American counterparts (Pucher & Dijkstra, 2003). For instance, in The Netherlands and Germany, "cyclists caught riding in the wrong direction, running red lights, making illegal turns, or riding at night without functioning lights can expect at least a warning notice and possibly a ticket and fine" (Pucher & Dijkstra, 2003, p. 1514). Like with the case of ticketing motorists, by enforcing the role of bicyclists in bicycling accidents, Dutch and German law enforcement encourages safety and caution among riders. While the positive relationship between strict enforcement and support of bicycling may seem counter intuitive, research regarding bicycling on university campuses confirms that campuses that best accommodate cyclists also enforce some of the strictest bicycle laws (Balsas, 2003).

Law enforcement also plays a central role in encouraging bicycling through its influence on theft. Research shows that the potential risk of having a bicycle stolen or vandalized is negatively correlated with bicycle use (Rietveld & Daniel, 2004). Unfortunately, the risk of theft or vandalism not only decreases one's willingness to bike in general, but also decreases one's willingness to use a higher-quality bike while cycling, which might encourage longer or more frequent trips (Rietvels & Daniel, 2004). However, research also shows that, by focusing their attention on areas experiencing

high crime, such as bicycle parking facilities where theft often occurs, law enforcement officials can drastically reduce overall crime (Braga, 2007). This is because, generally speaking, crime is not equally distributed throughout a region, but rather is clustered in concentrated areas, also known as “hot spots” (Braga, 2007). What’s more, research on bicycling at universities shows that officers patrolling by bicycle are better able to prevent crime because getting them out of the car makes them more accessible to students, faculty, and staff (Balsas, 2003). As a result, one can surmise that increased patrolling of areas known to have high rates of bicycle theft, especially by bicycle patrol, could reduce rates of theft overall, therefore reducing the perceived risk of having one’s bicycle stolen and increasing the rate of cycling.

Bicycle-Friendly Plans and Policies

Finally, the importance of plans and policies that support a comprehensive approach to increasing bicycle-friendliness cannot be understated. Communities that simply stripe a bike lane on their major roadways and are subsequently puzzled when bicycling rates do not increase are missing the bigger picture. As Pucher, Dill and Handy (2010) attest:

> A comprehensive approach produces a much greater impact on bicycling than individual measures that are not coordinated. The impact of any particular measure is enhanced by the synergies with complementary measures in the same package. In that sense, the whole package is more than the sum of its parts. (p. S122)

On university campuses, and in communities at large, this comprehensive approach to planning for bicyclists may be achieved through a variety of means, including the following: the creation of a specific bicycle committee to represent bicyclists’ interests in

the transportation planning process; the hiring of a bicycle coordinator responsible for "assessing needs, identifying opportunities, formulating and implementing plans, coordinating events and maintaining the campus bicycle and pedestrian facilities" (Balsas, 2003); periodic surveying of bicyclist needs and concerns; and the creation of a bicycle plan that encourages non-motorized transportation (Balsas, 2003).

Summary

As the literature demonstrates, the reasons for low bicycle shares of trips, and the methods for improving bikability and increasing rates of biking, are multifaceted. According to Pucher, Dill and Handy (2010), "Countries and cities with high levels of bicycling and good safety rates tend to have extensive infrastructure, as well as pro-bicycle policies and programs, whereas those with low bicycling rates and poor safety records generally have done much less" (p. S107). Accordingly, the quality of urban design, the type and safety of bicycle facilities, the convenience and directness of routes, and the existence of bicycle education and traffic enforcement, must all be present in order to create a bicycle-friendly university. While specific interventions alone may have a positive effect on bicycling, they are usually more affective when they are employed as part of a comprehensive plan to increase bicycling (Pucher, Dill & Handy, 2010). The following chapter of this thesis provides a detailed description of the methodology used in conducting a case study assessing the bicycle-friendliness of the University of Florida.

CHAPTER 3
METHODOLOGY

Background

In the spring of 2012, the University of Florida's Office of Sustainability indicated an interest in applying to the League of American Bicyclists' Bicycle Friendly University program. The League of American Bicyclists (LAB) is a non-profit bicycle advocacy and education organization that "provides incentives, hands-on assistance, and award recognition for communities, universities and businesses that actively support bicycling, and ranks states based on their level of bike-friendliness" (League of American Bicyclists, 2012a). LAB was founded in 1880 to defend the rights of cyclists. Its primary focus has been bicycle advocacy and educational programming since 1965 (League of American Bicyclists, 2012c). LAB's programs include Bicycle Friendly State, Bicycle Friendly Community, Bicycle Friendly University, and Bicycle Friendly Business, all of which recognize their respective entity (state, community, university or business) for supporting bicycling (League of American Bicyclists, 2012c). Additionally, LAB's advocacy work includes organizing the annual National Bike Summit in Washington, D.C., supporting bicycle-friendly federal legislation (e.g., the "Conserve by Bike" amendment to the 2005 Energy Policy Act, which used education and marketing to encourage individuals to commute by bike), and advising the National Highway Traffic Safety Administration on various bicycle-related transportation issues (League of American Bicyclists, 2012c).

"The Five E's"

Under the direction of the League of American Bicyclists, The Bicycle Friendly University program "recognizes institutions of higher education for promoting and

providing a more bicycle-friendly campus for students, staff and visitors. The Bicycle Friendly University program provides the roadmap and technical assistance to create great campuses for cycling" (League of American Bicyclists, 2012b). In order to perform a prospective descriptive case study analyzing the bicycle-friendliness of the University of Florida, the researcher collected the data needed to complete the BFU application. This application took the form of a questionnaire consisting of select-one multiple choice, select-many multiple choice, yes/no, short answer, and long answer (100+ word) questions. These questions were largely concerned with five distinct, bicycle-related topics, termed "The Five E's" by the League of American Bicyclists: Engineering, Education, Encouragement, Enforcement, and Evaluation and Planning.

The first "E", engineering, assessed the physical infrastructure in place in a university community and its effect on bicycling. Some topics of inquiry included the existence of bicycle lanes and bicycle parking, and the use of a "complete streets" policy. The second "E", education, determined the availability and distribution of information related to safe bicycling for both cyclists and motorists. Questions pertained to such topics as the availability of cycling education and the distribution of information, such as bicycle facility maps. The third "E", encouragement, assessed how well the university community promoted bicycling. Topics of inquiry concerned the existence of university-sponsored bicycling events, as well as bicycle maps, bike-share programs, and bicycle repair services. The fourth "E", enforcement, focused on the relationship between law enforcement and the bicycling communities. These questions evaluated the strength of the relationship between these two communities, as well as the enforcement of laws related to safe bicycling for both cyclists and motorists. Finally, the

fifth “E”, evaluation and planning, examined the systems that the university had in place for evaluating the current bicycle network, and for planning its future. These questions were concerned with such issues as the tracking of bicycle crash and fatality rates, and the existence of a bicycle master plan.

In order to assess UF’s bicycle-friendliness based upon its performance relative to “The Five E’s” described above, data had to be collected before the application and subsequent evaluation could be completed.

Collecting Data

The researcher collected the data needed to answer the questions asked in the BFU application. This data came from a variety of sources, including personal observation, the examination of UF webpages, and various print resources, including campus planning documents. Additionally, the answers to specific application questions were provided by a number of professionals at the University of Florida who have expertise in areas directly related to those topics covered by the questionnaire. These answers were given in-person, over the telephone, and through e-mail. The following represents a complete list of individuals who assisted in answering questions asked in the BFU application:

- Harold Barrand, Associate Director , Physical Plant Division
- Rena Buchan, Assistant Director of Housing for Graduate and Family Housing, Department of Housing and Residence Education
- Dan Connaughton, Director, Florida Traffic & Bicycle Safety Education Program, and Faculty, Department of Tourism, Recreation & Sports Management
- Linda Dixon, Associate Director, Planning Office, Facilities, Planning & Construction Division

- Scott Fox, Director, Transportation and Parking Services
- Ronald Fuller, Assistant Director, Transportation and Parking Services
- Erik Lewis, Senior Planner, Planning Office, Facilities, Planning & Construction Division
- John Savona, Officer, Bicycle Unit, University of Florida Police Department
- Stephanie Sims, Implementation Coordinator, Office of Sustainability
- James Tyger, Program Coordinator, Student Government
- Dan Williams, Assistant Vice President, Marketing

Making an Assessment

As previously mentioned, the BFU application consisted of select-one multiple choice, select-many multiple choice, yes/no, short answer, and long answer (100+ word) questions. The BFU application did not include a grading rubric; evaluation of a university's bicycle-friendliness is done internally by the LAB. Therefore, in order for UF's performance on each question to be evaluated as "good", "fair", or "poor" relative to its support of bicycling on campus, a grading rubric was developed by the researcher. This rubric was established to be sensitive to the type of question being asked in the questionnaire, and the answer's relationship to bicycle-friendliness. For example, select-one questions were subdivided according to select-one question type, of which there are three: Type-A, Type-B, and Literature. Grading criteria were then established for each type. Similarly, select-many questions were subdivided according to their question type, of which there are two: Type-1 and Type-2. Specific grading criteria were also established for each type. The grading rubrics for each question type can be found in Tables 3-1 through 3-6 located at the end of this chapter.

Additionally, for the sake of analysis, five assessment tables were created to correspond with each of “The Five E’s” covered by the BFU application. Select-one, select-many, and yes/no question types were included in these tables. Informational questions that had answers with no intrinsic value to the assessment were excluded from the tables, although this information was included as background material in Chapter 4: Findings. Short answer responses were also excluded from the tables, but were included in the Findings. Long answer questions were considered supplemental to the previously-mentioned question types and were not included in the assessment tables or Findings. Finally, questions whose answers could not be obtained were excluded from the tables and Findings. In total, the education, encouragement, and evaluation and planning tables each assess seven questions, the encouragement table assesses eleven questions, and the engineering table assesses twenty questions. All five assessment tables (Table 4-1, Table 4-2, Table 4-3, Table 4-4 and Table 4-5) can be found at the end of Chapter 4. Additionally, a full-text version of the LAB’s Bicycle Friendly University application can be found in Appendix A.

