

Metropolitan Center

Greenways Management and Maintenance Study

Analysis, Findings and Recommendations for a Miami-Dade County Greenway Management and Maintenance System

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GREENWAYS MANAGEMENT AND MAINTENANCE STUDY

EXECUTIVE SUMMARY

Federal legislation offers communities around the nation funding for construction of transportation enhancement projects related to greenways and bike paths, but this funding is limited to construction. It cannot be used for operations and maintenance. Most state dollars are also limited to construction only. Thus, communities have to come up with their own funding for managing greenway systems. Moreover, with new and expanding systems, communities have recognized the need to assess current management and maintenance practices as well as funding in order to ensure efficient and effective operation of such systems now and into the future.

The Miami-Dade Metropolitan Planning Organization (MPO) contracted with the Institute of Government at Florida International University to review current policies and practices related to the management and maintenance of bicycle/pedestrian facilities in the county and to recommend improvements for this set of county services.

This executive summary presents major recommendations of the study and lists key findings and conclusions from each chapter.

RECOMMENDATIONS

With about 20 percent of the 600 mile greenway network in operation now and detailed plans for the remaining 500 miles in place, Miami-Dade County has the luxury of taking an incremental approach to improving the management and maintenance of its system based upon miles added in any given year. A four-phase process is recommended.

- **Phase 1:** Strengthen and clarify agreements and memorandums of understanding and establish an interagency coordinating committee to improve immediately the current system.
- **Phase 2:** Provide dedicated funding to carry out the functions outlined in the memorandums of understanding within the current multi-organizational framework.
- **Phase 3:** Create a county agency with its own budget and staff charged with the responsibility of managing and maintaining the trail/greenway/pathway network.
- **Phase 4:** Create a quasi-county agency (authority) with its own dedicated source of funding, charged with the responsibility of managing and maintaining the trail/greenway/pathway network.

Chapter 2 addresses a number of major issues creating a need to assess management and maintenance of greenway programs in Miami-Dade County. These include the following

- Availability of funding
- Statutes, regulations and industry guidelines
- Existing agency responsibilities
- Proposed new programs
- Liability
- Safety

Recent federal funding and local and state planning recommendations will be a source of funds for building greenway systems. Highway and other transportation officials as well as state agencies are recommending the establishment of greenway maintenance programs prior to construction of new or expanded systems. Such programs are essential for enjoyment of the pathways as well as to reduce liability and safety issues:

Chapter 3 shows evidence that economic activity related to greenways does have an impact on the local economy. There have been many documented cases where the development of trails and greenways helped to attract businesses, create jobs and increase public revenue (National Bicycle Pedestrian Clearing House [NBPC], 1995). Examples of the positive economic impacts of trails include:

- Pinellas Trail in Florida, where storefront occupancy in downtown Dunedin increased from 65 percent to 100 percent after construction of the trail.
- The Tallahassee-St. Marks Trail in Florida, where an estimated 170,000 visitors per year help to generate over \$1.8 million in annual local revenue.
- Northern Central Rail-Trail in Maryland, where the state is able to offset the \$191,893 cost of managing and maintaining the trail by generating \$303,750 in taxable revenue from trail related activities (NBPC, 1995).

According to this report, sporting goods and bicycles shops in Miami-Dade generate \$43 million in annual sales and employ a total of 914 people.

This chapter also surveyed people who used local trails. Focus groups and user surveys revealed two important facts. First, it is apparent that the existing trails and pathways are not meeting the demands of the respondents that were surveyed. Even though 52 percent of the respondents claimed to use the facilities at least twice a week, they complained of poor maintenance and of traveling long distances to use existing facilities. Second, trail users expressed a concern over the lack of services that are available to them. From lack of vendors to repair services, there appears to be a potential niche for individuals who are interested in meeting the needs of this market. Miami-Dade County should look at the possibility of selling vending rights to individuals who may be willing to provide goods and services for trail users where appropriate, particularly since this market group seems to spend a lot on hobby-related activities.

Chapter 4 examined how greenways are managed in Miami-Dade County. There are multiple players in the greenway business in this county (See table below). Coordination appears difficult, but the difficulty is likely the result of funding constraints and not capability or desire to do a good job. There are sufficient examples of good maintenance to conclude that even with overlapping responsibilities, good management and maintenance of greenways are possible in the county. However, with only 100 miles in service right now and 500 more miles planned for the future, it seems evident that better coordination as well as sufficient funding (and staffing) will be necessary to ensure an efficient and effective 600-mile greenways network in Miami-Dade County.

Agency	Responsibility Regarding Bicycle/Pedestrian Facilities
Miami-Dade Park and Recreation	<ul style="list-style-type: none"> ▪ Maintains facilities that are within county parks. ▪ Maintains the M-Path, the Snake Creek Canal, the Snapper Creek Trail and a portion of the Old Cutler Trail.
Miami-Dade Public Works	<ul style="list-style-type: none"> ▪ Repairs and rebuilds pathway surfaces throughout the county on an as needed basis (Except for M-path, paths within parks and paths maintained by municipalities). ▪ Contracts out landscape services for various roadways and pathways (However, the contracts do not reference the pathways specifically).
Miami-Dade Transit Agency	<ul style="list-style-type: none"> ▪ Maintains the landscaped /green areas associated with the South Dade Busway but does not provide surface repair maintenance.
Miami-Dade Planning Office (MPO)	<ul style="list-style-type: none"> ▪ Plans and coordinates the location and design of non-motorized facilities. ▪ Coordinates the bicycle/pedestrian education and safety programs ▪ Oversees the activities of the Bicycle/Pedestrian Advisory Committee (BPAC) ▪ Operates and maintains the bicycle locker program.
South Florida Water Management District	<ul style="list-style-type: none"> ▪ Allows people to use their right of ways for greenways. ▪ Requires a maintenance plan before issuing a permit their rights-of-way. ▪ Will not maintain greenways, except for those maintenance functions directly related to its facilities.
Florida Department of Transportation (FDOT), District 6	<ul style="list-style-type: none"> ▪ Constructs bicycle/pedestrian facilities but generally turns over the maintenance of these facilities to cities and counties, under formal agreements.
Florida Turnpike Authority	<ul style="list-style-type: none"> ▪ Plans to study the feasibility of including bicycle/pedestrian facilities on its rights or way but will turn over maintenance responsibilities to another entity.
Miami-Dade County Expressway Authority	<ul style="list-style-type: none"> ▪ Plans to study the feasibility of including and maintaining bicycle/pedestrian facilities on its rights of way.

It may be easy to underestimate the scope of work, daily activities and other management and maintenance issues related to an expanded greenway system. With multiple agency involvement now, there is no clear overall picture of the level of activity, maintenance spending and administrative costs, including interagency coordination, associated with the existing system. While lack of funding has been a constant refrain for less than desirable maintenance and operational performance, the amount of funding needed is relatively small in light of the county's overall budget. A greenways program may only need a few hundred thousand dollars for the early years and a couple of million dollars in the later years as the system nears the 600-mile plan—all of this out of a \$2 plus billion dollar budget. Any new funding requests, however, face a number of difficult challenges,

as competition is fierce for the allocation of existing dollars much less new funds and the demand to keep taxes low is a constant refrain.

Chapter 5 reviews several communities that were identified as having exemplary greenways program. They are considered best practice communities. The survey of the “best practice” case studies revealed the following with respect to the management and maintenance of non-motorized systems:

Maintenance and Management

- In all the case studies, park and recreation and transportation departments, which typically includes public works, are responsible for managing and maintaining the trails/greenways/pathways. Parks departments are typically in charge of mowing and landscaping of green areas; and transportation departments are responsible for planning, construction, sweeping and repairs of pathways.
- The Indianapolis Greenways is the only non-motorized system in the study that consolidated all of the maintenance functions under one department. In this case, its Public Works Department takes care of all the landscaping and pathway maintenance.
- Regularly scheduled maintenance and inspections were common practice in the systems.

Interagency Coordination

- The case studies revealed that “best practice” areas generally use multiple departments for planning, construction, management and maintenance of trails, greenways and pathways. Their activities are coordinated through memorandums of understanding that outline each department’s responsibilities in terms of geographic areas and tasks.
- Some areas have advisory committees to provide oversight and ensure interagency cooperation. These committees consist of representatives from the various agencies involved in the planning, construction, maintenance and management of greenways, trails and bicycle pathways. Public organizations, such as bicycle clubs, are also involved. The purpose of these committees is to ensure that all the responsible agencies are cooperating with each other and carrying out their tasks.
- In several cases, one department served as the central coordinating entity responsible for overseeing all of the planning, management and maintenance functions related to the trails, greenways and pathways. The Indy Greenways is a good example.
- Systems with effective interagency coordination had designated staff for management and maintenance. Some areas had a trail manager or project manager assigned to oversee interagency coordination.

- Interagency coordination in the planning, construction and maintenance of trails/greenways/pathways has helped to minimize maintenance costs in Indianapolis and in Seattle.

Maintenance Funding

- Most areas use general funds budgeted for road and sidewalk maintenance or park and recreation activities to carry out trail/greenway/pathway functions. Except for Indianapolis and Portland, the metropolitan areas examined here do not have a budget line item or a designated funding source for the maintenance and management of trails, greenways and pathways. They often use a gas tax as a revenue source.
- It is possible to create a non-profit agency to conduct fundraising activities as a means of generating additional revenue for the trail/greenway/pathway system. Indianapolis serves as an example.
- Privatization may provide a cost-effective method of providing maintenance functions, and, in some cases, privatization may reduce maintenance costs. Pinellas is an example.

Advocacy / Volunteers

- Advocacy groups, consisting of volunteers and staff, appeared to function well in providing oversight. These groups, when given the proper structure, work to ensure that the greenways are constructed and maintained properly.
- Advocacy/volunteer groups also helped with fundraising and served as a means of getting political support for greenway facilities. In some cases, these groups also helped by volunteering to perform minor maintenance functions, such as litter removal.

Best Practice Areas	System for Interagency Coordination	Dedicated Funding	Scheduled Maintenance	Privatized Maintenance	Advocacy Groups	100 Miles of Greenways/ Trails/Pathways
Indianapolis Greenways, IN	X	X	X		X	
Phoenix, AZ	X		X*		X	X
Pinellas Trail, FL			X	X	X	
Portland, OR			X		X	X
Seattle, WA			X		X	X

Chapter 6 examined several scenarios for identifying what it might cost for the county to operate a 600-mile greenway network. Based on data from the best practice case studies, an extrapolation of costs from a major book on greenway management and the creation of a hypothetical budget and staffing plan for the 600-mile system, the following range of costs were identified.

Estimated Annual Cost of Operating a 600-Mile Greenway System in Miami-Dade County

“Best Practice” Average	Schwartz, Flink and Searns adjusted	Line Item Budget	Average of All Three
\$2,610,000	\$2,300,000	\$1,804,000	\$2,238,000

Realistically the likely source of funding for greenway maintenance programs is through general revenues of the managing government. For Miami-Dade County, this means using its countywide general fund budget as the source of funds for greenway maintenance. Since the 600 miles of greenway would be a countywide resource, this source of funding is appropriate for operating and maintaining the system. However, tax pressures as exemplified by the countywide millage rate, currently at 9 mills out of a possible 10, the division of responsibility among several county departments, and the intergovernmental nature of the greenway system make competition fierce for countywide funding. Many other worthwhile and essential services within the departments that provide some greenway activity now and the many others looking for scarce countywide tax dollars as well have been and will continue to pursue funding from this source of revenue. It is unlikely that a fractured greenway management program can compete successfully with other county programs, including those within departments that have some responsibility for greenway systems now, for these scarce resources. The next part of this chapter addresses organizational issues.

CHAPTER 1: INTRODUCTION

Federal legislation offers communities around the nation funding for construction of transportation enhancement projects related to greenways and bike paths. A number of communities have used this funding to expand or construct new trails, greenways and other forms of non-motorized bicycle/pedestrian facilities, and many others are planning to start new programs. Miami-Dade County already has 100 miles of bicycle/pedestrian facilities in place and is planning to build as many as 500 more miles for a comprehensive, countywide greenways network.

Federal funding, however, is limited to construction. It cannot be used for operations and maintenance. Most state dollars related to greenways are also limited to construction. Thus, communities have to come up with their own funding for managing day-to-day operation of greenway systems. Moreover, with new and expanding systems, communities have recognized the need to assess current management and maintenance practices as well as funding in order to ensure efficient and effective operation of such systems now and into the future.

The Miami-Dade County Metropolitan Planning Organization (MPO) contracted with the Institute of Government at Florida International University to review current policies and practices related to the management and maintenance of bicycle/pedestrian facilities in the county and to recommend improvements for this set of county services.

This report presents the findings of this study. It provides an assessment of a number of issues related to the current environment for managing and maintaining the county's greenway network. It summarizes key characteristics of other communities around the United States (U.S.) known for their exemplary practices in managing and maintaining their bicycle/pedestrian facilities. The study also gives a cost analysis of management and maintenance services, including a hypothetical budget for a 600-mile system in the county. Finally, it presents several steps for improving the current system.

OVERVIEW OF REPORT

The chapters that follow present the findings of our study. The topic of each chapter is shown below followed by the identification of material in the appendices.

- Chapter 1 introduces the report and provides definitions of key terms used in the study.
- Chapter 2 assesses the local non-motorized transportation plans, agency policies, funding issues and other factors that point to the need for an enhanced greenways maintenance and management system in Miami-Dade County.
- Chapter 3 profiles the bicycle business in the county and outlines concerns of bicycle users with regards to maintenance of bike paths.
- Chapter 4 assesses the maintenance and management practices of agencies responsible for non-motorized facilities in the county.