Summary

The methodology described in this chapter helped to assess the bicycle-friendliness of the University of Florida. Although there may be other methods of completing this assessment, it should be noted that the BFU application chosen as the basis for this study has been used to evaluate the bicycle-friendliness of universities across the United States. The following chapter presents the findings resulting from these methods, and offers a means for evaluation and further discussion.

Table 3-1. Grading rubric: Yes/No question

Example Response	Score (points)	Score (%)	Assessment
Yes	1/1	100%	Good
No	0/1	0%	Poor

Table 3-2. Grading rubric: Select-one question (Type A) – "When MORE is better"

Example Response	Score (points)	Score (%)	Assessment
"All", "Most", "1:1", etc.	2/2	100%	Good
"Some", "Few", "1:3", etc.	1/2	50%	Fair
"None", "Never", "Not regularly scheduled", "1:5 or more", etc.	0/2	0%	Poor

Table 3-3. Grading rubric: Select-one question (Type B) – "When LESS is better"

Example Response	Score (points)	Score (%)	Assessment
"0", "None", etc.	2/2	100%	Good
"Some", "Few", etc.	1/2	50%	Fair
"All", "Most", etc.	0/2	0%	Poor

Table 3-4. Grading rubric: Select-one question (Literature) – Literature is used to make an assessment

Example Response	Score (points)	Score (%)	Assessment
Variable	N/A	N/A	Good, Fair or Poor

Table 3-5. Grading rubric: Select-many question (Type 1) – "When MORE is better"

Example Response	Score (points)	Score (%)	Assessment
67% to 100% of possible responses selected	Variable	67-100%	Good
34% to 66% of possible responses selected	Variable	34-66%	Fair
0 to 33% of possible responses selected	Variable	0-33%	Poor
"None", "None of the above", etc.	0	0%	Poor

Table 3-6. Grading rubric: Select-many question (Type 2) – "When LESS is better"

Example Response	Score (points)	Score (%)	Assessment
0 to 33% of possible responses selected	Variable	0-33%	Good
34% to 66% of possible responses selected	Variable	34-66%	Fair
67% to 100% of possible responses selected	Variable	67-100%	Good

CHAPTER 4
FINDINGS

This Chapter summarizes the findings obtained by completing the BFU application for the University of Florida. This Chapter is divided into five sections. The first section provides an overview of the University of Florida case study area in order to provide a context for the subsequent findings. Sections two through six present findings from the BFU application relative to each of "The Five E's" covered by the questionnaire: engineering, education, encouragement, enforcement, and evaluation and planning. The last section provides a summary of the findings from the UF case study. Finally, it should be noted that the five assessment tables (Table 4-1 through 4-5) that were created based upon the information obtained through completion of the BFU application can be found at the end of this Chapter. Additionally, as previously noted, a full-text version of the LAB's Bicycle Friendly University application can be found in Appendix A.

University Profile

The University of Florida is a national university located in Gainesville, Florida. The suburban campus has a population of 52,271 students and 22,211 faculty and staff, and, on average, the 80% of students who live off campus commute 2.16 miles to campus, with the median commute distance equaling 1.70 miles.

The university has a Sustainable Transportation Working Group consisting of student, faculty, and staff participants representing a variety of interests, including the university police department, student government, campus planning, transportation and parking services, sustainability, and health and wellness. This group meets quarterly to discuss and plan for multiple modes of transportation on campus, including bicycling. However, the university does not have a dedicated Bicycle Program Manager, nor does

it have a specific budget for bicycle programming. Instead, bicycle-related issues are handled by five main staff members of the university, and funding for bicycle programming is received through a number of sources, including the university's Transportation and Parking Services, the university's Office of Sustainability, and through grant funding, such as from the Florida Department of Transportation. Due to the lack of a single Bicycle Program Manager, it is difficult to accurately estimate the percentage of time that the relevant staff members spend on bicycling issues as a whole. However, acknowledging this difficulty, if approximately 5% of each staff member's time is devoted to bicycling issues, then the cumulative percentage would equal roughly 25% of one (hypothetical) person's time.

The university's bicycle program does not have its own webpage. Instead, bicycling issues are covered on multiple webpages, most notably the Office of Sustainability's Transportation page (http://sustainable.ufl.edu/transportation/) and Transportation and Parking Service's page (http://www.parking.ufl.edu/pages/transcommopt.asp). However, the university does have four bicycle advocacy groups that are currently active on campus, and UF acknowledges investing in bicycling for a number of reasons listed in the BFU questionnaire, including the following:

- Improve quality of life and health for students, faculty, and staff
- Connect the community and the campus
- Provide multiple transportation options
- Reduce demand for car-parking
- Address climate change and environmental stewardship concerns
- Decrease traffic congestion
- Respond to user demand
- Improve the safety of bicyclists and pedestrians

Given the background information about the University of Florida described above, this chapter now describes those findings obtained from completion of the BFU application by the researcher. These findings begin with the first of "The Five E's", engineering, and move progressively through each "E" covered by the application. As mentioned previously, the five assessment tables (Table 4-1 through 4-5) that were created based upon the information obtained through completion of the BFU application can be found at the end of this Chapter.

Engineering

The university accommodates bicycling through a de facto Complete Streets policy that was adopted in 2006 as part of its *Campus Master Plan, 2005-2015.* The implementation of these bicycle policies are ensured through the hiring of outside consultants to train staff or review plans, the use of an implementation checklist and design manual, and the oversight of a "bicycle program manager".

Parking

In order to ensure that end-of-trip facilities exist for bicyclists, the university has adopted the following procedures:

- Bike parking ordinance/policy for existing buildings
- Bike parking ordinance/policy for new developments
- Policy requiring showers in non-residential buildings
- Policy requiring lockers in non-residential buildings
- Bicycles permitted in most campus buildings
- Requirement for new developments to meet LEED silver standards or higher

In coordination with the city, county, and Metropolitan Transportation Organization, the university strives to reduce dependence on single-occupant vehicles as the primary mode of travel, and to encourage multiple modes of transportation (University of Florida, 2006). One way in which UF Transportation and Parking Services does this is by

capping the number of automobile-parking spaces available on campus. Parking passes are available to any student, faculty or staff who would like to buy one, at varying levels of expense. Student passes cost $150 for an annual pass, while the price of faculty and staff parking passes vary depending upon the type of pass purchased. For example, faculty and staff parking passes begin at $312 for an annual pass and rise in price to $1,002 for an annual "gated" parking pass. Additionally, staff and faculty may buy a less expensive commuter pass for $156 per year, or a motorcycle/scooter pass for $150 per year. However, while any student, faculty, or staff who wishes to buy a parking pass may do so, there are only 23,000 parking spots available to park cars in. With a total of 73,482 on-site students, faculty, and staff, and 23,000 on-campus parking spots, the automobile-parking spots can only accommodate 31% of the total campus population at a given time.

As of 2011, 12,458 bicycle parking spaces were available on campus, resulting in a ratio of roughly 1 bicycle parking space for every 5 persons on campus. What's more, students are allowed to park their bikes in their dorm rooms. On campus, the types of bicycle parking available include racks and bike depot/hubs/stations. Bicycle parking can be found at all major university locations, including dormitories, libraries, classroom buildings, recreation centers, administrative buildings, transit stations, research labs, and off-campus university-owned housing. Most of the bicycle racks and depots/hubs/stations meet the security and convenience guidelines recommended by the Association of Pedestrian and Bicycle Professionals, and there is an ongoing effort to replace non-compliant bicycle parking with appropriate styles. Indeed, the university

has spent approximately $75,000 on bicycle racks in the past year (R. Fuller, personal communication, 7 February 2013).

Bicycle Facilities

The university provides locker rooms and showers in some non-residential buildings without charge, as well as dedicated bicycle maintenance persons at their Student Government-sponsored Bike Repair shop; these maintenance people have access to bicycle maintenance supplies. The university also has policies in place mandating the accommodation of bicyclists during construction. Through its partnership with the Gainesville Regional Transit System (RTS), the university is able to provide transit service to its students, which includes transit vehicles that are equipped with bicycle racks.

The centerline mileage of the total campus road network is approximately 13.2 miles, all of which are under the university's control. There are no protected/buffered bike lanes or cycle tracks, shared lane markings, signed bike routes, natural surface shared use paths, or single tracks on campus. However, 8.1 miles of the campus road network, or approximately 61% of the total, is covered by conventional bike lanes. The university bicycle network also includes approximately 1.6 miles of shared-use path, 0.5 mile of contra-flow bike lanes, and 0.33 mile of bike boulevards, for a total of 10.53 miles of bicycle roadway facilities, meaning that approximately 80% of the campus road network is designed to specifically accommodate bicycling. The university has improved conditions for bicyclists on campus roads by limiting automobile speeds on campus streets to 20 mph or less, creating bicycle cut-throughs, removing on-street car parking, using speed tables to calm traffic, and creating car-free zones. However, the university has done nothing to specifically accommodate bicyclists at campus

intersections, nor does it do anything beyond routine roadway maintenance on behalf of cyclists, although it does facilitate the reporting of bicycle facility problems through the availability of e-mail and phone reporting to the university's Physical Plant Division (PPD), as well as the inclusion of an online "Work Request" tool on the PPD website where bicycle facility problems can be reported.

Education

The university strives to ensure that incoming students, faculty, and staff are educated on safe cycling and driving by presenting such information to all incoming students, providing educational handouts at resource fairs and campus events, and including that information in welcome materials for new students, faculty, and staff, such as the university's New Employee Guide (University of Florida Office of Human Resources, 2013). The university does not regularly schedule classes on commuting, bicycle maintenance, or traffic and cycling skills, nor does it provide physical education cycling classes for credit. However, it does house the Florida Traffic and Bicycle Safety Education Program as well as the Florida Pedestrian & Bicycling Safety Resource Center (PedBike SRC) under contract with the Florida Department of Transportation. The Florida Traffic and Bicycle Safety Education Program, which began in 1982, targets school teachers and community trainers, and teaches them to instruct bicycle safety courses and workshops for elementary, middle, and high school students around the state of Florida. Additionally, PedBike SRC promotes safe walking and cycling in the state by providing information and educational materials to statewide advocacy groups. Furthermore, information on safe cycling and driving are also included on the Office of Sustainability's Transportation webpage and UF Transportation and Parking Service's webpage, in articles from The Independent Florida Alligator (the student newspaper),

during campus events such as the Spring Break Safety Fair, Road Safety Week, and One Less Car Day, and from the university's police department. Additionally, a number of courses covering material related to bicycling are offered through the College of Design, Construction and Planning, the College of Engineering, and the College of Public Health and Health Professions at the university. Finally, operators of campus transit, administered through the Gainesville Regional Transit System, and the UFPD police officers receive driver training that includes information on sharing the road with bicyclists.

Encouragement

Bicycling is promoted at the university through car-free days, such as the Office of Sustainability's One Less Car Day, which encourages the use of alternative transportation, and through organized rides, such as the monthly Gainesville Critical Mass ride, which begins on campus at UF's Plaza of the Americas. A number of signature cycling festivals, major rides, and races take place throughout the community, many of them organized by the Gainesville Cycling Club, as well as cycling teams and clubs on campus. However, the university does not sponsor or actively support any of these community rides, nor does the university's marketing department specifically promote bicycling to current or potential university students and staff.

Eight bicycle shops are located within a 5-mile radius of campus, for a total of 1 shop for approximately every 9,310 students, faculty, and staff on campus. The university also has a skate park with bike access, and it participates in a fledgling "bike-share system", better described as a departmental bicycle program. This program, which currently includes 35 bicycles, offers refurbished bicycles to UF departments with the purpose of promoting bicycling and encouraging the use of alternative transportation

by faculty/staff. Bicycles are available on a first-come, first-serve basis, and departments are encouraged to develop a check-in/out system to allow multiple employees to share the bicycles. Bicycles become the property of participating departments, who assume all maintenance and repair. Departments are encouraged to use student government's free bicycle repair. A light set, U-lock, helmet, and safety information are provided with all bicycles. Riders must follow all traffic laws, wear helmets, and be UF employees. The university also has a student government-sponsored Bike Repair shop, as previously mentioned, which has been in operation for at least 15 years.

Because the university is located in a League of American Bicyclist designated Bicycle Friendly Community, a number of bicycle resources from the larger Gainesville community that are available to university students, faculty, and staff. These resources include online maps and an online route finding service. Specifically, Team Florida Cycling, UF's student-run bicycling club, offers two bicycle maps on their blog (http://teamfloridacycling.wordpress.com/resources/maps/) consisting of a Gainesville street map and a map of area bike trails. Similarly, the City of Gainesville's Bicycle & Pedestrian program offers an area bike map and an area bike trail map for the entire city, including the University of Florida. These maps can be accessed on their webpage (http://www.cityofgainesville.org/GOVERNMENT/CityDepartmentsNZ/PublicWorks/TransportationServices/BicyclePedestrianPrograms/Maps/tabid/733/Default.aspx). The creation of a 2013 bicycle map update is currently underway by the City of Gainesville's Bicycle & Pedestrian program administered by the Public Works department. Additionally, the Gainesville Cycling Club offers twenty bicycle maps of area bike rides

on their map webpage (http://gccfla.org/cgi-bin/web_maps.cgi). Finally, Google Maps offers bicycle route information in beta for Gainesville riders, including routes through the university.

Enforcement

The university's police department, UFPD, strives to lower the risk of bicycle theft or loss by offering voluntary bicycle registration, signage and demonstrations on how to properly lock a bicycle, regular security patrols of bicycle parking areas, a stolen or impounded bicycle recovery system, and information campaigns about lowering the chances of bicycle theft. Although only one full-time officer patrols exclusively by bike, as of 2012, 35 of the total 95 sworn officers, or approximately 37% of the force, is trained and able to patrol on bike (J. Savona, personal communication, August 23, 2012). This training occurs through both basic academy training and UFPD's own mountain bike school, which consists of 40-hours of bicycle-patrol education.

The campus police department actively interacts with the campus cycling community. Indeed, while the one full-time officer who patrols by bike, Officer John Savona, is the appointed law-enforcement point person to interact with bicyclists, UFPD officers in general distribute bicycle theft deterrent information and bicycle safety education on an informal basis to students, faculty, and staff throughout campus. This includes stopping bicyclists who are improperly wearing their helmets in order to talk to them about bicycle safety, presenting bike law pamphlets to violators, registering the bicycles of cyclists who are pulled over for violating traffic laws so that they might be recovered during a theft, and presenting bicycle safety information to incoming freshman during UF PREVIEW, UF's student orientation. The UFPD also participates in campaigns to improve bicycle safety by giving away helmet and lights, by targeting both

motorist and cyclist infractions. Indeed, the UFPD strives to treat bicyclists equitably and promote safety for all riders by enforcing the following traffic regulations:

- There are specific penalties for failing to yield to a bicyclist while turning.
- It is illegal to park or drive in a bike lane (intersections excepted).
- There are penalties for motor vehicle users who 'door'[1] bicyclists.
- There is an ordinance (under Florida law) requiring a 3 foot passing distance.

Evaluation and Planning

Planning for bicyclists is embedded in The Transportation Element of the Campus Master Plan, 2005-2015, which was adopted in March 2006 and is currently in the process of being updated for the years 2010-2020. As mentioned previously, no dedicated funding source exists for implementation of the bicycle plan, however, funding for bicycle programming is acquired through a number of sources, including various university departments and external grant funding. Bicycle usage on campus is tracked through periodic manual counts, intercept2, and e-mail surveys. According to the 2009-2011 American Community Survey 3-Year Estimates, 3,388 (or 6%) of workers in Gainesville age 16 and older commute via bicycle (see Table 4-6). However, the most recent on-campus bicycle mode share data from 2009 indicates that 10.3% of travel to campus is done by bicycle (see table 4-7). When this table is examined more closely, it appears that 12.5% of undergraduates, 11.2% of graduate students, 6.3% of faculty, 4.1% of staff, and 12.5% of visitors to the university travel to campus by bicycle. In the last five years, no bicycle crash fatalities involving automobiles have occurred at the university. Also, no specific plans have been created to reduce crashes, no satisfaction

[1] To "door" a bicyclist means to open an automobile door into the path of an approaching cyclist, who may crash into the door or try to avoid it by swerving into traffic, often resulting in serious injury or even death.

[2] "Intercept" is a form of data collection in which potential survey respondents are stopped at a designated location, screened for appropriateness, and administered a survey.

survey has been completed regarding student and staff bicycling, and no study has been performed to evaluate the economic impact of bicycling at UF.

Summary

The findings of this study, as derived from the researcher's completion of the Bicycle Friendly University application, reveal that there is extensive accommodation of bicyclists on the University of Florida campus; however, these findings also reveal that there are specific instances in which UF needs improvement in order to maximize its bicycle-friendliness (see Tables 4-1 through 4-5). For example, in terms of engineering, the ratio of bicycle parking to total campus population is less than desirable, there is no special accommodation of cyclists at intersections, and nothing beyond routine road maintenance is done on behalf of cyclists. Additionally, in the case of education, UF does not offer a ticket diversion program or special classes, like commuter courses or cycling skills courses, which would increase cycling-specific knowledge and raise awareness of cyclists on campus. In terms of encouragement, the university does not promote bicycling, nor does it sponsor any signature cycling events, and in the case of enforcement, there are no restrictions on bicyclists at the university. Finally, in terms of evaluation and planning, UF does not have a specific program or plan to reduce crashes, and it has not surveyed the university community to assess individuals' satisfaction with cycling on campus or the economic impact of cycling there. The following chapter will delve into a detailed discussion of those areas of bicycle-friendliness in which UF needs the most improvement according to the assessment.

Table 4-1. Assessing the Bicycle Friendliness of the University of Florida - Engineering

Question	Type (Yes/No; Select-one, Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
What policy does your institution have for accommodating bicyclists?	Select-one (Literature)	Complete Streets policy	N/A	Good
What tools are in place to ensure implementation?	Select-many (Type 1)	Implementation checklist; Design manual; Oversight by bicycle program coordinator/manager	3/5 (60%)	Fair
How does your college/university ensure your engineers and planners accommodate bicyclists according to AASHTO, MUTCD and NACTO standards?	Select-many (Type 1)	Hire outside consultants to train staff or review plans	1/6 (17%)	Poor
How do your college/university policies ensure that there are end-of-trip facilities for bicyclists?	Select-many (Type 1)	Bike parking ordinance/policy for existing buildings; Bike parking ordinance/policy for new developments; Policy requiring showers in non-residential buildings; Policy requiring lockers in non-residential buildings; Bicycles are permitted in most campus buildings; Requirement for new developments to meet LEED silver standards or higher	6/7 (86%)	Good

Table 4-1. Continued

Question	Type (Yes/No; Select-one, Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
How many annual on-campus automobile parking permits are available each year per total campus population?	Select-one (Literature)	26-55%	N/A	Good
How much is charged annually for an automobile parking permit?	Select-one (Literature)	$101-200	N/A	Good
The university/college provides free or subsidized parking for (check all that apply)	Select-many (Type 2)	Some faculty	1/5 (20%)	Good
What is the ratio of bicycle parking spaces to your total campus population?	Select-one (Type A)	1:5 or more	0/2 (0%)	Poor
What type of bicycle parking do you provide on campus?	Select-many (Type 1)	Bike racks; Bike depot/hubs/stations	2/5 (40%)	Fair
At which location do you provide bike parking?	Select-many (Type 1)	Dormitories; Libraries; Classroom buildings; Recreation Centers; Administrative Buildings; Transit stations; Research Labs; Off-campus college/university-owned housing	8/8 (100 %)	Good