- Chapter 5 gives examples of metropolitan areas recognized for their “best practice” in managing and maintaining bicycle/pedestrian facilities.
- Chapter 6 presents an analysis of administrative and operational funding issues and provides several cost estimates for managing and maintaining existing and proposed facilities in Miami-Dade County.
- Chapter 7 gives detailed recommendations for creating and funding a local management and maintenance program.
- Appendix 1 is a copy of the business survey reported on in Chapter 3.
- Appendix 2 is a copy of the user survey reported on in Chapter 3 with results shown in graphs.
- Appendix 3 is a contact list of people within agencies in the county who deal with greenways.
- Appendix 4 is a contact list for the “best practice” communities.
- Appendix 5 is a copy of the survey used for greenway/trails management and maintenance used to help identify best practice communities and report on the case studies in Chapter 4.
- Appendix 6 is a detailed table with cost estimates by trail extrapolated from figures found in *Greenways: A Guide to Planning, Design, and Development*.
- Appendix 7 is a narrative on the assumptions used in creating a line-item budget and staffing plan for the 600-mile greenway system in the county.

DEFINITIONS

Several key terms are used in this study, and they may mean different things to different people. To help in better understanding the report, these terms are defined next.

Trails, greenways, bicycle/pedestrian facilities

These refer to off-road, non-motorized facilities such as trails, greenways, bicycle and pedestrian pathways—excluding sidewalks. These are located on linear stretches of green areas and contain paved or unpaved paths. They are used for bicycling, walking, skating, horseback riding and any other form of non-motorized use. Because trails and greenways are generally designed as bicycle/pedestrian facilities, these terms are used interchangeably throughout the report to refer to the entire network of off-road, non-motorized facilities in the county. On-road facilities such as bicycle lanes on streets are not addressed in this report.

Paths and green areas

In some parts of the report, a distinction is made between paths and green areas. In such cases, path refers to the paved or unpaved portion of the facility. Path is also referred to as pathway. The green area refers to the grass, trees and other landscaped sections of the facilities.

Maintenance

Maintenance is categorized into two types activities: routine and repair. Routine maintenance involves regularly scheduled activities such as sweeping and mowing. Repair maintenance refers to capital improvements, emergency repairs or activities that are done on an as needed basis. These include “patching holes, replacing severely worn or cracked sections, replacing old signs, repainting stripes, etc.” (MPO, 1995)

Management

This term refers to all activities related to operating and maintaining bicycle/pedestrian facilities. These include overseeing maintenance functions, maintaining interdepartmental and intergovernmental relations, coordinating activities and programs for trail usage, assessing financial and budgetary needs and carrying out day-to-day administrative functions.

Best Practice

Best practice is more a term of art than science. It refers to a program that is considered the best of its type, hence the term best practice. No one has the time or capacity to evaluate every item of every program carried out around the country in order to determine ultimately which one is best. From a functional point of view, best practice really means better or more effective practice than yours. The term “best practice” is used in this report as a term of art, although the communities cited here may, in fact, be the best at what they do. There may be others, of course, that are better; we were not able to identify them within the scope of this research project.

COMMENTS AND SUGGESTIONS

Although there are a number of studies on greenway and trail development, few relate to the management and maintenance of bicycle/pedestrian facilities. Most of the studies focus on the technical aspects of management and maintenance, such as mowing cycles and techniques, path construction and equipment specifications. They are mainly “how-to” publications, serving as useful guides to people in the field. This report, then, fills a void in the research and information dissemination regarding issues of operating and maintaining bicycle/pedestrian facilities. It is hoped that other researchers will build on this report and provide more information about managing, operating and funding greenway programs that will help other program managers and decision-makers improve greenway systems around the country.

Your comments and suggestions about this report are appreciated and can be sent to:

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CHAPTER 2: THE NEED TO REVIEW MANAGEMENT AND MAINTENANCE OF THE GREENWAY PROGRAM

This chapter addresses a number of major issues creating a need to assess management and maintenance of greenway programs in Miami-Dade County. These are outlined below. The rest of Chapter 2 elaborates on these issues.

- Availability of funding
- Statutes, regulations and industry guidelines
- Existing agency responsibilities
- Proposed new programs
- Liability
- Safety

AVAILABILITY OF FUNDING SOURCES TO CONSTRUCT NEW FACILITIES

County officials expect an infusion of transportation funds from both the TEA-21 and the 1.5 percent set-aside of the surface transportation program. In the *1999-2003 Transportation Improvement Program* for Miami-Dade, there are approximately \$24 million of non-motorized projects that are unfunded (MPO, 1998). This figure represents a major backlog of bicycle/pedestrian facilities that Miami-Dade County has yet to build. Assuming that funds become available, there could be many miles of new facilities coming online within the next decade, all of which will require maintenance. The following is an explanation of TEA-21 and the proposed 1.5 percent set-aside program of surface transportation. These funds, however, can only be used for construction and not for maintenance.

TEA-21 Funds

A big impetus to building bicycle facilities in Miami-Dade County has been funding attached to the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Within this federal appropriations bill, there was a mandatory set-aside of 10 percent for enhancement projects. Bicycle/pedestrian projects were among the ten eligible activity areas. All projects required a 10 percent local match. The first round of ISTEA helped to fund several local bicycle/pedestrian projects, including \$3 million for the Biscayne Trail of the South Dade Greenway Network.

The latest transportation bill, entitled TEA-21, will allocate approximately \$30 million to the Miami-Dade MPO over the next six years. The Miami-Dade area can expect additional trails to be constructed under this legislation, adding significant mileage to the non-motorized system. Even though TEA-21 allows for refurbishment of existing facilities to bring them up to current standards, the federal legislation does not allow funding to be used for maintenance of the facilities.

Long Range Transportation Plan 2015

The *Long Range Transportation Plan for 2015*, adopted by the MPO, contains a new commitment for non-motorized modes of transportation, which included a policy to reserve 1.5 percent of all eligible surface transportation capital funds for non-motorized projects (MPO, 1995). The MPO staff is working on applying the formula to the *2020 Long Range Transportation Plan*. The 1.5 percent set-aside could add approximately \$2 million annually for construction of non-motorized facilities.

The 1.5 percent set-aside funds and the TEA-21 federal enhancement funds are the most obvious source of construction dollars. They could total approximately \$15 million over the next six years, helping to build out the bicycle/pedestrian system outlined in the South and North Dade Greenway Networks and the *Bicycle Facilities Plan* (MPO, 1995). Again, these funds contain no provision for maintenance of facilities upon their completion.

MAINTENANCE AND MANAGEMENT NEEDS OF EXISTING FACILITIES

An inventory of existing bicycle/greenway facilities shows that there are approximately 100 miles of major bicycle/pedestrian facilities already in use in Miami-Dade County. The 1972 Decade of Progress Bond Program led to the construction of many of these facilities. Table 1 on the following page identifies the name and location of these facilities and estimates their mileage.

All of the existing facilities require regular maintenance if they are to stay useful. This includes sweeping, trash pick-up and surface repairs. The green areas of these facilities also require mowing and landscape maintenance. According to the MPO's *Report on Bicycle/Pedestrian Facilities Maintenance*, Miami-Dade's problems center around fragmentation of management and maintenance responsibilities among agencies and somewhat ineffective interagency coordination. More importantly, there is no entity to plan, review or monitor the overall maintenance of these facilities (Hunter, 1994).

A joint memorandum from the directors of Miami-Dade Public Works and the Park and Recreation Department from 1996 outlines some of the problems related to greenway, pathway, and trail maintenance. The memorandum pointed out that neither department has received funding or staff needed to carry out maintenance of these facilities. It also stated that neither department has the responsibility of "sweeping County bicycle paths." In the memo, the departments requested a cost benefit analysis, a program comparison and other data that would justify budget commitments regarding maintenance of bicycle/pedestrian facilities (Cutie and Hernandez, Memorandum, October 15, 1996).

To address the current deficiencies with the existing maintenance system, the 1995 *Metro-Dade Bicycle Facilities Plan* recommended that the county conduct a scheduled inventory/inspection of all facilities and create a regular schedule for sweeping. The Plan suggests that, without some management and maintenance mechanisms in place, the existing bicycle/pedestrian facilities could suffer. It points out that the degree of maintenance performed and the standard of quality that is maintained has a direct impact on the

effectiveness, service life, liability, and degree of use of these facilities (Metropolitan Planning Organization [MPO], 1995).

TABLE 1 EXISTING BICYCLE/PEDESTRIAN FACILITIES

Bicycle Facilities	Location	Number of Miles
Amelia Earhart Park	Inside park	.57
Bayshore Drive*	Peacock Park to 32 nd Road	2.41
Biscayne Boulevard	Miami River north to NE 36 th Street	2.78
Black Creek Canal	Larry & Penny Thompson Park to US-1	4.15
Brickell Avenue*	Rickenbacker Causeway to SE 15 th Road	.83
Green & White Paths <ul style="list-style-type: none"> • SW 24th Street • SW 56th Street • SW 72nd Street • SW 152nd Street to Metrozoo • SW 264th Street • SW 288th Street • SW 312th Street 	<ul style="list-style-type: none"> • SW 24th Street from 87th Ave to 117th Ave • SW 56th Street from 87th Ave to 117th Ave • SW 72nd Street from 87th Ave to 117th Ave • SW 152nd Street to Metrozoo • SW 264th Street from US-1 to SW 137th Ave • SW 288th Street from US-1 to FEC Rail Road • SW 312th Street from US-1 to SW 137th Ave 	19.52
Greynolds Park	Inside park	.89
Haulover Park	Inside park	1.78
Pro-Player Park	Park perimeter	1.93
Larry & Penny Thompson Park	Inside park	1.35
M Path	Miami River to SW 67 th Avenue	8.27
Main Highway*	Ingram Highway to the Peacock Park	1.10
Matheson Hammock	Inside park	1.50
Old Cutler Road*	Coco Plum Circle (SW 72 St) to US-1	14.06
Red Road	Old Cutler path to Kendall Drive	1.77
Rickenbacker Causeway/ Route 1	Entrance to Rickenbacker Cswy through Key Biscayne City Limit <ul style="list-style-type: none"> • NE Key paths • Rickenbacker Cswy to Crandon lanes • Crandon bike lanes • Atlantic path 	13.41
Snake Creek Canal	SW 24 th Street to SW 22 nd Street <ul style="list-style-type: none"> • East path • West path • Bike lane 	3.30
Snapper Creek	Tamiami Park to SW 107 Ave <ul style="list-style-type: none"> • East path • West path 	4.73
SW 87 th Avenue	Old Cutler path through Black Point Park	3.39
Tamiami Park	Inside park	1.18
Tropical Park	Inside park	3.33
US-1 (North South Bikeway)	Old Cutler to SW 312th Street	7.73
Total Mileage		99.9

Source: Miami-Dade County Metropolitan Planning Organization, Bicycle/Pedestrian Program

Note: Mileage of facilities varies depending on source; therefore, the above information provides an estimate of existing miles.

* Parts of County Bicycle Route #1.

MAINTENANCE AND MANAGEMENT NEEDS OF PROPOSED BICYCLE/PEDESTRIAN FACILITIES

The Miami-Dade County Comprehensive Development Master Plan contains various goals and objectives that seek to improve and expand bicycle mobility in this area (1998). It is an effort to satisfy Policy 9-J5 of the *Florida Administrative Code* established by the Florida Legislature and the Florida Department of Community Affairs (State of Florida, 1998). This legislation requires counties to address the issue of multimodal transportation in the Traffic Circulation Element of their comprehensive plans. The plan states that Miami-Dade County “will promote and assist in the creation of a countywide system of interconnected designated bicycle ways, and promote the implementation of the *Metro-Dade Bicycle Facilities Plan*” (MPO, 1995).

In response to the Comprehensive Plan, there are proposals to build approximately 500 miles of greenways in Miami-Dade. This is in addition to the 99.9 miles of existing facilities. If all the planned facilities are constructed, Miami-Dade could have the largest greenway and bicycle/pedestrian network in the United States. The problem is that the county has not developed a mechanism or identified the funding needed to provide maintenance for all of these additional facilities.

The plans for the new greenway and bicycle/pedestrian facilities include the South Dade Greenway Network, the North Dade Greenway Network and portions of new facilities identified in the Bicycle Facilities Plan. Below is a brief description of each of the greenway plans.

South Dade Greenway Network

On February 1994, the MPO adopted and approved the *South Dade Greenway Network Master Plan* (The Redlands Conservancy). This plan calls for approximately 189 miles of multi-purpose non-motorized trails south of Kendall Drive. It consists of ten major trails, which use the rights-of-way of the Florida Department of Transportation, Miami-Dade County Public Works, the South Florida Water Management District, and the City of Homestead. The South Dade Greenway Network, once completed, will be one of the largest greenway systems in the United States and the largest in the state of Florida. The system will cost approximately \$15 million in 1994 dollars--representing a dramatic increase in funding and system mileage for bicycle/ pedestrian facilities in Miami-Dade County (The Redlands Conservancy, 1994).

Currently, there are four open trails on the South Dade Greenway Network: the South Dade Trail (along the US1 Busway, Phase I), the Southern Glades Trail, a four mile section of the Tallahassee Connector, and portions of the Everglades Trail. The Biscayne Trail is currently at the stage of planning, design, and engineering (PD&E). See Table 2 for a detailed list of the trails that are to be part of the South Dade Greenway Network.