Table 4-1. Continued

Question	Type (Yes/No; Select-one, Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
Are students allowed to park their bikes in their dorm rooms?	Yes/No	Yes	1/1 (100 %)	Good
Does your bike parking meet the security and convenience guidelines recommended by the Association of Pedestrian and Bicycle Professionals (APBP)?	Select-one (Type A)	Most	2/2 (100 %)	Good
Do you provide any of the following for students, faculty, and/or staff who commute by bike?	Select-many (Type 1)	Locker rooms in non-residential buildings without charge; Shower facilities in non-residential buildings without charge; Maintenance supplies such as tools, pumps, and tubes; Dedicated bike maintenance person	4/6 (67%)	Good
Do you accommodate bicyclists during construction (detour routes, signage, etc.)?	Yes/No	Yes	1/1 (100 %)	Good
Does your college/university have a transit service (including Shuttles, Night Ride, etc.)?	Yes/No	Yes	1/1 (100 %)	Good

Table 4-1. Continued

Question	Type (Yes/No; Select-one, Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
Are transit vehicles equipped with bike racks?	Select-one (Type A)	All	2/2 (100 %)	Good
What other ways have you improved conditions for bicyclists?	Select-many (Type 1)	Speed limits 20 mph or less on campus streets; Bike cut throughs; Remove on-street car parking; Speed tables to calm traffic; Car restrictions/car-free zones	6/10 (60%)	Fair
How do you accommodate bicyclists at intersections in your college/university?	Select-many (Type 1)	None of the above	0/8 (0%)	Poor
Is there anything beyond routine roadway maintenance that you do on behalf of cyclists?	Select-many (Type 1)	(No options selected)	0/4 (0%)	Poor
How does your college/university facilitate reporting of bicycle facility problems?	Select-many (Type 1)	Email/ phone report to maintenance dept; Online reporting tool like SeeClickFix	2/3 (67%)	Good

Table 4-2. Assessing the Bicycle Friendliness of the University of Florida - Education

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
What do you do to ensure that incoming students, faculty and staff are educated on safe cycling and driving?	Select-many (Type 1)	Presentation to all incoming students; Handouts at resource fairs; Information in all welcome packets for new students, faculty, and staff	3/6 (50%)	Fair
What have you done in the last 18 months to educate motorists and bicyclists on sharing the road safely?	Select-many (Type 1)	Campus newsletter/paper article; Dedicated bike page on college/university website; Other	3/10 (30%)	Poor
Do you have or participate in a ticket diversion program?	Select-many (Type 1)	None	0/3 (0%)	Poor
Which of the following options [Traffic skills 101; Cycling Skills classes; Commuter classes; Bicycle maintenance classes; Physical education cycling classes] are available on a regular basis at your college/university? (Please include classes for non-students as well)	Select-one (Type A)	Not regularly scheduled	0/2 (0%)	Poor

Table 4-2. Continued

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
Are there bicycle-related course offerings in transportation planning, policy, engineering or public health?	Yes/No	Yes	1/1 (100%)	Good
Has your college/university hosted a League Cycling Instructor seminar in the past two years?	Yes/No	No	0/1 (0%)	Poor
Does your college/university have driver training for any of the following professional drivers that includes information on sharing the road with bicyclists?	Select-many (Type 1)	Campus transit operators; Police	2/5 (40%)	Fair

Table 4-3. Assessing the Bicycle Friendliness of the University of Florida - Encouragement

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
How do you promote bicycling at your college/university?	Select-many (Type 1)	Organized ride; Car-free days	2/11 (18%)	Poor
Does the college/university sponsor or actively support any [signature cycling events]?	Yes/No	No	0/1 (0%)	Poor
Does your marketing department promote bicycling to current and potential students/staff?	Yes/No	No	0/1 (0%)	Poor
Are there cycling teams or clubs at your college/university?	Select-many (Type 1)	Recreational Bike Clubs (road or mountain); Racing clubs or teams (road, mountain, cyclocross, track, triathlon, etc.)	2/4 (50%)	Fair
What is the ratio of your total campus population to specialty bicycle retailers within a 5-mile radius of campus?	Select-one (Type A)	1 shop for every 7,001-15,000 students, faculty, staff	1/2 (50%)	Fair
Which of these bicycling facilities or amenities do you have at your college/university?	Select-many (Type 1)	Skate park with bike access	1/7 (14%)	Poor

Table 4-3. Continued

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
Does your college/university have or participate in a bike-share or rental system?	Yes/No	Yes	1/1 (100%)	Good
Does your college or university have a co-op or bike center?	Yes/No	Yes	1/1 (100%)	Good
If [your college has a co-op or bike center], which of the following services does it offer?	Select-many (Type 1)	Bike repairs	1/7 (14%)	Poor
Is your college/university located in a League of American Bicyclists designated Bicycle Friendly Community?	Yes/No	Yes	1/1 (100%)	Good
What bike-map and/or route finding information is available for your college/university which has been updated in the last 18 months?	Select-many (Type 1)	Online route finding service; Online map	2/5 (40%)	Fair

Table 4-4. Assessing the Bicycle Friendliness of the University of Florida - Enforcement

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
How does your college/university lower the risk of bicycle theft/loss?	Select-many (Type 1)	Bike registration; Signage or demonstrations to teach proper locking; Regular security patrols of bicycle parking areas; Stolen or impounded bikes recovery system; Information campaign to educate students on lowering their chances of bike theft	5/7 (71%)	Good
What percentage of patrolling police department employees is on bike?	Select-one (Type A)	30% or higher	2/2 (100%)	Good
How does your campus police department interact with the student/ staff cycling community?	Select-many (Type 1)	Appointed law-enforcement point person to interact with bicyclists; Officers distribute bike safety/theft deterrent information; Officers provide bike safety education; Other	4/4 (100%)	Good
What kind of training is offered to police officers regarding traffic law as it applies to bicyclists?	Select-many (Type 1)	Basic academy training	1/7 (14%)	Poor
What enforcement campaigns are targeted at improving bicyclist safety?	Select-many (Type 1)	Helmet giveaways; Light giveaways; Targeting motorist infractions; Targeting bicyclist infractions	4/6 (67%)	Good

Table 4-4. Continued.

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
Do your college/university policies treat bicyclists equitably and promote safety for all users?	Select-many (Type 1)	There are specific penalties for failing to yield to a bicyclist when turning; It is illegal to park or drive in a bike lane (intersections excepted); There are penalties for motor vehicle users who 'door' bicyclists; There is an ordinance requiring a 3 ft passing distance.	4/9 (44%)	Fair
Are there any prohibitions or restrictions on bicyclists at your college/university?	Yes/No	No	0/1 (0%)	Poor

Table 4-5. Assessing the Bicycle Friendliness of the University of Florida – Evaluation and Planning

Question	Type (Yes/No; Select-one; Select-many; Short answer)	Survey Response	Score (%)	Assessment (Good, Fair, Poor)
Does your college/university have a comprehensive bicycle master plan?	Yes/No	Yes	1/1 (100%)	Good
Is there a dedicated funding source for implementation?	Yes/No	No	0/1 (0%)	Poor
How do you track bicycle usage on campus?	Select-many (Type 1)	Periodic Manual Counts, Other	2/4 (50%)	Fair
How many bicyclist crash fatalities involving automobiles have occurred at your college/university in the past five years?	Select-one (Type B)	0	1/1 (100%)	Good
Do you have a specific plan or program to reduce crashes?	Yes/No	No	0/1 (0%)	Poor
Have you done a satisfaction survey of students and staff on bicycling at your college/university?	Yes/No	No	0/1 (0%)	Poor
Have you done an economic impact study on bicycling at your college/university?	Yes/No	No	0/1 (0%)	Poor

Table 4-6. 2009-2011 American Community Survey 3-Year Estimates: Means of Transportation to Work – Gainesville city, Florida

	Estimate	Percent (%)	Margin of Error
Total:	55,897	100%	+/-1,931
Car, truck, or van:	42,549	76%	+/-1,885
Drove alone	35,430	83%	+/-1,933
Carpooled:	7,119	17%	+/-968
Public transportation (excluding taxicab):	3,616	6%	+/-656
Bus or trolley bus	3,584	99%	+/-651
Streetcar or trolley car	32	<1%	+/-51
Taxicab	15	<1%	+/-25
Motorcycle	865	2%	+/-465
Bicycle	3,388	6%	+/-782
Walked	3,217	6%	+/-669
Other means	197	<1%	+/-221
Worked at home	2,050	4%	+/-405

(U.S. Census Bureau, n.d.)

Table 4-7. % Travel to Campus by Mode in 2009 – University of Florida

Mode:	Undergr-aduate Student	Graduate Student	Faculty	Staff	Visitor	Total
Walk	21.7	21.5	12.5	6.1	27.1	18.7
Bicycle	12.5	11.2	6.3	4.1	12.5	10.3
Motorcycle/ Scooter	3.6	2.8	0.0	2.0	2.1	2.8
Carpool	2.4	1.9	9.4	11.2	4.2	4.5
Automobile	9.2	15.9	56.2	57.2	33.3	24.3
Transit	50.6	46.7	15.6	18.4	20.8	39.2
Other	0.0	0.0	0.0	1.0	0.0	0.2

(University of Florida Office of Sustainability, n.d.)

CHAPTER 5
DISCUSSION

This chapter uses the findings from the Bicycle Friendly University application to assess the University of Florida's role as a bicycle-friendly campus. When considering the findings of this study, it is clear that there is extensive accommodation of bicyclists on the University of Florida campus. As a result, a few of UF's many successes in supporting engineering, education, encouragement, enforcement, and evaluation and planning practices that facilitate bicycle-friendliness will be acknowledged. However, the findings of this study also reveal that there are certain areas related to bicycle-friendliness in which UF needs improvement. Therefore, this chapter will largely focus on the campus bicycle network's current failures, and will provide recommendations for improving those deficiencies. The five assessment tables (Table 5-1 through 5-5) displaying these failures can be found at the end of this chapter. Lastly, limitations of the research will be identified.

Engineering

The University of Florida has plans in place, such as its Complete Streets policy embedded within its *Campus Master Plan, 2005-2015*, which enable safe, comfortable access to travel for all campus roadway users, including bicyclists. It also has infrastructure on the ground that conveys these plans physically, such as the 80% coverage of the campus road network by a variety of facilities that accommodate cyclists. As Chapter 2 explains, the presence of bicycling infrastructure is a primary factor in determining whether individuals within a community will cycle for transportation (Van Dyck et al., 2012). However, three areas of engineering covered by the BFU application reveal the University clearly needs improvement according to the

researcher's assessment (see Table 5-1 at the end of this section). These are: the ratio of bicycle parking spaces to total campus population; accommodating bicyclists at intersections; and going beyond routine roadway maintenance on behalf of cyclists.

The literature clearly demonstrates that end-of-trip facilities, such as bicycle parking, are essential to attracting more people to cycling (Van Dyck et. al, 2012) because, just as drivers are more or less likely to drive to their destination based on the availability and convenience of car parking spaces, cyclists are more or less likely to bike to their destination based on the availability and convenience of bicycle parking (Pucher and Buehler, 2008). However, at UF, the ratio of total campus population to available bicycle parking is greater than 1:5. Clearly, if the university wishes to encourage greater rates of cycling, it must provide adequate parking facilities for its students, faculty, and staff. That said, there is an ongoing effort to replace non-compliant bicycle parking with appropriate styles, and the university spent approximately $75,000 on bicycle rack purchases in 2012. Therefore, it seems that the need for additional bicycle parking is an issue that is being acknowledged and addressed.

Research indicates that one-third of total bicycle crashes occur at intersections, and 74% of crashes at intersections result in fatalities (Dobbs, 2009). Studies also show that the reason for high rates of bicycle-automobile crashes at intersections is because, "drivers may be making 'looked-but-failed-to-see' errors, whereby they search for oncoming motor vehicles but do not recognize that a cyclist is approaching because they are not looking for them" (Reynolds, Harris, Teschke, Cripton and Winters, 2009, p. 15). In an effort to ensure cyclist safety and reduce the likelihood of a serious or fatal

crash on campus, the university should research the benefit of implementing bicycle-specific designs at intersections, especially at turning locations. As the research demonstrates, increasing the visibility of bicyclists at intersections, whether through the provision of bike boxes, bicycle turn lanes, or other possible roadway treatments, reduces the overall number of bicycle-automobile collisions and increases awareness of all modes of transportation (Dobbs, 2009).

While the university accommodates bicyclists during roadway construction through the provision of a detour, it does not go beyond routine roadway maintenance on behalf of cyclists. This is problematic due to the potentially life-threatening effect of pavement deficiencies on cyclists (Dobbs, 2009). Pavement deficiencies, such as potholes, broken pavement, exposed drainage grates, and debris, may all cause bicycle accidents, whether directly, via collision with the deficient material, or indirectly, via collision with an automobile while attempting to avoid the problematic roadway (Dobbs, 2009). Thus, the university should invest in greater roadway maintenance on behalf of cyclists, such as more frequent sweeping of bicycle lanes or the expedited clearance of potholes and broken pavement.

Education

The university has some demonstrated successes in the area of education. Most impressively, the university houses both the Florida Pedestrian & Bicyclist Resource Center, which promotes safe walking and cycling activities in Florida through the provision of information and educational materials to advocacy groups across the state (Florida Pedestrian and Bicycling Safety Resource Center, 2012), and the Florida Traffic and Bicycle Safety Education Program, which trains school teachers and community leaders to teach children the knowledge and skills they need in order to be both safe

and competent pedestrians and cyclists (Florida Traffic and Bicycle Safety Education Program, 2013). Both programs are funded by the Florida Department of Transportation Safety Office, and operate at a state-wide level. While they are not programs intended to educate university students, faculty, and staff, nor are they contractually obligated to do so, their presence in Gainesville communicates the existence of knowledge persons in the community with expertise in the area of bicycle education. Nonetheless, the study findings reveal that there is very little bicycle education programming available at UF, and therefore much room for improvement (see Table 5-2 at the end of this chapter).

The university does not offer any classes on campus that directly educate campus cyclists on the knowledge and skills needed to bicycle safely and competently, and it has not hosted a LAB Cycling Instructor seminar in the past two years. As the research in Chapter 2 indicates, education plays a crucial role in legitimizing bicycling and increasing bicycle safety within communities, and those countries that invest most heavily in bicycling education tend to have both safer cycling practices and higher levels of bicycle ridership (Pucher and Djikstra, 2003). For instance, by not offering a ticket diversion program, which is a sentence that includes attending classes about traffic and cyclist safety for motorists and cyclist who violate traffic laws, the university is missing an opportunity to further educate the campus community about safe driving and cycling. Additionally, with only 6.3% of faculty and 4.1% of staff traveling to campus by bike, compared to 12.5% of undergraduates, 11.2% of graduate students, and 12.5% of campus visitors, as stated Chapter 4, the university has the opportunity to increase faculty and staff bicycle ridership. This could be accomplished through the provision of

commuter or cycling skills classes for staff and faculty who may be lacking the skills or knowledge needed to feel comfortable about commuting to campus via bike.

Encouragement

The university has various successes in the area of encouragement. For instance, the university is home to four recreational and racing bike clubs, and is situated in a larger Bicycle Friendly Community that is also host to its own active bicycle club, the Gainesville Cycling Club. Due to its location in a Bicycle Friendly Community, the university benefits from the availability of a number of community-wide resources that encourage cycling, such as the presence of 8 bike shops within a 5-mile radius of campus, the availability of online bike route information, and the annual presence of the Gainesville Cycling Festival. The university also has its own Student Government-sponsored Bike Repair service on campus, which offers free bike repair service for students, faculty and staff (University of Florida Student Government, 2013), and sponsors events such as One Less Car Day, which promote the use of bicycling among other forms of alternative transportation. However, despite its many successes, there are still improvements that could be made (see Table 5-3 at the end of this chapter).

For instance, as research in Chapter 2 indicates, people who have high levels of social support and witness the modeling of bicycling behavior are more likely to cycle themselves (de Geus, 2009). However, the university marketing department does not specifically promote bicycling to current or potential students and staff, nor does the university explicitly sponsor or actively support any signature bicycling events. Additionally, the university has limited amenities for cyclists beyond a skate park with bike access, and while the Student Government-sponsored Bike Repair service is a huge asset to the campus cycling community, that bike center does not offer any

services beyond free repair that might further encourage cycling on campus. Unfortunately, these are missed opportunities. As a multimodal campus that already resides within a Bicycle Friendly Community, the university could easily and honestly promote itself as having a higher quality of life for its residents than many other university communities. However, in failing to capitalize on promoting its bicycle-friendly qualities, or in providing additional amenities to the campus community, the university is missing opportunities to not only make itself more desirable to prospective students, faculty, and staff, but to encourage greater rates of bicycling on campus.

Enforcement

One area of bicycle-friendliness in which the university clearly shines is enforcement. With one full-time officer who patrols exclusively by bike, and 35 of the total 95 sworn officers trained and able to patrol on bike as of 2012, the UFPD is actively involved in the campus cycling community. One aspect of enforcement that is particularly important, and is an area that the UFPD is actively involved in, is encouraging bicycling by deterring theft. As the literature revealed, the risk of bicycle theft may reduce individuals' likelihood to bike at all, or to invest in and use a higher-quality bike that might encourage cyclists to make longer and more frequent bicycle trips (Rietveld and Daniel, 2004). The UFPD's equal enforcement of traffic laws for all roadway users is also particularly significant. As the research shows, the equitable enforcement of traffic regulations legitimize the role of bicycling on the roadway, and encourage safe and cautious driving (Pucher & Djikstra, 2003).

While the study findings revealed two failures in the enforcement section of the BFU application, these failures are debatable. First, question #54 asks, "What kind of training is offered to police officers regarding traffic law as it applies to bicyclists?" The

question is select-many multiple choice, and it offers six different types of trainings among its answer choices, as well as one option for “no training”. To this researcher, it appears that this question may represent a case where choosing any of the possible types of training other than “none” would be adequate; expecting a police force to engage in more than two bicycle-related trainings seems unreasonable and unrealistic. As well, because of the question type, the findings from this particular question do not reveal that the UFPD actually has its own mountain bike training school that it designed for its officers; because there was no ability to submit a short answer or to choose “other” as an answer option, this second training by the UFPD is not reflected in the results. Needless to say in this case, the assessment of “poor” may have had more to do with the way the question was asked and the design of the grading rubrics than the UFPD actually performing poorly in this area.

Second, question #58 asks, “Are there any prohibitions or restrictions of bicyclists at your college/university?” This is a question whose answer appears relatively subjective to the researcher; not having any restrictions on bicyclists could be a good thing because it does not inhibit bicycle use, but it could also be a bad thing if there are high traffic pedestrian areas that may be in need of such restrictions. For example, at UF there are some areas where restrictions on bicyclists may be a good idea, such as high traffic pedestrian areas where there is a lot of congestion and a better chance of bicyclist colliding with pedestrians. However, the method for assessing whether or not a restriction on bicyclists is needed was not revealed by this research, therefore it is unclear if this “failure” is actually an area of poor performance by UFPD. Nevertheless, despite these ambiguous failings, the findings clearly demonstrate that, by continuing to

look for ways to involve itself with the campus cycling community, whether through bicycle safety campaigns, increased police patrols by bike, or the creation of a traffic ticket diversion program, the UFPD can continue to have an integral role in encouraging bicycle-friendliness at UF.

Evaluation and Planning

Communities with high levels of bicycling and safety tend to not only have extensive bicycle infrastructure, but also have established programs and policies that are supportive of bicycling (Pucher, Dill & Handy, 2010). Fortunately, the university has both. By utilizing a Complete Streets policy that specifically plans for bicycle accommodations on campus, in addition to other modes of transportation, the university clearly indicates its view of the importance of a viable bicycle network. The existence of a Sustainable Transportation Working Group consisting of campus professionals who advocate and plan for bicycling, among other modes, at the university also communicates its significance. However, evaluation and planning for bicycling at UF is not without its failures (see Table 5-5 at the end of this chapter).