TABLE 2 PLANNED BICYCLE FACILITIES

Bicycle Facilities	Number of Miles
South Dade Greenway Network	
Biscayne Trail	36.2
Black Creek Trail	17.0
Princeton Trail	15.8
Mowry Trail	11.0
Everglades Trail	21.5
Keys Trail	25.7
Krome Trail	17.5
South Dade Trail	25.7
Southern Glades Trail	12.6
Tallahassee Connector	6.0
South Dade Greenway Total	189.0
North Dade Greenway Network	
Atlantic Trail	16.8
Beacon Trail	6.9
Commodore Trail	15.1
East-West Trail	7.9
Flagler Trail	14.9
Gold Coast Trail	20.8
Lake Belt Trail	29.3
Lehman Trail	1.8
Ludlam Trail	10.9
Memorial Trail	16.0
Merrick Trail	10.4
Miami River Trail	20.9
Miccosukee Trail	27.8
Miller Link	2.5
M-Path Trail	9.9
Oleta Link	2.5
North Krome Trail	9.4
Perimeter Trail	9.0
Snake Creek Trail	18.6
Snapper Creek Trail	10.5
Turnpike Trail	13.8
Utility Trail	7.5
Venetian Link	4.1
West Kendall Trail	16.8
North Dade Greenway Total	304.1
Total	493.1

Source: South Dade Greenway Network Master Plan and North Dade Greenway Network Master Plan

In addition to outlining the plans for building bicycle/pedestrian facilities, the *South Dade Greenway Network Master Plan* specifically addresses the issue of maintenance and management. The South Dade Plan calls for the creation of a Trails Authority and

recommends that this entity have singular responsibility for maintenance and integrated management of facilities--including funding, design/development, and construction. The plan also stresses the importance for a maintenance and security plan to be in place. The plan did not identify any potential funding source for implementing these management and maintenance recommendations (The Redlands Conservancy, 1994).

North Dade Greenway Network

In 1998, the MPO adopted and approved the *North Dade Greenway Network Master Plan*. This plan calls for 24 trails, totaling approximately 304.1 linear miles of non-motorized bicycle/pedestrian facilities north of Kendall Drive. Table 2 provides a list of the trails of the North Dade Network (Florida International University [FIU], 1997). At this time, there is no secured funding for building 21 of the trails, although they are eligible for Transportation Enhancement (TEA-21) funds. As was the case with the South Dade Greenway Network, there are no funding sources identified to cover the management and maintenance costs of the proposed facilities for the North Dade Network (FIU, 1997).

Currently, the Florida Department of Transportation has expressed an interest in taking on the responsibility for constructing portions of the North Dade Greenway Network which includes the East West Corridor and the Krome Avenue Trail. FDOT will also include the Venetian Trail as part of the overall construction for the new Venetian Causeway. Additionally, the Florida Turnpike District would consider partnering on the Turnpike Trail as part of its 20-Year Master Plan. It is important to point out, however, that although these agencies are committed to constructing these facilities, they do not have responsibility for managing or maintaining them once constructed.

INDUSTRY GUIDELINES AND PERMIT REQUIREMENTS FOR MAINTENANCE

Not only is Miami-Dade faced with an internal need to establish a management and maintenance program, external sources are also forcing the county to address the need to develop maintenance plans for bicycle/pedestrian facilities. Indeed, the need to have a maintenance program before the construction of a bicycle/pedestrian facility is becoming an industry issue. As is explained below, the American Association of State Highway and Transportation Officials (AASHTO) and the South Florida Water Management District are among some of the organizations that are advocating such conditions.

AASHTO Guidelines

The American Association of State Highway and Transportation Officials (AASHTO) prepares a publication that provides general design guidelines for bicycle facilities in the United States (1981). These guidelines are the industry standard for construction. The publication also gives recommendations regarding the maintenance of bicycle facilities. The recommended maintenance routines include regular sweeping, surface repairs, edging, vegetation control, mowing, periodic inspections, and enforcement of unauthorized motorized vehicles.

AASHTO warns that facilities can become un-rideable and can quickly turn into a liability if they are neglected or if there is no regular maintenance. To avoid such problems, the

publication stipulates that, before construction, it is necessary to identify the agency that will be responsible for maintenance of the bicycle facility. In addition, costs for operation and maintenance of facilities should be budgeted during the planning stages (AASHTO, 1981). Miami-Dade County has not yet followed the AASHTO recommendations; none of the plans to construct additional bicycle/pedestrian facilities, for example, stipulates who will be in charge of maintenance (FIU, 1997; the Redlands Conservancy, 1994).

South Florida Water Management District (SFWMD) Permit Conditions

The South Florida Water Management District (SFWMD) requires all entities that want to utilize its properties to secure a use permit. According to the SFWMD permit manual, the permit can stipulate conditions that the applicant must follow in order to get permission to use the District's right-of-ways (ROWs) (South Florida Water Management District). For instance, staff will request a maintenance plan, budget and schedule prior to issuance of permits.

Both the South Dade Greenway Network and the North Dade Greenway Network identify substantial ROW owned by the SFWMD (FIU, 1997; the Redlands Conservancy, 1994). In fact, the South Dade Greenway Network calls for building approximately 50 percent of its trail system on SFWMD ROW. It is likely, therefore, that the SFWMD will require the South and North Dade Greenway Networks to provide maintenance commitments as part of the permit process.

LIABILITY

Miami-Dade County could risk increased exposure to litigation from not having an adequate oversight system for maintenance of the bicycle/pedestrian facilities under its jurisdiction. Injuries and accidents can occur from overhanging and protruding tree limbs, poor visibility, lack of proper signage or stripping, surface imperfections, accumulated debris on tread surface, and poor design. Records from the Miami-Dade County Risk Management Department indicate that over 80 percent of the bicycle and pedestrian claims against the county involved potholes or other problems related to poor surface conditions of pathways or sidewalks (Miami-Dade Risk Management, 1998).

From 1993 to 1997, the County had a total of 115 liability cases related to pedestrian and bicycle accidents. Twenty-two cases involved bicyclists, 89 involved pedestrians, three involved skaters, and one involved a wheelchair. The 115 claims totaled \$388,441 in bodily injury and recovery damages. As of the time the research for this section was conducted, the County has only closed 36 percent of the cases and has paid a total of \$188,063 in liability expenses. Of the remaining claims, 45 percent closed without payment and 19 percent are still open. The open cases total \$243,452 in potential liability costs (Miami-Dade Risk Management, 1998).

In order to limit future lawsuits and reduce liability costs, Miami-Dade County needs to reduce hazardous conditions on designated routes. Broken pavement, fallen tree branches, improper signage, and any other obstruction that can lead to bodily injury or property damage are considered hazardous. Miami-Dade County has the responsibility to prevent or correct

such hazards, according to Tort Law, as long as the agency in charge of the facility has reasonable knowledge of the potential hazards and is aware of industry standards related to maintenance (Bicycle Federation of America, 1986).

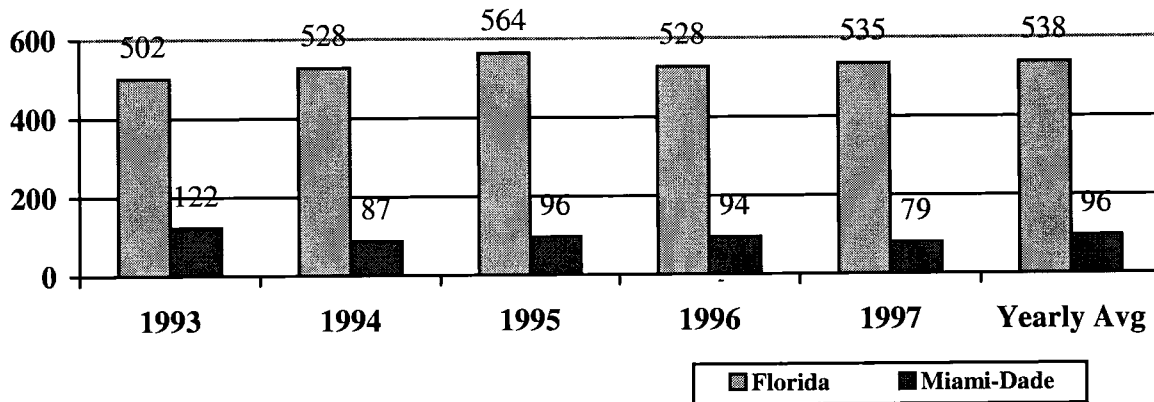
A publication by the Bicycle Federation of America, entitled *Liability Aspects of Bikeway Designation*, provides a series of steps that the county should take to reduce bikeway risks (1986). First, the county must ensure that the design of all non-motorized facilities meets acceptable standards. Second, all maintenance operations must conform to acceptable standards. The county should also have written procedures for maintenance. Third, there must be regularly scheduled inspections of all facilities and quick follow through on required maintenance items. Finally, the county should maintain written records chronicling the activities of all the agencies involved in the management or maintenance of the bicycle/pedestrian facilities. (Bicycle Federation of America, 1986). Of course these are basic components of a comprehensive management and maintenance program, and such programs need adequate funding to be successful.

SAFETY

According to the National Highway Traffic Safety Administration, 20 percent of Florida's pedestrian fatalities occur in South Florida. Other national surveys also rank South Florida and Miami-Dade County among the most dangerous metropolitan areas in the nation for pedestrians and bicyclists. For example, the "Mean Streets" Survey, developed by the Surface Transportation Policy Project, ranked Miami/Fort Lauderdale as the third most dangerous metropolitan area in the U.S. (Rosenberg, Carole, 1998). Statistics from the Florida Department of Transportation on deaths and serious injuries to pedestrians and bicyclists confirms the severity of the problem. From 1993 to 1997, Miami-Dade County alone accounted for approximately 18 percent of the pedestrian fatalities and 12 percent of the bicycle fatalities in the state of Florida. (See Figures 1 and 2).

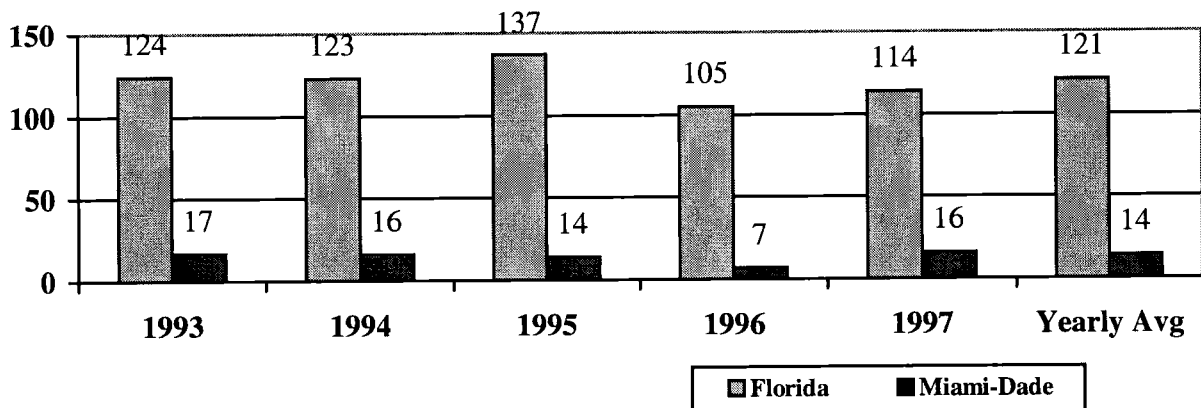
As the "Mean Streets" report indicates, the most dangerous metropolitan areas do not provide safe areas for pedestrians and bicyclists. In Miami-Dade, for example, many neighborhoods do not have sidewalks or designated bicycle facilities. Further, few off-road and on-road facilities exist to meet the needs of experienced bicyclists or children. In fact, there are only 10 miles of on-road bicycle lanes in the county. This is substantially less than bicycle-friendly communities such as Seattle, Phoenix and Portland, which have extensive networks of bicycle lanes and other forms of on-road, non-motorized facilities. In Miami-Dade, the few off-road facilities that do exist tend to have trash, debris and other obstructions that make them less usable. Consequently, bicyclists, pedestrians and others may be forced on to the roadside, creating hazardous conditions that contribute to on-road crashes.

FIGURE 1 PEDESTRIAN FACILITIES IN FLORIDA AND MIAMI-DADE, 1993-1997



Source: Florida Department of Transportation, 1998.

FIGURE 2 BICYCLE FATALITIES IN FLORIDA AND MIAMI-DADE, 1993-1997



Source: Florida Department of Transportation, 1998.

ILLUSTRATIONS OF MAINTENANCE PROBLEMS

This section provides pictures of some of the most common maintenance problems found in Miami-Dade County. The pictures show design, landscaping and surface problems. Below is a discussion of how each of these items affects maintenance.

Design

Good design will not only enhance the usage of a facility; it will also expand the life span of that facility and reduce the cost and frequency of maintenance. Planners must take into account the topography, climate, flora and fauna of the area when designing a facility. All of these factors affect maintenance. One common design problem is poor drainage. Figure 3, for example, shows how the Black Creek Canal Trail has eroded due to poor drainage and

erosion control. Other design problems relate to safety issues. In some cases, the trail design obstructed visibility. In other cases, trails did not provide protective barriers against traffic or potential hazards for users. This is evident on the M-Path, where planners did not design any barrier to protect users from a 10-foot drop next to the path (See Figure 4).

FIGURE 3 EROSION PROBLEM



Black Creek Trail:

The path has eroded due to poor drainage.