For instance, the lack of a dedicated funding source for bicycle program implementation creates uncertainty regarding the university's ability to adequately support cyclist's needs, which potentially decreases its legitimacy and effectiveness. Similarly, although there are plans to hire an alternative transportation coordinator for the university in the near future (R. Fuller, personal communication, February 7, 2013), the current lack of a single dedicated Bicycle Program Manager or contact person communicates a relative lack of importance with regards to bicycling. Finally, by failing to conduct a bicycle satisfaction survey of students, faculty, and staff, or an economic impact study on bicycling at UF, the university is potentially missing opportunities to

further promote bicycling by learning more about, and adjusting for, current cycling conditions.

Limitations

This study and its methodology were formulated around the desire of the University of Florida to apply for the Bicycle Friendly University designation from the League of American Bicyclists. As a result, the findings of this study were pursuant to the types of questions being asked in the BFU questionnaire. While the BFU application asks three questions that touch upon the community outside of the university, specifically question #41, “List the signature cycling events at your campus or in your community (e.g. bike festivals, major rides and races)”, question #48, “Is your college/university located in a League of American Bicyclists designated Bicycle Friendly Community”, and question #61, “What is the most current journey-to-work data (bicycle mode share) for your community”, the Bicycle Friendly University application largely ignores the larger context in which the university exists. For example, while UF is located in a city, Gainesville, Florida, which is considered a “Bicycle Friendly Community” by the LAB, major improvements are still needed in order to make both the city and the university a truly safe and convenient place for cyclists, especially along major roadways where the university and larger community connect. While a university campus may be bicycle-friendly, this means little if students, faculty, and staff cannot safely and easily commute between the campus and their homes. As a result, this general lack of inquiry into the connection between the campus and the community limits the value of what it means to be a “Bicycle Friendly University” as designated by the LAB.

Additionally, while the BFU application posed as the basis for this study's methodology, the assessment tools (i.e. grading rubrics) used to evaluate the study's findings were created entirely by the researcher. These rubrics were created because the BFU application does not provide a scoring or evaluation device for applicants; the LAB evaluates the application and designates a university as bicycle-friendly based upon its own internal, private grading system. As a result, the application proved to be a good tool to assess where improvements were needed in order for a university to become more bicycle-friendly, but does not facilitate evaluating "how" bicycle-friendly a university is compared to other universities or to the "ideal" (hypothetical) bicycle-friendly university.

Finally, it is possible that some of the data collected for this study are inaccurate due to human error. A variety of professionals at the University of Florida provided answers to particular BFU application questions. Although these are individuals who are knowledgeable in their field, it is possible that they may have been incorrect at times, or may not have had full knowledge of the topic that they were discussing.

Table 5-1. Bicycle-Friendliness Failures of the University of Florida - Engineering

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
How does your college/university ensure your engineers and planners accommodate bicyclists according to AASHTO, MUTCD and NACTO standards?	Select-many (Type 1)	Hire outside consultants to train staff or review plans	1/6 (17%)	Poor
What is the ratio of bicycle parking spaces to your total campus population?	Select-one (Type A)	1:5 or more	0/2 (0%)	Poor
How do you accommodate bicyclists at intersections in your college/university?	Select-many (Type 1)	None of the above	0/8 (0%)	Poor
Is there anything beyond routine roadway maintenance that you do on behalf of cyclists?	Select-many (Type 1)	(No options selected)	0/4 (0%)	Poor

Table 5-2. Bicycle-Friendliness Failures of the University of Florida - Education

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
What have you done in the last 18 months to educate motorists and bicyclists on sharing the road safely?	Select-many (Type 1)	Campus newsletter/paper article; Dedicated bike page on college/university website; Other	3/10 (30%)	Poor
Do you have or participate in a ticket diversion program?	Select-many (Type 1)	None	0/3 (0%)	Poor
Which of the following options [Traffic skills 101; Cycling Skills classes; Commuter classes; Bicycle maintenance classes; Physical education cycling classes] are available on a regular basis at your college/university? (Please include classes for non-students as well)	Select-one (Type A)	Not regularly scheduled	0/2 (0%)	Poor
Has your college/university hosted a League Cycling Instructor seminar in the past two years?	Yes/No	No	0/1 (0%)	Poor

Table 5-3. Bicycle-Friendliness Failures of the University of Florida - Encouragement

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
How do you promote bicycling at your college/university?	Select-many (Type 1)	Organized ride; Car-free days	2/11 (18%)	Poor
Does the college/university sponsor or actively support any [signature cycling events]?	Yes/No	No	0/1 (0%)	Poor
Does your marketing department promote bicycling to current and potential students/staff?	Yes/No	No	0/1 (0%)	Poor
Which of these bicycling facilities or amenities do you have at your college/university?	Select-many (Type 1)	Skate park with bike access	1/7 (14%)	Poor
If [your college has a co-op or bike center], which of the following services does it offer?	Select-many (Type 1)	Bike repairs	1/7 (14%)	Poor

Table 5-4. Bicycle-Friendliness Failures of the University of Florida - Enforcement

Question	Type (Yes/No; Select-one; Select-many)	Response	Score (%)	Assessment (Good, Fair, Poor)
What kind of training is offered to police officers regarding traffic law as it applies to bicyclists?	Select-many (Type 1)	Basic academy training	1/7 (14%)	Poor
Are there any prohibitions or restrictions on bicyclists at your college/university?	Yes/No	No	0/1 (0%)	Poor

Table 5-5. Bicycle-Friendliness Failures of the University of Florida – Evaluation and Planning

Question	Type (Yes/No; Select-one; Select-many; Short answer)	Survey Response	Score (%)	Assessment (Good, Fair, Poor)
Is there a dedicated funding source for implementation?	Yes/No	No	0/1 (0%)	Poor
Do you have a specific plan or program to reduce crashes?	Yes/No	No	0/1 (0%)	Poor
Have you done a satisfaction survey of students and staff on bicycling at your college/university?	Yes/No	No	0/1 (0%)	Poor
Have you done an economic impact study on bicycling at your college/university?	Yes/No	No	0/1 (0%)	Poor

CHAPTER 6
CONCLUSION

The United States is an overwhelmingly automobile-dependent country, and the various policies and practices put in place since the first half of the twentieth century have continued to accommodate automobility at the expense of alternative modes of transportation. As a result, over the past century the American transportation system has had enormous negative consequences on public and environmental health, including contributions to both climate change and the current obesity epidemic.

Recognizing these historical trends, and considering their own struggles with roadway congestion, limited parking availability, and constrained financial resources, some American universities have begun investing in bicycling as a means of reducing single occupancy car use on campus and addressing its associated negative effects. As described in the literature and outlined by the League of American Bicyclists (2011), these investments have largely concerned five features of the built and social environments known to have an impact on cycling rates: engineering, education, encouragement, enforcement, and evaluation and planning.

Acknowledging the importance of these five features to encouraging bicycling, this thesis used a prospective descriptive case study design to examine how well the University of Florida promotes and provides for cycling, in order to identify those areas in need of greatest improvement regarding bicycle-friendliness on campus. Results of this study indicated that various enhancements to the built and social environments could be made in order to improve bicycle-friendliness at UF and ultimately encourage greater rates of cycling for transportation. In the area of engineering, these enhancements included providing special accommodation for cyclists at intersections,

increasing the number of bicycle parking spaces on campus, and going beyond routine roadway maintenance in order to meet cyclists' needs. In the area of education, these enhancements included enhancing current efforts to educate motorists and cyclists about sharing the road safely, creating a ticket diversion program, and offering cycling classes for students, faculty, or staff desiring to enhance their bicycling skills and knowledge. In the area of encouragement, these enhancements included greater promotion of bicycling by UF, university sponsorship of cycling events, and enhancements to facilities and amenities for bicyclists. In the area of enforcement, these enhancements included a potential prohibition of cyclists in high traffic, pedestrian-concentrated areas. Finally, in the area of evaluation and planning, these enhancements included the use of surveys to judge student, faculty, and staff satisfaction regarding cycling on campus, and the economic impact of bicycling at UF.

Future research into the bicycle-friendliness of the University of Florida should examine the feasibility and effectiveness, both in terms of cost and influence on cycling rates, of making the above-mentioned enhancements. Given current constraints on financial resources at UF, research that is both pointed in scope and meticulous in analysis will be necessary if substantial sums of money are needed. Ultimately, making the improvements required to maximize the University of Florida's bicycle-friendliness will have long-term ramifications that extend beyond the campus boundaries. Because travel behaviors on campus likely affect the transportation habits of students, faculty, and staff into the future, universities' approach to accommodating bicycling may spread from campus to the rest of society (Balsas, 2003). As a result, by communicating the

feasibility and desirability of making cycling a mainstream mode of travel on campus, universities can shape the long term health and sustainability of communities at large.

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APPENDIX
BICYCLE FRIENDLY UNIVERSITY APPLICATION

Working for a Bicycle Friendly America

Name of Applying Institution

Name of Institution:

Which campus?

- ☐ Main
- ☐ Other

If other, describe (50 word limit)

Has this campus applied to the Bicycle Friendly University program before?

- ☐ Yes
- ☐ No

City:
State:
President/Chancellor/top official (include title):

Applicant Profile

First Name:
Last Name:
Title:

Are you

- ☐ Faculty
- ☐ Staff
- ☐ Student

If student, please provide supervisor’s address and contact information

Address:
City:
State:
Zip:
Phone:
Email:

University Profile

1. Type of institution

- [ ] National University
- [ ] Liberal Arts College
- [ ] Baccalaureate College
- [ ] Technical College
- [ ] Community College
- [ ] Career College

2. Type of Campus

- [ ] Urban
- [ ] Suburban
- [ ] Rural

3. Population

Total campus enrollment:
Number of on-site faculty and staff:
Percent of students living off campus:
City population:

4. What is the average commute distance of the students living off campus? (in miles)

5. Do you have a Bicycle Program Manager or a contact person responsible for bike-related issues (if there is no designated program manager)?

- [ ] Yes
- [ ] No

Who is the Bicycle Program Manager?

- [ ] Applicant
- [ ] Other

Name and contact information of Bicycle Program Manager

5a. What percentage of the Bike Program Manager's time is spent on bicycling issues?

Select One

5b. What is the bicycle program's annual budget? (in US Dollar)

5c. What is the bicycle program's webpage?