FIGURE 4 LACK OF PROTECTIVE BARRIER



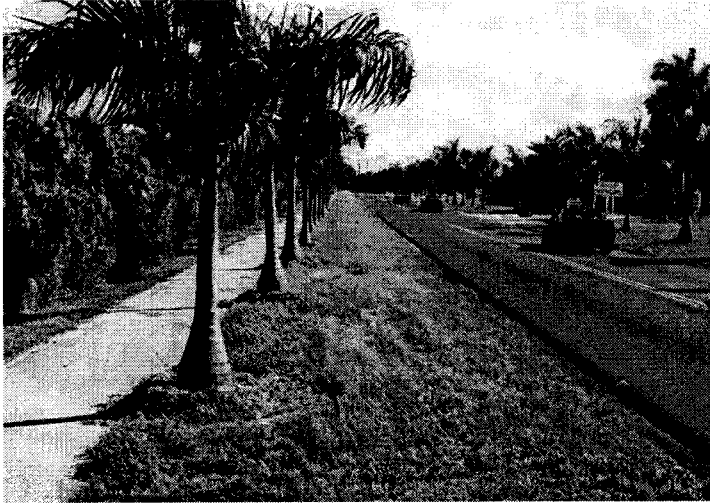
M-Path:

There is a 10-foot drop before the bridge. The path does not have a barrier to prevent falls.

Although landscaping can enhance a bicycle/pedestrian facility, it can also pose maintenance and safety problems. As a general rule, trees and other plant material should be at least two feet from a path to avoid problems with roots and foliage. On some Miami-Dade trails, trees were planted less than foot away from the trail (See Figure 5), and plant material had encroached on the path and posed a potential hazard for users (See Figure 6). Another common problem was landscaping that obstructed visibility. In Figure 7, for example, the plants obstruct visibility at a pedestrian crossing, posing a danger from on-coming traffic. It

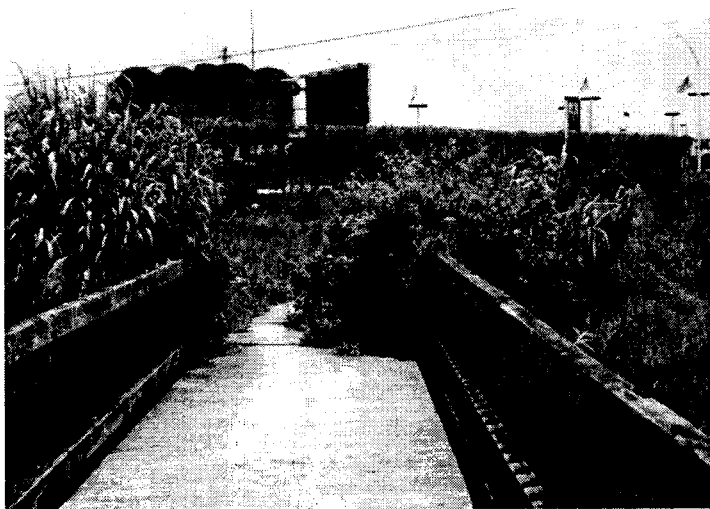
should be noted that at times road building and pathway standards conflict with one another. The question is which standard has priority in such cases? One answer, of course, is to avoid such conflicts by better planning and coordination of construction projects where the two are connected. This likely requires additional staff, which means additional funding.

FIGURE 5 PALM TREES PLANTED TOO CLOSE TO PATH



Old Cutler Trail, South:
Palm trees were planted less than two feet from the path.

FIGURE 6 OVERGROWN PLANTS OBSTRUCT ACCESS TO PATH



Black Creek Trail:
The plants have grown over the path. They obstruct access and pose a potential hazard.

FIGURE 7 LANDSCAPING OBSTRUCTS VISIBILITY



M-Path:

Plants near pedestrian crossing obstruct visibility of on-coming traffic.

Surface Maintenance

Proper construction and maintenance can prolong the life span of a path considerably. Figure 8 and Figure 9 show how grass can take over a path and gradually destroy it. This is generally an indication that the ground was not properly cleared prior to construction. Another problem was that some trails could not accommodate maintenance equipment. Some paths were damaged because they were not wide enough or could not withstand the weight of the maintenance equipment (See Figure 10.).

FIGURE 8 PATH DESTROYED BY GRASS



Black Creek Trail:

Grass has taken over the trail and destroyed the surface of the path.

FIGURE 9 GRASS GROWING THROUGH PAVEMENT



Old Cutler Trail, South:
Grass is growing through the concrete. The soil was not cleared properly before construction.

FIGURE 10 PATH DAMAGED BY MAINTENANCE EQUIPMENT



Old Cutler Trail, South:
Maintenance equipment has damaged the surface of the path.

FIGURE 11 UTILITY LINE OBSTRUCTS CLEARANCE



M-Path:
Utility lines can obstruct clearance for bicyclist and pedestrians.

Interagency Cooperation

Finally, interagency cooperation can play an important factor in maintenance and safety issues. Problems can occur if agencies do not consult each other regarding landscaping or capital improvement on or near trails. Figure 11, for example, shows a utility line that can obstruct the clearance of bicyclists and pedestrians. Figure 12 shows a column being constructed in the middle of a path. This may create obstacles for users and obstruct the view of on coming bicyclists and pedestrians. Sometimes problems are unavoidable due to engineering issues, but more and better cooperation can improve the design, construction, landscaping and maintenance of these kinds of facilities.

FIGURE 12 COLUMN CREATES DANGEROUS OBSTACLE



South Dade Busway:

Construction of a column in the middle of the path creates a dangerous obstacle and obstructs the visibility of users.

Miscellaneous Maintenance and Potential Liability Problems

Below are pictures of other miscellaneous maintenance problems that can pose hazards. Figure 13, for example, shows a pedestrian bridge that is missing a rail. Figure 14 shows a boulder that needs to be removed from the middle of the path. To avoid a potential hazard, both of these situations require immediate maintenance attention.

FIGURE 13 MISSING RAIL ON PEDESTRIAN BRIDGE



M-Path:

Rail is missing from the pedestrian bridge.

FIGURE 14 BOULDER IN PATH



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CHAPTER 3: ECONOMIC IMPACT AND USER VIEWS OF GREENWAYS

Trails, greenways and bicycle/pedestrian facilities help stimulate the economy of an area by attracting people and creating demand for goods and services. With 131 million Americans regularly bicycling, walking, skating or jogging for exercise, sport or recreation, the market is lucrative for businesses that cater to the needs of trail users. Such businesses include restaurants, convenience stores, bicycle shops, campgrounds and hotels (U.S. Department of Transportation and the Federal Highway Administration, 1994). There have been many documented cases where the development of trails and greenways helped to attract businesses, create jobs and increase public revenue (National Bicycle Pedestrian Clearing House [NBPC], 1995). Examples of the positive economic impacts of trails include:

- Pinellas Trail in Florida, where storefront occupancy in downtown Dunedin increased from 65 percent to 100 percent after construction of the trail.
- The Tallahassee-St. Marks Trail in Florida, where an estimated 170,000 visitors per year help to generate over \$1.8 million in annual local revenue.
- Northern Central Rail-Trail in Maryland, where the state is able to offset the \$191,893 cost of managing and maintaining the trail by generating \$303,750 in taxable revenue from trail related activities (NBPC, 1995).

As Miami-Dade County develops a comprehensive maintenance and management program for its proposed 600-mile greenway network, it should better understand the benefits and challenges associated with current trail/greenway usage. With such information, the county can maximize the economic benefits of future trails and minimize negative impacts.

This chapter provides a discussion of the results from a survey of bicycle stores and from members of organizations who use existing trails. The findings are divided into two sections. The first section outlines the findings of a business survey and provides a limited profile of the bicycle industry in Miami-Dade County. Local data are presented with reference to national data to determine how Miami-Dade compares to national trends. The second section focuses on the results of the user survey and provides information on user expenditures, trail use patterns and maintenance concerns.

BUSINESS SURVEY

A business survey was conducted to assess the current economic impact of the bicycle industry in Miami-Dade. (See Appendix 1 for a sample of the survey.) It focused on job creation and retail sales of bicycle stores in the area. The survey attempted to quantify five items: 1) the total number of bicycle stores in Miami-Dade County, 2) the average number of years in operation, 3) the number of people employed by these stores, 4) the volume of sales generated and 5) the number of bicycles sold in the county. Because most of the department store chains in this area would not participate in the study for fear of revealing proprietary

information, the survey results focus primarily on individual bicycle stores. Nevertheless, we will present the survey results from the department stores for comparative purposes.

In addition to the survey, we used data from Dun and Bradstreet to get an indication of overall employment and sales generated by the bicycle industry in Miami-Dade, including manufacturing, distribution and rentals. Finally, we used national statistics on bicycle shops as comparative benchmarks. Table 3 provides a summary of the findings.

TABLE 3 SUMMARY OF BUSINESS SURVEY RESULTS FOR INDEPENDENT BICYCLE STORES

Item	Survey Results
Number of Bicycle Stores	40
Average Years in Operation	15.1
Total Bicycle Store Employees	84
Average Employees per Bicycle Store	3.2
Estimated Annual Sales per Bicycle Store	\$ 440,230*
Total Annual Sales	\$5,723,000*
Average Number of Bicycles Sold per Year	450**
Total Bicycles Sold per Year	7,652

Source: Metropolitan Center, Greenways Management and Maintenance Study, 1999. Business Survey.

Note: This table does not include information about department stores.

* Only 13 stores provided information regarding annual sales.

**Only 17 stores provided information regarding number of bicycles sold per year.

Number of Bicycle Stores

According to the National Bicycle Dealers Association (NBDA), there are approximately 6,800 specialty bicycle dealers in the U.S., 85 percent of which are “single-location/one owner operations.” Florida ranks third (behind California and New York) for having the largest number of “single-location/one owner” bicycle stores in the nation, with approximately 369 independent dealers (NBDA, 1998). Miami-Dade County had a total of 40 bicycle shops in 1998, not including department stores.¹ This represents 11 percent of the independent bicycle stores in Florida.

Only 26 of 40 independent stores participated in the business survey, giving us a response rate of 65 percent. In addition, two department store chains, representing 14 stores in the county, completed the survey. Many stores did not participate because they did not want to reveal what they thought to be proprietary information.

¹ We derived a count of 40 bicycle stores by using the local telephone book. Specifically, we identified all the businesses listed under “Bicycles” and contacted each business to determine if they were listed correctly. Although we found 46 bicycle stores in the telephone book, our follow up calls revealed that three stores had gone out of business and three were listed incorrectly. To validate our count, we also contacted the NBDA. Their records indicated that Miami-Dade had 39 bicycle shops in 1997. Since our count was conducted in 1998, we concluded that the additional store in our count was probably a new business.

Years in Operation

According to the NBDA, bicycle stores have a large turnover rate. Approximately 1,000 bicycle dealers go out of business each year in the U.S. They are mostly start-up businesses with a life span of less than five years (NBDA, 1997). In Miami-Dade, survey respondents, excluding department stores, reported being in operation an average of 15.1 years.

Approximately 70 percent of the stores that we surveyed reported that they had been in business for more than five years, with 46 percent reporting that they had been in operation for 15 years or more. Such longevity demonstrates the stability of these enterprises in Miami-Dade.

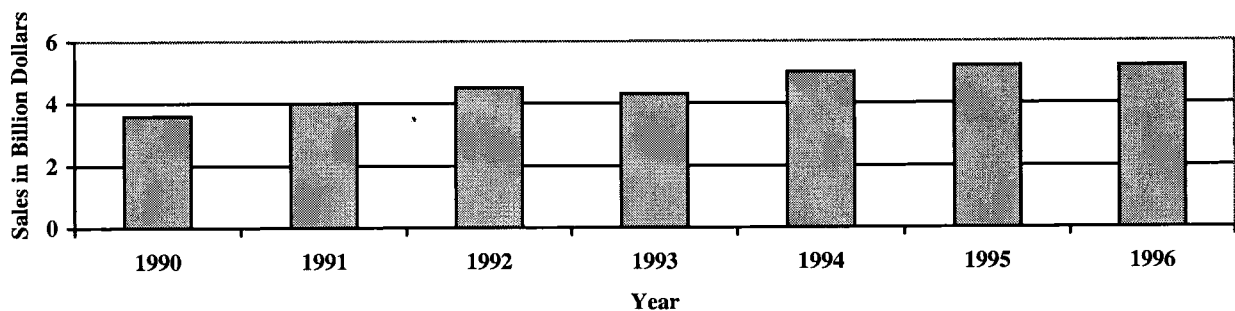
Number of People Employed

Dun and Bradstreet data indicate that a total of 914 people are employed in sporting goods and bicycle shops in Miami-Dade (1998). This includes department stores, sporting goods stores and any other businesses that deal with the sale, production, repair or rental of bicycles and their related parts. The independent bicycle stores that we surveyed employed a total of 84 people, representing 9 percent of all sporting goods and bicycle-related employment in the county. Each store had an average of three employees. Although we were not able to get results from all the department store chains in Miami-Dade, those that did respond reported they had 35 employees in bicycle related jobs. Together, bicycle store and department store respondents had a total of 129 employees, approximately 14 percent of the employees in the sporting goods and bicycle shop industry.

Sales

In 1996, the U.S. bicycle industry made \$5.2 billion in the retail sale of bicycles, related parts and accessories. As Figure 15 demonstrates, there has been a steady growth in sales since 1990, indicating the growing popularity of bicycling. Figure 15 includes the sales generated by specialty shops as well as department stores (NBDA, 1997).

FIGURE 15 YEARLY SALES FOR THE BICYCLE INDUSTRY IN THE UNITED STATES



Source: National Bicycle Dealers Association, 1997, STATPAK

The 1997 NBDA national survey also indicates that department stores, discount stores and toy stores accounted for 70 percent of retail unit sales. These stores specialized in the juvenile market, generally selling less expensive bikes that ranged in price from \$69 to \$169.

Specialty bicycle dealers, on the other hand, accounted for 30 percent of the retail market in the U.S. They specialized on high quality products that ranged in price from \$355 to over \$4,000. Specialty stores also accounted for almost 100 percent of the service and repair market (NBDA, 1998).

Miami-Dade County seems to follow the national trend. According to Dun and Bradstreet data, sales for sporting goods and bicycle shops in Miami-Dade totaled \$43 million in 1997 (Dun & Bradstreet, 1998). The survey respondents accounted for 35 percent of this amount, generating \$15 million in sales that year. Department stores accounted for 67 percent of the sales among respondents. They had approximately \$10 million in sales, specializing in children's bicycles and less expensive products. Independent bicycle stores accounted for the remaining 33 percent, with \$5 million in sales. They specialized in the adult market, offering high-end specialty products. Parts, accessories and service generally made up over half of the gross sales for these stores.

It is important to note at this point that only 13 of the 26 stores that responded to the survey agreed to provide sales information. The remaining 13 stores would not answer this question. Of the 13 bicycle shops that provided sales information, the average annual sales per store was approximately \$440,230. This is slightly above the national average, which was \$402,500 per store (NBDA, 1997). Since only 32 percent of the stores in Miami-Dade provided sales information, it is possible that a full response may have yielded a different result.

No national figures were available on the average annual sales of department stores. However, based on the information obtained from the two department store chains that responded to our survey, we estimated that these stores averaged \$700,000 in annual sales per store.

Number of Bicycles Sold Per Year

Over 10 million bicycles were sold in the U.S. in 1996 (NBDA, 1997). Based on information from the NBDA and the survey, we were able to determine that approximately 77,000 bicycles were sold in Miami-Dade County in 1997. Independent bicycle stores accounted for approximately 10 percent of these sales, and department stores accounted for the remaining 90 percent.

According to national estimates, the average independent dealer sells between 500 and 600 bicycles per year (NBDA, 1998). In Miami-Dade the average is 450 per bicycle store--ranging from a high of 1,500 to a low of 20 bikes. This is slightly below the national average. However, it should be noted that only 42 percent of the respondents answered this question; therefore, the figures may be somewhat skewed. Interestingly, department stores sold an average of 4,900 bicycles per year. This figure is so large because it includes children's bicycles and other bicycle-related products such as tricycles.

Analysis of Findings

According to our findings, sporting goods and bicycles shops in Miami-Dade generate \$43 million in annual sales and employ a total of 914 people. Respondents to our survey accounted for 35 percent of those sales and 14 percent of the employment. Even though the respondents did not appear to employ a large number of people, with an average of three employees per store, they represent over a forth of the sales generated by the sporting goods and bicycle shop industry.

Compared to other small independent bicycle stores around the country, Miami-Dade seemed to follow the national trend in terms of average annual sales and total number of bicycles sold per year. The respondents averaged \$440,230 in annual sales and sold approximately 450 bicycles per store.

Because only two department store chains participated in our survey, we were unable to provide a more accurate assessment of their impact on the economy. Nevertheless, we were able to confirm that the department stores dominate the bicycle market in Miami-Dade, representing 67 percent of the annual sales and 90 percent of the bicycles sold.

USER SURVEY

The purpose of the user survey was to develop several profiles of user habits and concerns. A standard survey instrument common in most trail-use studies, with some modifications to meet local needs, was also used here (Moore, et al, 1992). (See Appendix 2 for a sample of the survey and survey results.) Several focus group sessions were held with representatives from walking, bicycling, running and equestrian organizations. The survey was distributed to the participants (See Table 4). The response rate was extremely low for this survey. Overall, a total of 40 people agreed to participate in the focus group meetings and answer the survey.

TABLE 4 FOCUS GROUPS THAT PARTICIPATED IN THE USER SURVEY

Organization	Membership
The Everglades Bicycle Club	240 members
Team Foot Works Walkers	200 members
South Florida Trail Riders	310 members (equestrians)
Miami Running Club	5,000 members

Focus group and survey data helped ascertain information in the following areas: 1) expenses related to trail use, 2) trail use patterns and 3) attitudes toward trail maintenance. Since only hobby club enthusiasts were queried, the survey results may not represent the general population. Nevertheless, these groups represent people who seriously engage in these recreational activities and their answers provide a good indication of their spending habits and use patterns.

Expenses Related to Trail Use

In order to determine user expenses, the user survey asked each participant to itemize their hobby-related expenses for the following categories: clothing, equipment, accessories, books, membership, subscriptions, and "other." Assuming that the survey respondents were representative of the members in their organization, the survey results revealed that the bicyclists spent an average of \$2,264 per person annually, the runners \$472, the walkers \$446, and the equestrians \$5,968. Table 5 provides an estimated amount of the average annual expenditures per user group. It shows that the four groups surveyed (which represent a total of 5,750 people) generate an estimated \$2.7 million dollars in sales.

TABLE 5: ANNUAL TRAIL-RELATED EXPENDITURES BY USER GROUP

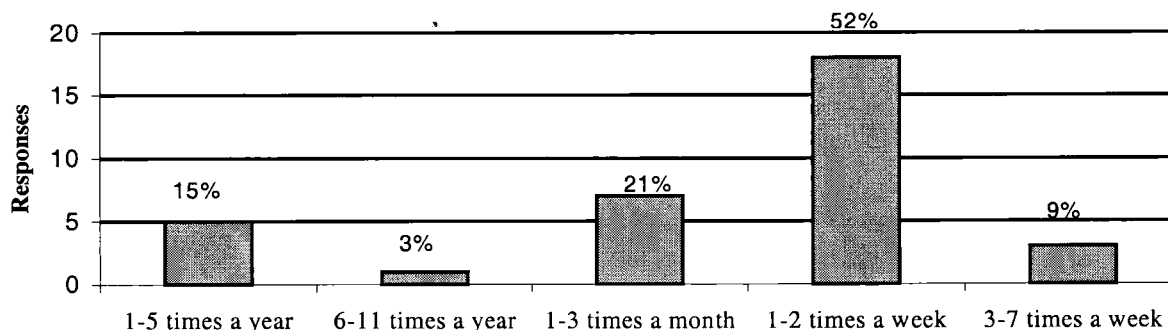
Organization	Membership	Average Expenditure Per Person Per Year	Estimated User Expenditures Per Organization Per Year
Everglades Bicycle Club	240	\$2,264	\$ 543,360
Miami Running Club	5,000	472	236,000
South Florida Trail Riders	310	5,968	1,850,080
Team Foot Works Walkers	200	446	\$ 89,200
Total	5,750	\$ 473	\$2,718,640

Source: Metropolitan Center, Greenways Management and Maintenance Study, 1999, User Survey.

Trail Use Patterns

The user survey also provided information on trail use patterns. Approximately 52 percent of the respondents used Miami-Dade County trails/greenways/bikeways at least once or twice a week (See Figure 16). The facilities that users frequented the most were Old Cutler, the Everglades Trail and Key Biscayne--with Old Cutler ranking first in use (See Appendix 2 for survey results). Canal banks ranked fourth in popularity, particularly among equestrians, who complained that there were not enough trails for riding.

FIGURE 16 NUMBER OF TIMES USERS VISIT TRAILS, GREENWAYS AND BICYCLE/PEDESTRIAN FACILITIES IN MIAMI-DADE COUNTY PER YEAR



Source: User Survey

Attitudes Toward Facility Maintenance

Respondents were asked to rank their level of satisfaction with respect to various factors related to trail maintenance. The survey revealed that there was a general dissatisfaction with trail amenities and facilities and with the overall maintenance of trails. The following are some of the areas where users reported the most dissatisfaction.

- Overall maintenance
- Poor surface condition of facilities
- Lack of restrooms
- Lack of drinking water
- Lack of services (such as food vendors or repair shops)
- Parking at access points. (See Appendix 2 for the survey results).

In addition to completing the survey, we asked the focus groups to voice their opinion regarding maintenance of bicycle/pedestrian facilities. Group discussions revealed that the greatest deterrents to using trail facilities were safety hazards, such as broken pavements, overgrown roots and debris. The groups complained that the county provided few facilities where they could enjoy their recreational activity safely. In many cases, they expressed that they had to use regular streets because the pedestrian/bicycle facilities were full of debris or had other problems that affected their use. They also complained of having to travel long distances to use existing trails/pathways. Equestrians expressed concern over the lack of trails and facilities for their horses. Some bicyclists requested more on-road bicycle lanes instead of off-road pathways, stating that pedestrian traffic and other obstacles on the pathways made it difficult for them to ride safely. All users were concerned about the lack of bathrooms and water stops along trails.

DISCUSSION OF FINDINGS

The focus groups and user surveys revealed two important facts. First, it is apparent that the existing trails and pathways are not meeting the demands of the respondents that were surveyed. Even though 52 percent of the respondents claimed to use the facilities at least twice a week, they complained of poor maintenance and of traveling long distances to use existing facilities. It is clear from these statements that there is a demand for more pedestrian/bicycle facilities, but that these facilities must be maintained in good condition for people to use them. Second, trail users expressed a concern over the lack of services that are available to them. From lack of vendors to repair services, there appears to be a potential niche for individuals who are interested in meeting the needs of this market. Miami-Dade County should look at the possibility of selling vending rights to individuals who may be willing to provide goods and services for trail users where appropriate, particularly since this market group seems to spend a lot on hobby-related activities.

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CHAPTER 4 EXISTING GREENWAY MAINTENANCE PROGRAMS IN MIAMI-DADE COUNTY

In this chapter, existing greenway programs are reviewed in order to lay out the current organizational structure, operating mechanisms and maintenance issues. Information for this review came from a number of interviews with key personnel from various government agencies responsible for the management and/or maintenance of bicycle/pedestrian facilities in the county. Appendix 3 shows the contact list by agency. Staff in the following agencies were interviewed:

- Miami-Dade Park & Recreation Department
- Miami-Dade Public Works
- Miami-Dade Transit Agency
- Miami-Dade Expressway Authority
- Miami-Dade Metropolitan Planning Organization (MPO)
- South Florida Water Management District
- Florida Department of Transportation, District 6
- Florida Turnpike

Of the eight agencies interviewed, three of them have staff assigned to address bicycle issues:

- Miami-Dade Public Works
- Miami-Dade MPO
- Florida Department of Transportation, District 6

The cities of Miami, Miami Beach, Hialeah and Coral Gables were also contacted as part of this study. Although these cities do maintain bike paths within their city parks, they do not perform routine maintenance of any bikepaths outside of those parks, such as those constructed alongside secondary roads within these cities. Miami-Dade's Public Works Department has general responsibility for maintenance of secondary roads and bikepaths within cities. This is the case for the cities of Hialeah and Miami. Although Coral Gables contracts for maintenance of landscaped areas around the Old Cutler Road pathway within the municipality, the city does not maintain the actual surface of the pathway.

Within the geographic boundaries of Miami-Dade County, the bulk of the responsibility for the maintenance of pathways (the surface and shoulder areas of bicycle/pedestrian facilities) falls on the county government. As a result, a number of agencies in the county are responsible for the maintenance and management of a large network of bicycle/pedestrian facilities throughout unincorporated and incorporated Miami-Dade County. The section that follows provides an historical perspective on the events that helped to shape the current system.

BACKGROUND

Much of the bicycle/pedestrian system that exists today in Miami-Dade County originated from the Decade of Progress Bond Program. The Decade of Progress provided \$75.8 million for the construction and expansion of parks, recreation and cultural facilities. This included the construction of major bikeways along Old Cutler Road, Snake Creek, Snapper Creek, Greynolds Park, Black Creek and other locations (Metro-Dade County, 1979).

With funding from the Decade of Progress Bond, the Park and Recreation Department became the lead agency in charge of the bicycle/pedestrian facilities in Miami-Dade County. The department planned the location of the new bikeways and was responsible for maintaining these facilities once they were completed.

The county's Public Works Department became involved in the maintenance of bicycle/pedestrian facilities after receiving a request from Park and Recreation to assist in maintaining asphalt surface of the bikeways. Since the Park and Recreation Department did not have the asphalt patching capability to service new bicycle/pedestrian facilities, Public Works agreed to use pothole patching crews from the county roadway network to patch minor defects on bikeways. Public Works did not request reimbursement for this service since roadway pothole patching crews "were already budgeted and the amount of bikeway patching at that time was negligible" (Public Works).

The two departments also agreed that Park and Recreation would contract out major overlay or reconstruction projects that were beyond the capabilities of in-house crews. Park and Recreation could use a private vendor or contract these services through the Public Works Department. In such cases, the Park and Recreation Department would reimburse Public Works, "since contract expenditures are direct costs that are not included in the Public Works budget" (Public Works).

The maintenance agreement between Park and Recreation and Public Works was informal. The departments did not see the need for a formal written agreement responsibility for maintenance of the bicycle/pedestrian facilities remained within the Parks and Recreation Department. The departments have followed this informal understanding for many years (Public Works).