6. How many hours each week do additional college/university employees (not counting the bicycle program manager) work on bicycle issues?

Faculty: Select One

Staff: Select One

Students: Select One

7. How many hours each week do volunteers work on bicycle issues on average?

Select One

8. Do you have a Bicycle Advisory Committee?

- ☐ Yes
- ☐ No
- ☐ Other

If other, describe (50 word limit)

8a. How often does the committee meet?

- ☐ Monthly
- ☐ Bi-monthly
- ☐ Quarterly
- ☐ Annually
- ☐ Does not meet regularly

8b. Which of the following groups are represented or regularly attend the Bicycle Advisory Committee? Check all that apply

- [ ] User group
- [ ] Law enforcement/ public safety division
- [ ] Student government
- [ ] Planning department
- [ ] Facility services/ transportation department
- [ ] Health and wellness
- [ ] City/county/regional government staff
- [ ] Faculty/researchers
- [ ] Racing team/club

9. Which bicycle advocacy group(s) is/are active on campus?

9a. Is this group/Are any of these groups working with you on this application?

- [ ] Yes
- [ ] No

9b. Do you contract with this group/these groups for any services or programs?

- [ ] Yes
- [ ] No

9c. Please provide the name and contact information of the primary contact of this group/these groups.

10. What are the primary reasons your college/university has invested in bicycling? (Check all that apply.)

- ☐ Improve quality of life/ health for students, faculty and staff
- ☐ Connect community and campus
- ☐ Provide transportation options
- ☐ Reduce car-parking demands
- ☐ Support smart growth
- ☐ Address climate change/environmental stewardship concerns
- ☐ Decrease traffic congestion
- ☐ Attract students
- ☐ Respond to user demand
- ☐ Improve bicyclist/pedestrian safety
- ☐ Meet city, county, or state requirements
- ☐ Other

If other, describe (50 word limit)

11. What was your institution's most significant achievement for bicycling in the past two years? (250 word limit)

12. What specific improvements does your college/university have planned for bicycling in the coming year? (100 word limit)

Engineering

13. What policy does your institution have for accommodating bicyclists?

- ☐ Complete Streets policy
- ☐ A bicycle accommodation policy
- ☐ None

13a. When was it adopted? None

13b. Provide a link to this legislation or policy

13c. What tools are in place to ensure implementation? (Check all that apply.)

- ☐ Implementation checklist
- ☐ Design manual
- ☐ Training
- ☐ Oversight by bicycle program coordinator/ manager
- ☐ Other
- ☐ None

If other, describe (100 word limit)

14. How does your college/university ensure your engineers and planners accommodate bicyclists according to AASHTO, MUTCD and NACTO standards? (Check all that apply.)

- ☐ Offer general training
- ☐ Offer a FHWA/NHI Training Course
- ☐ Hire outside consultants to train staff or review plans
- ☐ Send staff to bicycle-specific conferences/training
- ☐ Require project consultants to have bike/pedestrian qualifications
- ☐ Design manual
- ☐ None

15. How do your college/university policies ensure that there are end-of-trip facilities for bicyclists? (Check all that apply.)

- ☐ Bike parking ordinance/policy for existing buildings
- ☐ Bike parking ordinance/policy for new developments
- ☐ Policy requiring showers in non-residential buildings
- ☐ Policy requiring lockers in non-residential buildings
- ☐ Bicycles are permitted in most campus buildings
- ☐ Policy that allows bike parking to substitute for car parking
- ☐ Requirement for new developments to meet LEED silver standards or higher
- ☐ None

16. How many annual on-campus automobile parking permits are available each year per total campus population?

Select One

16a. How much is charged annually for an automobile parking permit? Select One

16b. The university/college provides free or subsidized parking for (check all that apply)

- ☐ All faculty
- ☐ All staff
- ☐ Some faculty
- ☐ Some staff
- ☐ None

17. How many individual bike parking spaces (not racks) are available at your college/university?

17a. What is the ratio of bicycle parking spaces to your total campus population?

- ☐ 1 : 1
- ☐ 1 : 2
- ☐ 1 : 3
- ☐ 1 : 4
- ☐ 1 : 5 or more

17b. What type of bicycle parking do you provide on campus? Check all that apply.

- [ ] Bike racks
- [ ] Bike lockers
- [ ] Bike depot/hubs/stations
- [ ] Indoor bike rooms
- [ ] Bike cages
- [ ] None

17c. At which location do you provide bike parking? Check all that apply.

- [ ] Dormitories
- [ ] Libraries
- [ ] Classroom buildings
- [ ] Recreation Centers
- [ ] Administrative Buildings
- [ ] Transit stations
- [ ] Research Labs
- [ ] Off-campus college/university-owned housing
- [ ] None

17d. Are students allowed to park their bikes in their dorm rooms?

- [ ] Yes
- [ ] No

18. Does your bike parking meet the security and convenience guidelines recommended by the Association of Pedestrian and Bicycle Professionals (APBP)?

- [ ] All
- [ ] Most
- [ ] Some
- [ ] Few
- [ ] None

19. Do you provide any of the following for students, faculty, and/or staff who commute by bike? (Check all that apply.)

- ☐ Locker rooms in non-residential buildings without charge
- ☐ Shower facilities in non-residential buildings without charge
- ☐ Discounted or complimentary gym membership
- ☐ Bicycle workstand
- ☐ Maintenance supplies such as tools, pumps, and tubes
- ☐ Dedicated bike maintenance person
- ☐ None of the above

20. Do you accommodate bicyclists during construction (detour routes, signage, etc)?

- ☐ Yes
- ☐ No

21. Does your college/university have a transit service (including Shuttles, Night Ride, etc.)?

- ☐ Yes
- ☐ No

21b. Are transit vehicles equipped with bike racks?

- ☐ All
- ☐ Most
- ☐ Some
- ☐ Few
- ☐ None

22. What is the centerline mileage of your total campus road network?

22a. How many centerline miles of this network are under the college/university's control?

23. What is the mileage of your total shared-use path network on campus?

24. List all current bicycle accommodations on campus. Complete all that apply.
All should comply with AASHTO and MUTCD standards.

a. Conventional bike lanes
Current mileage:

b. Protected/buffered bike lanes or cycle tracks
Current mileage:

c. Contra-flow bike lanes
Current mileage:

d. Bike boulevards
Current mileage:

e. Shared lane markings (sharrows)
Current mileage:

f. Signed bike routes
Current mileage:

g. Paved shared use paths
Current mileage:

h. Natural surface shared use paths
Current mileage:

i. Singletrack
Current mileage:

25. What other ways have you improved conditions for bicyclists? (Check all that apply.)

- [ ] Campus-wide traffic calming
- [ ] Colored bike lanes
- [ ] Speed limits 20 mph or less on campus streets
- [ ] Bike cut throughs
- [ ] Way-finding signage with distance and/or time information
- [ ] Bicycle roundabouts
- [ ] Remove on-street car parking
- [ ] Speed tables to calm traffic
- [ ] Car restrictions/car-free zones
- [ ] Other
- [ ] None

If other, describe (250 word limit)

26. How do you accommodate bicyclists at intersections in your college/university? (Check all that apply.)

- [ ] When signals are timed, they are timed for cycling speeds
- [ ] When signals are demand activated, there are loop detector markings or bike-accessible push buttons.
- [ ] Video detection
- [ ] Advance stop line or Bike Box
- [ ] Bicycle signal heads
- [ ] No signals, N/A
- [ ] Other
- [ ] None of the above

If other, describe (100 word limit)

27. Is there anything beyond routine roadway maintenance that you do on behalf of cyclists?

- [ ] More frequent bike lane sweeping
- [ ] Paths/trails cleared same time or before roadway
- [ ] Potholes are cleared within 24-48 hours
- [ ] Other

If other, describe (100 word limit)

28. How does your college/university facilitate reporting of bicycle facility problems?

- [ ] Email/ phone report to maintenance dept
- [ ] Online reporting tool like SeeClickFix
- [ ] None
- [ ] Other

If other, please describe. (250 word limit)

29. Describe any other infrastructure features or improvements at your college/university that promote bicycling (250 word limit).

Education

30. What do you do to ensure that incoming students, faculty and staff are educated on safe cycling and driving? (Check all that apply.)

- ☐ Bike safety video(s)
- ☐ Educational bike tours of campus
- ☐ Presentation to all incoming students
- ☐ Handouts at resource fairs
- ☐ Information in all welcome packets for new students, faculty, and staff
- ☐ Other

If other, describe (100 word limit)

31. What have you done in the last 18 months to educate motorists and bicyclists on sharing the road safely? (Check all that apply.)

- ☐ Public service announcements
- ☐ Campus newsletter/paper article
- ☐ Bicycle ambassador program
- ☐ Newspaper column/blog on bicycling
- ☐ Dedicated bike page on college/university website
- ☐ Billboards/ digital billboards
- ☐ Share the Road signs
- ☐ Share the Road information in campus driver's education
- ☐ Test for motorists applying for/renewing parking permits
- ☐ Other
- ☐ None of the above

If other, describe (200 word limit)

32. Do you have or participate in a ticket diversion program ? Check all that apply.

- ☐ Motorists
- ☐ Cyclists
- ☐ None

33. Which of the following options are available on a regular basis at your college/university? (Please include classes for non-students as well)

33a. Traffic Skills 101 (or equivalent) classes -- including classroom and on-bike instruction.

- [ ] Weekly
- [ ] Monthly
- [ ] Quarterly
- [ ] Annually
- [ ] Not regularly scheduled
- [ ] Never

33b. Cycling Skills classes -- three to four hour classroom training courses

- [ ] Weekly
- [ ] Monthly
- [ ] Quarterly
- [ ] Annually
- [ ] Not regularly scheduled
- [ ] Never

33c. Commuter classes - one/two hour classes

- [ ] Weekly
- [ ] Monthly
- [ ] Quarterly
- [ ] Yearly
- [ ] Not regularly scheduled
- [ ] Never

33d. Bicycle maintenance classes

- [ ] Weekly
- [ ] Monthly
- [ ] Quarterly
- [ ] Annually
- [ ] Not regularly scheduled
- [ ] Never

33e. Physical education cycling classes (for credit)

- [ ] Each term
- [ ] Annually
- [ ] None

34. How many students do you teach with these classes annually?

35. Are there bicycle-related course offerings in transportation planning, policy, engineering or public health?

- [ ] Yes
- [ ] No

Please list and describe (250 word limit)

36. How many League Cycling Instructors are there in your college/university community?

36a. Please list active League Cycling Instructors. (100 word limit)

37. Has your college/university hosted a League Cycling Instructor seminar in the past two years?

- [ ] Yes
- [ ] No

38. Does your college/university have driver training for any of the following professional drivers that includes information on sharing the road with bicyclists? (Check all that apply.)