As the bicycle/pedestrian system has grown, however, the lines of responsibility have shifted somewhat and funding for these services has not kept up with the need. Several factors have contributed to this. First, since the Decade of Progress initiative, other agencies within the county have begun efforts to construct bicycle/pedestrian facilities. The Park and Recreation Department no longer is the only agency responsible for these projects. Second, budgetary and staffing cutbacks have reduced the maintenance capacity of Public Works and Park and Recreation. Neither of these agencies has the funding or manpower to make bikeway maintenance a priority, at least without hurting some other functions in their departments. Third, the Miami-Dade Transit Agency (MDTA) has become a third player in the maintenance process. MDTA has had jurisdiction over two bicycle/pedestrian facilities, M-Path and the South Dade Busway; however, Park and Recreation took over the maintenance

for M-Path. This shifting of responsibilities between agencies and funding shortfalls have created problems over maintenance, particularly in terms of pathway repairs. Fourth, there is growing sentiment that bicycle/pedestrian bikeways are transportation arteries and not just recreational facilities. This has created discussion in some areas over which agency should be responsible for bicycle/pedestrian facilities. Are bikeways transportation- or recreation-related, or both? Should function dictate which agency should have primary responsibility for this system? Should it be a new agency?

Although several memorandums of understanding have attempted to clarify departmental responsibilities and formalize the maintenance process, these documents have had limited impact. One of the problems is that these documents do not address the maintenance needs of all facilities in Miami-Dade County. For example, the most recent memorandum of understanding between Public Works and the Park and Recreation only deals with the bicycle paths along Old Cutler Road, Black Creek Canal and the Rickenbacker Causeway. According to this 1996 document, the Park and Recreation Department only “maintains a limited number of bicycle path facilities near county parks.” The memorandum also explains that the Public Works Department plays “a supportive role” in maintenance by providing asphalt repairs, trimming adjacent obstructions and other functions on an as-needed basis. More importantly, the memorandum clearly states that without adequate staffing or funding, the departments cannot “maintain all” of Miami-Dade county’s bicycle facilities or perform additional functions, such as sweeping (Cutie and Hernandez, Memorandum, October 15, 1996).

Today, eight agencies are involved, in some manner, for planning, construction, management and maintenance of bicycle/pedestrian facilities in Miami-Dade County. Not all are county agencies. Other agencies involved in some way with bicycle/pedestrian facilities include the South Florida Water Management District, the Florida Department of Transportation, District 6, the Florida Turnpike and the Miami-Dade Expressway Authority. The section that follows describes the roles of county and non-county agencies with respect to bicycle/pedestrian facilities with additional information on interagency relations and maintenance funding.

MIAMI-DADE PUBLIC WORKS DEPARTMENT

Agency Responsibility

Miami-Dade Public Works principal maintenance responsibility is repairing, restoring and replacing the asphalt surface of non-motorized facilities, when needed. Public Work’s crews also perform tree-root pruning on paths that are outside of county parks. In addition to this, the department contracts with private companies to perform landscape maintenance along various stretches of roadway, which in some locations includes pathways. These contracts appear to be for grass mowing, trash pick-up, and the like; however, there is no specific reference to pathways themselves. Public Works does not have responsibility for sweeping non-motorized facilities, except for the Rickenbacker Causeway—an on-road pathway that is part of a toll facility. Dedicated revenue from the tolls allows the department to sweep this pathway weekly as part routine maintenance.

The Public Works Department is one of three other agencies in the county that has a designated Bicycle Coordinator. The Bicycle Coordinator serves as “the formal point of

contact within the department for all bicycle-related matters, including maintenance” (Public Works).

Interagency Coordination

As is the case with road maintenance, Public Works relies on customer complaints to alert them of areas that need attention. However, the county has no centralized mechanism for reporting problems related to bicycle/pedestrian facilities. It is assumed that the MPO’s Bicycle/Pedestrian Coordinator, Team Metro or some other source will get calls from the general public and forward these complaints to Public Works. Being an informal process, this sometimes means lack of follow-up with Team Metro or the MPO to determine if problems were rectified. Public Works does keep a log of all complaints. The next step, tracking complaints, is a function of additional workload, funding and perhaps new staff.

Maintenance Funding

The Public Works Department gets some funding every year from Local Option Gas Tax for local street and pedestrian maintenance; however, there is no specific line item set aside for pathways. Capital budget funding is set aside for sidewalk and pathway restoration, but most of these funds are targeted for sidewalks (Miami-Dade County, 1997). Based on its performance with Rickenbacher Causeway, this department is perfectly capable of maintaining pathways given funding necessary for staff and equipment. With numerous competing demands for its limited maintenance budget, not all needed work can be done the way the department and more than likely the public would like it to be.

MIAMI-DADE PARK AND RECREATION

Agency Responsibility

Park and Recreation staff maintain pathways within or adjacent to county parks as a part of regular operations. Typically, this maintenance includes trimming, sweeping, weeding, blowing, pruning of roots and tree limbs, debris removal and repairing pathway surfaces. In some cases, personnel will do maintenance on pathways leading into parks, but not repairs.

In addition to maintaining bicycle/pedestrian facilities within county parks, Park and Recreation is responsible for four pathways outside of park jurisdiction: Snake Creek Canal; Old Cutler; Snapper Creek, and M-Path. Matheson Hammock staff is responsible for sweeping the pathway running along Old Cutler Road, from Cartagena Circle to SW 216th Street. The staff sweeps this 10-mile pathway, which is one of the most popular bike paths in the county, weekly or bi-weekly, depending on a supervisor drive-by inspection. The Matheson Hammock staff sweeps the path with a 7-foot sweeper mounted on a Ford tractor. The sweeping takes a full day, at an estimated cost of \$200 per day (including fringe benefits). According to staff, the sweeper is somewhat "delicate," requiring a fair amount of maintenance itself.

The Department of Park and Recreation is also responsible for maintaining landscaping at Metrorail and Metromover stations, along with the M-Path facility. The M-Path facility runs approximately 8.25 miles underneath the Metrorail elevated track from the Vizcaya Station to the Dadeland South Station. This is actually a dual-purpose pathway, serving primarily as an

access path for MDTA personnel. The department performs landscape maintenance only and does not have responsibility for the facility per se. Park and Recreation took over this responsibility from MDTA.

In addition to Old Cutler and the M-Path, staff from Black Point Park also perform routine maintenance on approximately four miles of a canal levee-top bikeway outside of the park proper, but only with weed eaters and blowers. No separate costs are available for this work.

Interagency Coordination

Administrative staff would welcome funding that would allow them to provide a higher level of maintenance service with respect to the trails. However, staff and budget cuts over the years have reduced the amount of service that can be provided. Landscaping around pathways further restricts their capability and increases the cost of maintenance. Other county departments often make landscaping decisions without considering the maintenance capacity of staff or the additional costs associated with upkeep.

Maintenance Funding

Park and Recreation has no budget line item relating to pathway maintenance, making it difficult to ascertain how much the department spends on such activities per year. The only budgetary reference to bicycle/pedestrian facilities was \$235,000 for landscape maintenance of the M-Path. This covers nine part-time staff for landscape maintenance around Metrorail and Metromover stations and only incidentally along the M-Path (because of its location). There was no separate line item or separate cost accounting for maintenance or repair activities around the M-Path (Park and Recreation Staff Interview, 1998). Because of the lack of such information, it was not possible to determine countywide pathway maintenance costs for the Park and Recreation Department.

MIAMI-DADE TRANSIT AGENCY (MDTA)

Agency Responsibility

The Miami-Dade Transit Agency (MDTA) has responsibility for only one bicycle/pedestrian facility, the South Dade Trail. This facility, which runs along the US-1 Busway, is a separate paved path and is approximately eight miles in length. It also is part of the South Dade Greenway Network. The Florida Department of Transportation constructed the South Dade Busway with federal funds, and entered a formal agreement with MDTA to maintain it (Department of Transportation Maintenance Exclusive Busway Corridor & Bicycle Path Maintenance Agreement with Metropolitan Dade County, 1997). Currently, MDTA is responsible for the maintenance of the greenway landscaping.

MDTA contracts out all the maintenance work associated with the South Dade Busway to a private landscape contractor. The current contractor performs mowing and litter pick-up on alternate weeks, with litter pick-up preceding mowing. It takes three consecutive days to mow the 8.2 miles of the Busway and costs \$2,340 per cycle. Litter pick-up costs \$360 per cycle. The contractor also performs additional services, such as tree trimming or edging, as needed. MDTA pays for such services on an hourly basis. The landscape contract specifies that the pathway must be encroachment free. In addition, the MDTA's janitorial contract

pertaining to the Busway stations also specifies that staff clean-sweep the pathway surfaces adjacent to the bus stations and not interfere with pathway traffic.

Interagency Coordination

It is not clear which agency is responsible for the routine surface repairs of the South Dade Busway bicycle path. Although MDTA is responsible for the overall maintenance of the bicycle path on the South Dade Busway, it only performs landscaping and not surface repairs on the path. The problem is that there is no agreement with any agency to perform such repairs on this facility. Consequently, there is confusion between agencies regarding who will undertake this task.

Neither FDOT nor Public Works claims responsibility for the South Dade Busway bicycle path. While FDOT is responsible for the roadway maintenance of the Busway, it is not responsible for the bike path. Although they have performed some repairs on the path, this work was part of the agreement to turn over the facility to the county and should not be interpreted as a continued commitment to provide such service. Public Works also claims that they do not have formal responsibility for maintaining this facility. However, should the need arise to repair the path, it is likely that Public Works will be responsible for this task since it is a county facility. For now, however, the study team was unable to find an agency that would claim formal responsibility for the South Dade Busway bicycle path.

Another area that needs to be addressed concerns bicycle racks and lockers. There are currently 14 Metro stations with bike lockers and all have bicycle racks. The MPO Bicycle/Pedestrian Program has taken over the job of maintaining these facilities. However, the MPO believes that MDTA should assume this responsibility.

Maintenance Funding

As indicated elsewhere in this report, the Busway project clearly shows the financial constraints the County is facing. The County agreed to maintain the green areas and the pathway associated with the project "at its own expense," but it has been forced to resort to tighter cost-control measures just to maintain landscaping at an acceptable level (Department of Transportation Maintenance Exclusive Busway Corridor & Bicycle Path Maintenance Agreement with Metropolitan Dade County, 1997).

MIAMI-DADE COUNTY METROPOLITAN PLANNING OFFICE (MPO)

The MPO is charged with planning and coordinating transportation projects within Miami-Dade County. This includes plans to develop an integrated multi-modal system. The MPO has a full time Bicycle/Pedestrian Coordinator and a full time assistant overseeing projects related to non-motorized facilities. They developed the Bicycle Facilities Master Plan and the North Dade Greenway Network Master Plan.

The Bicycle/Pedestrian Coordinator and his assistant are also responsible for pedestrian and bicycle safety and education programs. Furthermore, they serve as staff liaison to the county's Bicycle/ Pedestrian Advisory Committee (BPAC). BPAC is comprised of private

citizens appointed by the County Commission to serve in an advisory capacity on bicycle/pedestrian issues.

Although the MPO is not responsible for constructing or maintaining transportation facilities, the Bicycle/Pedestrian Coordinator does operate the bicycle locker program and its maintenance. The MPO also produce printed material, such as safety brochures, bicycle route maps and bicycle/transit integration program information.

While there is no formal procedure for reporting bicycle/pedestrian complaints within Miami-Dade County, this office is usually the first point of contact for anyone in the general public who has complaints about bicycle facilities. These complaints are forwarded to appropriate staff at MDTA, Public Works or Park and Recreation. Miami-Dade Public Works logs these complaints as they come in. However, as mentioned, there is no inter-departmental follow-up system to assure that these problems have been addressed.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMD)

Agency Responsibility

The South Florida Water Management District owns and maintains 900 miles of canal rights-of-ways (ROWs) within Miami-Dade County. Currently, there are 34.1 miles of off-road type trails on District rights-of-way that are permitted to the Miami-Dade Public Works Department, including the Southern Glades and Everglades Trails. These trails are made of unimproved crushed limestone and serve primarily as “mountain” biking and horse trails. In addition to the unpaved trails, SFWMD also has a bicycle path that extends approximately 10 miles on District ROWs. This path, know as the Black Creek Trail, is permitted to Miami-Dade Park and Recreation. The permit stipulates that the county should provide all maintenance on the rights-of-way that occupy the bicycle path (SFWMD, Scott Thorp, 1998).

SFWMD is responsible for maintaining the ROWs for operational uses associated with its water management activities. However, the degree of maintenance required for District operations is significantly less than what is needed for a greenways trail. For example, mowing ROWs for district use requires six cycles per year. Mowing for a greenway trail can require eight to ten cycles per year, depending on weather and type of trail.

The SFWMD is responsible for ROW berm gates, weedeating around District berm gates and activities such as trash removal, to the extent that it impacts its operations (i.e., construction debris, piles of tires). The District does not perform trash removal associated with greenway use (SFWMD, Scott Thorp, 1998).

According to the SFWMD permit manual, the agency requires that any organization that wants to build trails on District ROWs must provide a maintenance/operations plan covering activities that are beyond what the District is currently providing for its own use (SFWMD, Scott Thorp, 1998). This is important since approximately 50 percent of the adopted South Dade Greenway Network will be built on SFWMD canal rights-of-way.

Interagency Coordination

The District has encountered some problems with Miami-Dade County regarding joint ventures on trails. For example, the County Park and Recreation Department received a permit to build the Black Creek Trail on the C-1 canal leading to Black Point Marina. The Department built canoe launches on the trail but located them upstream of a water control structure that opened automatically without warning. (SFWMD, Scott Thorp, 1998). Better coordination would likely have led to a different location for the canoe launching.

Maintenance Funding

SFWMD contracts out for weeding, mowing and major trash removal. The current contractor charges the District approximately \$10.49 per acre for the 34.1 miles of the Southern Glades and Everglades Trails. SFWMD spends a total of \$16,465 for six cycles of mowing service throughout the year for a total of 1,501 acres (SFWMD, Scott Thorp, 1998).

In the past, the District has agreed to provide some in-kind services to facilitate the development of particular greenway trails. The in-kind services included signage, brochures, mailboxes for brochures and gate modifications. These were considered “one-time” activities (SFWMD, Scott Thorp, 1998). At this time, the District is not funding any increase for maintenance of greenway trails (SFWMD, Scott Thorp, 1998).

FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT)

Agency Responsibility

FDOT has eight districts throughout Florida. Miami-Dade is part of District 6. Each district is required to comply with FDOT’s maintenance program, which includes implementing the Maintenance Rating Program established by the Central Office. The rating program establishes criteria for meeting maintenance standards. The goal is to attain a rating of “80” for acceptable levels of maintenance. The rating manual establishes procedures for emergency, routine and special maintenance operations along FDOT’s rights-of-way (Florida Department of Transportation [FDOT], 1982). Routine maintenance for these facilities includes the following:

- Debris removal from pavement, shoulders and clear zones
- Mowing of vegetation
- Cleaning of gutters and ditches
- Structural inspection
- Replacement of lighting fixtures
- Replacement of traffic control devices
- Inspection of energy absorbing devices
- Inspection of emergency communication systems
- Inspection and maintenance of pavement and shoulders, with particular emphasis on maintaining shoulders flush with the pavement
- Inspection of highway components and safety features

Routine maintenance functions that pertain to non-motorized facilities include treatment of pavement and shoulders, mowing, signage and striping. Additionally, the rating manual

contains standards for sidewalks and shoulders adjacent to roadways, but does not include any provision for off-road facilities. The distinction is that off-road facilities are made out of asphalt and sidewalks are made out of concrete.

Currently, FDOT does not maintain any non-motorized paths in Miami-Dade County, except for bike shoulders that adjoin their road facilities. District 6 sweeps the expressway systems weekly. Primary and secondary routes are swept less frequently and minor roads only as-needed. If bike lanes adjoin an FDOT roadway (excluding expressways), then FDOT will sweep the facility. Mowing and litter pick up is done monthly, signage is done as needed, and striping is periodic. They will also take care of the asphalt pavement and pavement markings where bicycle facilities adjoin the roadways.

FDOT officials explained their plans for the maintenance of future pathways in Miami-Dade County includes responsibility for the bicycle paths it constructed but would seek agreements from the county for maintenance. FDOT generally takes the lead for project programming from the MPO and asks counties to maintain facilities that it cannot service. Currently, FDOT is planning to build a portion of the South Dade Greenway, called the Tallahassee Connector. Upon completion, this facility will revert to the county. FDOT is also planning to build three other trails of the South Dade Greenway Network as part of larger roadway projects: Phase II of the US-1 Busway South Dade Trail; US-1 component of the Keys Trail; and the Krome Trail on Krome Avenue.

Interagency Coordination

FDOT has built three non-motorized facilities in Miami-Dade County: the US-1 Busway path, a path in Miami Springs, and the Aventura pathway. These facilities have all been turned over to local government agencies with formal agreements from the agencies/municipalities to maintain and operate them. However, FDOT has no mechanism in place to ensure that the agencies are complying with the maintenance agreements. Additionally, once FDOT has built a facility and turned it over to another agency, it has very little leverage with that agency, other than taking back the facility.

Maintenance Funding

As discussed above, FDOT District 6 has an informal policy to build bicycle facilities and turn over the responsibility of maintenance to other entities. It prefers to limit its role to funding construction or actually building non-motorized facilities. However, the formal policy of the Florida Department of Transportation stipulates that the Department is responsible for maintaining paths and bicycle lanes as part of their overall maintenance program.

MIAMI-DADE COUNTY EXPRESSWAY AUTHORITY (MDX)

Currently, the Miami-Dade County Expressway Authority has no non-motorized facilities under its jurisdiction. On July 1998, however, the Board of the Authority passed an Enhancement Policy that calls for all major projects undertaken by the Authority to investigate the feasibility of including amenities, which include greenways and bicycle/pedestrian facilities. If the Authority does undertake to build such non-motorized facilities as components of major MDX projects, they will be responsible for maintaining them.

FLORIDA TURNPIKE

The Florida Turnpike does not have any non-motorized facilities under its jurisdiction in Miami-Dade County. They do have a Bicycle Coordinator on staff, however. The Florida Turnpike is in the process of developing a twenty-year master plan and is considering several bicycle projects that have been presented by the Bicycle/ Pedestrian Advisory Committee (BPAC). If the Turnpike builds these facilities as part of a major non-motorized facility project, it would most likely look to others to maintain them.

FINDINGS

As is apparent from the interviews with the above departments, there are multiple players in the greenway business in this county. Coordination appears difficult, but the difficulty is likely the result of funding constraints and not capability or desire to do a good job. There are sufficient examples of good maintenance to conclude that even with overlapping responsibilities, good management and maintenance of greenways are possible in the county. However, with only 100 miles in service right now and 500 more miles planned for the future, it seems evident that better coordination as well as sufficient funding (and staffing) will be necessary to ensure an efficient and effective 600-mile greenways network in Miami-Dade County.

It may be easy to underestimate the scope of work, daily activities and other management and maintenance issues related to an expanded greenway system. With multiple agency involvement now, there is no clear overall picture of the level of activity, maintenance spending and administrative costs, including interagency coordination, associated with the existing system. This report addresses this overall cost issue in Chapter 6. While lack of funding has been a constant refrain for less than desirable maintenance and operational performance, the amount of funding needed is relatively small in light of the county's overall budget. A greenways program may only need a few hundred thousand dollars for the early years and a couple of million dollars in the later years as the system nears the 600-mile plan—all of this out of a \$2 plus billion dollar budget. Any new funding requests, however, face a number of difficult challenges, as competition is fierce for the allocation of existing dollars much less new funds and the demand to keep taxes low is a constant refrain.

By way of summary, Table 6 identifies agency responsibilities for greenways in Miami-Dade County.

TABLE 6 AGENCY RESPONSIBILITIES REGARDING BICYCLE/PEDESTRIAN FACILITIES

Agency	Responsibility Regarding Bicycle/Pedestrian Facilities
Miami-Dade Park and Recreation	<ul style="list-style-type: none"> • Maintains facilities that are within county parks. • Maintains the M-Path, the Snake Creek Canal, the Snapper Creek Trail and a portion of the Old Cutler Trail.
Miami-Dade Public Works	<ul style="list-style-type: none"> • Repairs and rebuilds pathway surfaces throughout the county on an as needed basis (Except for M-path, paths within parks and paths maintained by municipalities). • Contracts out landscape services for various roadways and pathways (However, the contracts do not reference the pathways specifically).
Miami-Dade Transit Agency	<ul style="list-style-type: none"> • Maintains the landscaped /green areas associated with the South Dade Busway but does not provide surface repair maintenance.
Miami-Dade Planning Office (MPO)	<ul style="list-style-type: none"> • Plans and coordinates the location and design of non-motorized facilities. • Coordinates the bicycle/pedestrian education and safety programs • Oversees the activities of the Bicycle/Pedestrian Advisory Committee (BPAC) • Operates and maintains the bicycle locker program.
South Florida Water Management District	<ul style="list-style-type: none"> • Allows people to use their right of ways for greenways. • Requires a maintenance plan before issuing a permit their rights-of-way. • Will not maintain greenways, except for those maintenance functions directly related to its facilities.
Florida Department of Transportation (FDOT), District 6	<ul style="list-style-type: none"> • Constructs bicycle/pedestrian facilities but generally turns over the maintenance of these facilities to cities and counties, under formal agreements.
Florida Turnpike	<ul style="list-style-type: none"> • Plans to study the feasibility of including bicycle/pedestrian facilities on its rights or way but will turn over maintenance responsibilities to another entity.
Miami-Dade County Expressway Authority	<ul style="list-style-type: none"> • Plans to study the feasibility of including and maintaining bicycle/pedestrian facilities on its rights of way.

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CHAPTER 5: BEST PRACTICE CASE STUDIES

A number of metropolitan areas around the country have been recognized for their excellent bicycle and greenway programs. These areas can be considered examples of “best practice” for their management and maintenance of non-motorized facilities—trails, greenways and pathways. These bicycle/pedestrian friendly communities have most of the characteristics listed below that help make them “best practice” operations:

- Interagency coordination in the planning, construction, maintenance, and management of trails, greenways and pathways
- Dedicated funding for maintenance and management
- Regularly scheduled maintenance
- Privatized maintenance
- Strong advocacy groups
- 100 miles or more of greenways/trails/pathways

Through several sources, including a meeting of State Bicycle and Pedestrian Coordinators at the 1998 “Rails-to-Trails” Conference, the National Parks Service and other federal agencies, a number of communities were identified as the “best practice” greenway/trail/pathway systems. The following areas were selected as case studies for the report.

TABLE 7 BEST PRACTICE CASE STUDIES AND REASONS FOR SELECTING THEM

Best Practice Areas	System for Interagency Coordination	Dedicated Funding	Scheduled Maintenance	Privatized Maintenance	Advocacy Groups	100 Miles of Greenways/ Trails/Pathways
Indianapolis IN	X	X	X		X	
Phoenix, AZ	X		X*		X	X
Pinellas Trail, FL			X	X	X	
Portland, OR			X		X	X
Seattle, WA			X		X	X

* Because of the desert terrain, maintenance is scheduled as needed for unpaved trails. However, there is a regular schedule for paved trails.

Using a management and maintenance survey, we created a profile of each “best practice” case study (See Appendix 4 for the Management and Maintenance Survey). The following is a description of each non-motorized system and a discussion of their management and maintenance practices, funding sources and mechanisms for user advocacy.

BEST PRACTICE CASE STUDIES

Indianapolis Greenways

Although the Indianapolis system is still in the planning stages, the Indy Greenways project is a good model for interagency coordination, dedicated funding, citizen participation and volunteer support.

System. Indianapolis has five greenway corridors that extend a total of 50 miles--44 miles are paved and 6 miles are unpaved. The overall plan of the Indy Greenways is to build a

comprehensive fitness and conservation trail system for Marion County, consisting of 14 corridors and 175 miles of greenways. Of these, 150 miles would be paved.

Management and Maintenance. The Department of Parks and Recreation is in charge of managing the greenways in Marion County. The department has two staff formally assigned to manage the Indy Greenways project. They are responsible for overseeing planning, construction and maintenance of the system, since these functions take place in different departments.

Although maintenance was previously scattered among different departments, in 1998 Marion County consolidated all greenway maintenance functions within the Public Works Department through an interdepartmental agreement between the Department of Parks and Recreation, Public Works, and the Water Company. Under this agreement Public Works performs regularly scheduled maintenance and is responsible for mowing, sweeping, trash pick-up, surface cleaning and signage of all greenways. A crew of 11 workers performs these functions; however, they are also responsible for carrying out other maintenance functions not related to greenways. For example, they maintain some of the gardens in the downtown area.

In terms of maintenance, the Indianapolis project has been successful in using volunteers to help build and maintain its greenways. They have four volunteer workdays per year. In the past, they have removed approximately 2,000 tons of garbage from the waterways and greenways. In addition to volunteers, the county has also recruited the assistance of Construction Battalions from the Navy to build bridges.

Funding. The Indianapolis Greenways project has a dedicated source of funding for development and operations. The project receives an annual budget of \$220,000 for administration and maintenance. In addition, they received \$800,000 in 1998 for capital projects; however, this may vary from year to year. The county earmarks Cumulative Building Funds from property taxes to fund these endeavors. Furthermore, the project received \$3.1 million in external funds from ISTEAs and the Lilly Endowment.

Advocacy / Volunteers. The Indy Greenways Committee serves as the main mechanism for community involvement in the planning, building, management and maintenance of the greenway system. The committee reviews all policies and plans before they go before the Marion County Council. It also tries to resolve disputes among competing groups in the community. The committee has 15 members and is part of the Board for the Parks and Recreation Department. The mayor appoints five positions, the Council five, and the Park Board five.

In addition to the committee, Indy Greenways recently formed a non-profit organization known as the Friends of Indy Greenways (FIG). As a 501c3 organization, FIG can collect tax deductible contributions. FIG will serve as a formal mechanism for fundraising and will help to mobilize community support for activities related to greenways.

Phoenix

Phoenix has several hundred miles of trails and bikeways. It has established strong interagency agreements and regularly scheduled maintenance programs for its extensive network of non-motorized facilities. Phoenix also has a strong advocacy component.

System. Phoenix has over 100 miles of unpaved multiple use trails that are in natural preserves, 150 miles of unpaved paths along canals, and 20 miles of paved areas. In addition to the multi-use trails, Phoenix has a bikeway system of 423 miles—190 miles are lanes and the rest consist of bike-friendly streets.

Management and Maintenance. The Parks and Recreation Department and the Traffic Department planned and developed the linear park system in Phoenix and are now responsible for administering it. The Traffic Department takes care of areas of right-of-way (i.e., streets), and the Parks Department is responsible for everything else. Each department maintains, operates and polices their respective facilities. A memorandum of understanding outlines their specific areas and duties. The Traffic Department has a staff of two devoted to the bicycle system, and the Parks Department has ten staff members assigned to the planning and capital improvement of recreational facilities, including trails.

Because of the desert terrain, the Parks Department does not have a regularly scheduled maintenance program for unpaved trails. They schedule maintenance on an “as needed basis” for unpaved trails and sweep paved trails weekly. The Traffic Department’s schedule for maintenance of the bicycle system is part of a regular schedule for road maintenance. They perform routine maintenance every 21 days and address problem areas as they arise.