- [ ] College/university staff
- [ ] Campus transit operators
- [ ] Police
- [ ] Operators of university/college-owned vehicles
- [ ] Law enforcement students and/or staff
- [ ] None offered

39. Describe any other education efforts in your college/university that promote bicycling. (250 word limit)

Encouragement

40. How do you promote bicycling at your college/university? Check all that apply.

- ☐ Organized Ride
- ☐ President/Board-led Ride
- ☐ Campus bike tours
- ☐ Trail construction or maintenance day
- ☐ Car-free days
- ☐ Promotion of the People for Bikes Pledge
- ☐ Commuter events
- ☐ Mentoring program for new riders
- ☐ Cash incentives program for cycling
- ☐ Bike valet parking at events
- ☐ Other
- ☐ No promotion

If other, describe. (250 word limit)

41. List the signature cycling events at your campus or in your community (e.g. bike festivals, major rides and races). (500 word limit)

41a. Does the college/university sponsor or actively support any of these rides?

- ☐ Yes
- ☐ No

If yes, how? (150 word limit)

42. Does your marketing department promote bicycling to current and potential students/staff?

- ☐ Yes
- ☐ No

If yes, how? (150 word limit)

43. Are there cycling teams or clubs at your college/university? Check all that apply.

- [ ] Recreational Bike Clubs (road or mountain)
- [ ] National Mountain Bike Patrol
- [ ] Racing clubs or teams (road, mountain, cyclocross, track, triathlon, etc)
- [ ] BMX or freestyling clubs or teams
- [ ] None

44. What is the ratio of your total campus population to specialty bicycle retailers within a 5-mile radius of campus?

Select One

44a. List their names. (500 word limit)

45. Which of these bicycling facilities or amenities do you have at your college/university? Check all that apply.

- [ ] BMX track
- [ ] Velodrome
- [ ] Cyclocross course
- [ ] Mountain-bike park
- [ ] Pump tracks
- [ ] Skate park with bike access
- [ ] Other
- [ ] None

If other, describe (100 word limit)

46. Does your college/university have or participate in a bike-share or rental system?

- [ ] Yes
- [ ] No

46a. If yes, how many bikes are in the system?

46b. If yes, what kind of program is it? Check all that apply.

- ☐ Automated bike-share system
- ☐ Short-term bike rentals
- ☐ Long-term bike loan (term or longer)
- ☐ Bike library
- ☐ Unregulated program (i.e. Yellow Bike)
- ☐ Other

If other, describe. (100 word limit)

46c. If yes, who is permitted to use the system? Check all that apply.

- ☐ The public
- ☐ Students
- ☐ Staff/Faculty

47. Does your college or university have a co-op or bike center?

- ☐ Yes
- ☐ No

47a. If yes, which of the following services does it offer?

- ☐ Bike repairs
- ☐ DIY repair area
- ☐ Safety classes
- ☐ Stolen bike registry recovery assistance
- ☐ Bike valet parking services
- ☐ Bike messenger services
- ☐ Manage or assist on campus abandoned bike program

47b. How many years has it been in operation?

48. Is your college/university located in a League of American Bicyclists designated Bicycle Friendly Community?

- ☐ Yes
- ☐ No

49. What bike-map and/or route finding information is available for your college/university which has been updated in the last 18 months? Check all that apply.

- [ ] Online route finding service
- [ ] Online map
- [ ] Printed on-road bike-routes map
- [ ] Printed mountain bike trails map
- [ ] Other
- [ ] None

If other, describe (250 word limit)

50. Describe any other programs or policies that the college/university has to encourage cycling. (250 word limit)

Enforcement

51. How does your college/university lower the risk of bicycle theft/loss?

- [ ] Bike registration
- [ ] Signage or demonstrations to teach proper locking
- [ ] Bike lock rentals
- [ ] Free bike locks
- [ ] Regular security patrols of bicycle parking areas
- [ ] Stolen or impounded bikes recovery system
- [ ] Information campaign to educate students on lowering their chances of bike theft
- [ ] None

52. What percentage of patrolling police department employees is on bike? Select One

53. How does your campus police department interact with the student/ staff cycling community? Check all that apply.

- [ ] Appointed law-enforcement point person to interact with bicyclists
- [ ] Officers distribute bike safety/theft deterrent information
- [ ] Officers provide bike safety education
- [ ] Other
- [ ] There is currently no formal interaction

If other, describe. (250 word limit)

54. What kind of training is offered to police officers regarding traffic law as it applies to bicyclists? Check all that apply.

- [ ] Basic academy training
- [ ] International Police Mountain Bike Association training
- [ ] Law Enforcement Bicycle Association training
- [ ] National Highway Traffic Safety Administration Law Enforcement Training
- [ ] Smart Cycling course
- [ ] League Cycling Instructor/local cyclist presentation
- [ ] Institute for Police Training and Development bicycle training
- [ ] No training currently offered

55. What enforcement campaigns are targeted at improving bicyclist safety? Check all that apply.

- [ ] Helmet giveaways
- [ ] Light giveaways
- [ ] Targeting motorist infractions
- [ ] Targeting bicyclist infractions
- [ ] Positive enforcement ticketing
- [ ] Other
- [ ] None of the above

If other, describe. (250 word limit)

56. Are there any other campus public safety (e.g. EMS) employees on bikes?

- [ ] Yes
- [ ] No

If yes, describe. (250 word limit)

57. Do your college/university policies treat bicyclists equitably and promote safety for all users? Check all that apply.

- [ ] There are specific penalties for failing to yield to a bicyclist when turning.
- [ ] It is illegal to park or drive in a bike lane (intersections excepted).
- [ ] There are penalties for motor vehicle users who 'door' bicyclists.
- [ ] There is a ban on cell phone use while driving.
- [ ] There is a ban on texting while driving.
- [ ] The college/university uses photo enforcement for red lights and/or speed.
- [ ] There is an ordinance requiring a 3 ft passing distance.
- [ ] It is illegal to harass a bicyclist.
- [ ] Other
- [ ] None of the above

If other, describe. (250 word limit)

58. Are there any prohibitions or restrictions on bicyclists at your college/university?

- [ ] Yes
- [ ] No

If yes, describe. (200 word limit)

59. Describe any other programs or policies that the university/college has to enforce safe cycling. (250 word limit)

Evaluation and Planning

60. Does your college/university have a comprehensive bicycle master plan?

- ☐ Yes
- ☐ No

60a. When was it passed or most recently updated? None

60b. Is there a dedicated funding source for implementation?

- ☐ Yes
- ☐ No

If yes, describe. (200 word limit)

60c. Provide a link to the plan or describe. (250 word limit)

61. What is the most current journey-to-work data (bicycle mode share) for your community? This percentage can be found in the U.S. Census or the American Community Survey - Percentage of trips.

62. How do you track bicycle usage on campus?

- ☐ Automatic counters
- ☐ Periodic manual counts
- ☐ Travel diaries
- ☐ Other

If other, describe. (200 word limit)

62a. What are the most recent results?

63. How many bicyclist crash fatalities involving automobiles have occurred at your college/university in the past five years?

Select One

64. How many bicyclist crashes involving automobiles have occurred at your college/university in the past five years?

Select One

65. How many non-automobile related bicyclist crashes have occurred at your college/university in the past five years?

Select One

66. Do you have a specific plan or program to reduce crashes?

- [ ] Yes
- [ ] No

67. Have you done a satisfaction survey of students and staff on bicycling at your college/university?

- [ ] Yes
- [ ] No

If yes, describe the results. (250 word limit)

68. Have you done an economic impact study on bicycling at your college/university?

- [ ] Yes
- [ ] No

If yes, describe the results. (250 word limit)

69. Describe any other programs or policies your university/college has in place that evaluate and/or plan bicycling programs and facilities. (250 word limit)

Final Overview

70. What are the three primary reasons your college/university deserves to be designated a Bicycle Friendly University? Please be specific.

Reason One

Reason Two

Reason Three

71. What are the three aspects of your college/university most in need of improvement in order to accommodate bicyclists?

Aspect One (100 word limit)

Aspect Two (100 word limit)

Aspect Three (100 word limit)

72. Are you planning any new projects based on your completion of the Bicycle Friendly University application?

- ☐ Yes
- ☐ No

If yes, describe. (250 word limit)

72. OPTIONAL: What are the biggest challenges you see to becoming more bicycle-friendly? (100 word limit)

73. We often get requests for model BFU applications from aspiring universities. Would you be willing to share your application?

- ☐ Yes
- ☐ No

74. How did you hear about the BFU program?

Submit any documents that you would like to provide in support of your application and five high resolution photos (1-5MB) here. By submitting photos, the League of American Bicyclists has the right to use your photos to promote bicycling. Please note that the files will submit immediately and will not appear as an attachment.

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BIOGRAPHICAL SKETCH

Caitlin Garrison White was born and raised in south Florida. In 2003, she graduated from the University of Notre Dame with a Bachelor of Arts degree in history and a minor in European studies. After graduation, she worked on an organic farm in Naperville, Illinois before interning at a Chicago non-profit dedicated to addressing the issues of food insecurity endured by the city's urban poor. These experiences opened her eyes to the many connections between land use and public health, and guided her decision to enroll as a graduate student at the University of Florida. Caitlin's studies have primarily focused on the topic of health and the built environment, especially as it relates to urban agriculture and alternative transportation systems, and she intends to use her experience and education to serve a future career dedicated to building healthier, more sustainable and equitable communities.