Funding. The Parks Department receives \$2.5 million for the operation of open spaces, including trails. In addition, the Department received \$200,000 for trail development and \$500,000 for trailhead development. The Traffic Department had a total budget of \$1 million for the bicycle system. The City provided \$300,000 for capital projects from gas tax, and the remainder consisted of federal grants. They use city funds for low cost projects and federal funds for large projects, such as bridges and tunnels.

Although the two departments had funding for capital improvements and administration, they did not have a dedicated source of funding or budgets for the maintenance of the trails and bikeways. Maintenance of the bicycle system, for example, is part of general road maintenance. It is not budgeted specifically.

Advocacy / Volunteers. Phoenix has two advocacy groups that are concerned with trails and bicycle facilities, the Phoenix Sonoran Preserve Committee and the Phoenix Bicycle Task Force. The Phoenix Sonoran Preserve Committee provides a forum for citizen participation in the planning process of the multi-use trails. The committee is a volunteer body appointed by the Parks and Recreation Board. It holds workshops, reviews plans, and provides recommendations to the Board. The committee consists of nine members. The Parks and Recreation Board appoints three members for three years, three for two years and the other three for one year.

The Phoenix Bicycle Task Force, in existence since 1987, consists of city staff members from various departments and volunteers, primarily from bicycle clubs. The Task Force is based on voluntary participation and is active in developing plans and policies for the bicycle system. In fact, the Task Force helped to develop the original plan to build 200 miles of on-street lanes and bicycle-friendly streets.

Pinellas County Trail, Florida

Although the Pinellas County Trail is small in comparison to the other case studies in this report, it serves as a “best practice” model for privatized maintenance. It also has a regularly scheduled maintenance program and a strong volunteer component.

System. The Pinellas County Trail started out with 34 miles. Recently, two spurs of 4.5 miles and 1.5 miles, have been added and an additional 3.5 miles are planned, for a total of 40 miles. Pinellas County constructed this trail on FDOT right-of-way acquired for a future light rail corridor. The Pinellas Trail is a county facility that passes through seven municipalities.

Management and Maintenance. The Parks Department manages the Pinellas Trail. There are eight staff dedicated to the trail: six park rangers, one trail manager, one chief park ranger and one secretary. Although a trail manager administers the trail, there is also a Trail Interagency Task Force, which focuses primarily on interagency coordination and security issues.

Pinellas County contracts out the maintenance of the trail. This year, the winning contract was \$149,000 for the 40 miles. This is a two-year contract with a two-year renewable clause. The maintenance provider services the entire trail five days a week and is responsible for cleaning asphalt, litter removal, trimming, installing signs, minor repairs and trash removal once a week. They do flat mowing 35 times a year, and slope mowing 5 times a year. In addition to general maintenance, this past year the Parks Department went out to bid for major repairs such as erosion and root damage, for a cost of \$270,000.

Funding. The trail is budgeted out of the general revenue fund of Pinellas County. The 1996-97 budget for staff was \$237,690. Including capital expenditures, the budget totaled \$530,000. Last spring, the voters of Pinellas County passed a one cent optional sales tax for capital improvements, with \$7 million being allocated to the Pinellas Trail.

Advocacy / Volunteers. Pinellas County has in place the Auxiliary Trail Ranger Program consisting of 50 volunteers. The volunteers are trained and given uniforms and cellular telephones. Their focus is to assist with minor maintenance functions (such as litter removal), public information and security. This has been an effective way to get volunteers involved in the management and care of the trail.

Portland

Portland is recognized as one of the most bicycle-friendly communities in the U.S. Portland has over 100 miles of non-motorized facilities, a dedicated source of funding for management and operations, a regularly scheduled maintenance program and strong advocacy groups.

System. The Portland bicycle system has a total of 181 miles. It consists of 46 miles of paths, 123 miles of lanes, and 12 miles of boulevards and signed connections. The bicycle system is part of an effort by the City of Portland to decrease per capita auto use and increase alternative means of transportation. Approximately 3 percent of all trips in inner Portland are on bicycle. (Metro Regional Services, 1997)

Management and Maintenance. Two agencies are in charge of Portland's bicycle system: The Parks Department and the Transportation Department. The Transportation Department is in charge of utility lanes, paths and other aspects of the bicycle street system. The Parks Department takes care of the greenways and recreational areas. However, coordination of the management and maintenance of the bicycle system between these agencies is informal.

The Transportation Department is responsible for the planning and construction of the bicycle system. It has five staff people assigned to this task: one manager and four project directors. Project directors oversee the planning, construction and management of new projects. They work with the different departments involved in the projects and with the public.

Maintenance is the responsibility of the Transportation Department and the Parks Department. The Bureau of Maintenance within the Transportation Department takes care of on-road facilities and some off-road facilities. They sweep, asphalt, and repaint the pathways. The Parks Department takes care of most off-road facilities, including mowing and landscaping.

Funding. Portland has a capital budget ranging from \$500,000 to \$1 million per year for the continued implementation of the bicycle system, and approximately \$150,000 for management and operations. State law requires that 1 percent of general transportation revenue (GTR) go to bicycle transportation. In addition to GTR, state and federal grants provide additional funding. Though total budget fluctuates from year to year, depending on the level of grant funding obtained and city support, it is never less than 1 percent of GTR.

Advocacy / Volunteers. The Bicycle Advisory Committee and the Bicycle Transportation Alliance are the principal advocacy groups in Portland. The Bicycle Advisory Committee is an active body appointed by the City Council. The committee gives advice on projects and policies and carries some influence with the City Council. The Bicycle Transportation Alliance is a private-nonprofit organization made up of bicycle users throughout Portland. They are actively involved in projects and policy issues related to bicycle facilities.

Seattle

Seattle's bicycle system is regarded as one of the best in the U.S. Part of its success is due to a good working alliance between the various agencies responsible for the network and strong volunteer support. According to Peter Lagerwey, Seattle's Bicycle and Pedestrian Coordinator, advocacy and involvement are crucial elements in making the program work. These factors along with a scheduled maintenance program make Seattle an excellent case study.

System. The City of Seattle has a 133 mile bicycle network consisting of 28 miles of trails, 15 miles of bike lanes, and 90 miles of signed bicycle areas—all of which are paved.

Management and Maintenance. The Department of Transportation is the main agency in charge of the bicycle system. It builds and owns the trails, and oversees planning, construction, and management of all bicycle facilities. However, two departments are responsible for maintenance: the Department of Parks and Recreation and the Department of Transportation. A formal memorandum of understanding clearly outlines each department's responsibilities. To avoid misunderstandings, they use a map to depict this information. The departments amend the memorandum and the map periodically—using special guidelines. Specifically, the Department of Parks and Recreation is responsible for all off-street areas. It provides mowing and tree trimming services. The Department of Transportation is responsible for on-street lanes and capital projects. It sweeps the lanes and is responsible for repairs and signage. In general, there is cooperation between the two departments. Day-to-day coordination takes place at an informal level.

According to Seattle officials, the key to maintenance is in the planning and construction. Good drainage and landscaping are crucial. They use native material and set plants and trees at least six feet back from the pavement. Furthermore, Seattle builds its trails wide enough (13 feet) to fit and withstand motorized vehicles. This makes it easier to maintain pathways, since special equipment is required. It also eliminates the need for future widening of trails.

Funding. There is no dedicated funding for management or maintenance. The departments of Transportation and Parks and Recreation are responsible for funding their share of maintenance costs from their respective budgets. There is no specific line item for the maintenance of the bike system.

Although there is no dedicated funding for general management and maintenance, \$100,000 is budgeted for the city's Spot Check program. The Spot Check program gives the public the ability to report problems along the bike system. It also provides funds to address these problems. Except for this particular program and any other federal, state or local grant that the city may receive, all other funding comes from general revenues. Currently, the Transportation Department spends \$5 million per year on bike facilities, including capital projects. They estimate that they spend \$6,000 per mile on maintenance.

Advocacy / Volunteers. The Seattle Advisory Board is the main mechanism for advocacy and coordination. The mayor appoints Board members. The Seattle Advisory Board is made up of representatives from the Department of Transportation, the Park Department and volunteer groups, such as the Bike Club and the Northwest Bicycle Federation. They meet once a month and are responsible for overseeing all plans and policies affecting bicycle use. Public involvement is an essential element in the success of Seattle's program.

SUMMARY OF FINDINGS

The survey of the "best practice" case studies revealed the following with respect to the management and maintenance of non-motorized systems:

Maintenance and Management

- In all case studies, park and recreation and transportation departments, which typically includes street and road functions of public works, are responsible for managing and maintaining trails/greenways/pathways. Park departments are typically in charge of mowing and landscaping green areas, and transportation departments are responsible for planning, construction, sweeping and repairs of pathways.
- The Indianapolis Greenways is the only non-motorized system in the study that consolidated all of the maintenance functions under one department. In this case, its Public Works Department takes care of all the landscaping and pathway maintenance.
- Regularly scheduled maintenance and inspections were common practice in the systems.

Interagency Coordination

- The case studies revealed that “best practice” areas generally use multiple departments for planning, construction, management and maintenance of trails, greenways and pathways. Their activities are coordinated through memorandums of understanding that outline each department’s responsibilities in terms of geographic areas and tasks.
- Some areas have advisory committees to provide oversight and ensure interagency cooperation. These committees consist of representatives from various agencies involved in the planning, construction, maintenance and management of greenways, trails and bicycle pathways. Public organizations, such as bicycle clubs, are also involved. The purpose of these committees is to ensure that all the responsible agencies are cooperating with each other and carrying out their tasks.
- In several cases, one department served as the central coordinating entity responsible for overseeing all of the planning, management and maintenance functions related to the trails, greenways and pathways. The Indy Greenways is a good example.
- Systems with effective interagency coordination had designated staff for management and maintenance. Some areas had a trail manager or project manager assigned to oversee interagency coordination.
- Interagency coordination in the planning, construction and maintenance of trails/greenways/pathways has helped to minimize maintenance costs in Indianapolis and in Seattle.

Maintenance Funding

- Most areas use general funds budgeted for road and sidewalk maintenance or park and recreation activities to carry out trail/greenway/pathway functions. Except for Indianapolis and Portland, the metropolitan areas examined here do not have a budget line item or a designated funding source for the maintenance and management of trails, greenways and pathways. They often use a gas tax as a revenue source.

- It is possible to create a non-profit agency to conduct fundraising activities as a means of generating additional revenue for the trail/greenway/pathway system. Indianapolis serves as an example.
- Privatization may provide a cost-effective method of providing maintenance functions, and, in some cases, privatization may reduce maintenance costs. Pinellas is an example.

Advocacy / Volunteers

- Advocacy groups, consisting of volunteers and staff, appeared to function well in providing oversight. These groups, when given the proper structure, work to ensure that greenways are constructed and maintained properly.
- Advocacy/volunteer groups also helped with fundraising and served as a means of getting political support for greenway facilities. In some cases, these groups also helped by volunteering to perform minor maintenance functions, such as litter removal.

Thus, county decision-makers must keep in mind the following key points as they build a 600-mile network of non-motorized facilities. First, even though separate dedicated funding for greenways was not common among these jurisdictions, in each one funding was available for managing and maintaining these systems. More often than not, these dollars were part of the general fund budgets of the participating departments. As was mentioned previously, this suggests that greenway advocates must successfully compete for existing general fund dollars for greenways programs whether or not the multi-agency system stays in place or a separate entity is created for managing greenways.

Second, interagency coordination is critical, particularly when a system exceeds 100 miles. Many county agencies suggested that as their systems grew, they had to develop better mechanisms for coordinating planning, constructing, managing and maintaining trails, greenways and pathways. Without such coordination, continuity and oversight of activities would likely be missing. Third, to become a bicycle/pedestrian-friendly community, it is important to have a formal maintenance and management program that includes regularly scheduled maintenance and inspections. All of the “best practice” communities are known for the excellent condition of their trails/greenways/pathways. They achieve this by making sure they maintain their facilities properly. Finally, the study revealed that user advocacy is important in terms of generating support and in providing management and maintenance oversight.

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CHAPTER 6: OPERATIONS, MAINTENANCE, COST, FUNDING AND ORGANIZATIONAL ISSUES FOR GREENWAYS

A long-lasting, successful greenways program depends on quality construction, adequate maintenance and overall program management. A good operations plan will encourage usage while reducing safety and risk management problems. The key to developing a comprehensive management program is determining how “the land, amenities, and facilities will be used, how they will age, and how they will be repaired or replaced in the future” (Schwartz et. al., 1993, p. 291). The following seven components are considered essential elements of a successful greenway management program:

- Finding money for maintenance
- Maintenance of the system
- User safety and risk management
- Patrol and emergency procedures
- Administration
- Programming and events
- Stewardship and enhancement (Schwartz, Flink and Searns, 1993, p. 291)

Proper maintenance of greenway facilities is one of the most important components of a successful greenway program, perhaps the most important. The success or failure of greenways often hinges on whether they are maintained or left to deteriorate. Not surprisingly, the current focus on planning and construction of greenways reflects the fact that several sources of funds are available for these two tasks. In the near future, however, as the system begins to be built out, the focus should shift from planning and construction to operations and maintenance. Issues of funding will also switch from federal and state sources to the local revenue base.

The funding issue appears to present a far greater challenge than operational and maintenance issues to local greenways advocates. There are a variety of organizational and operational alternatives available for greenway systems, a number mentioned in this report. Lack of funding, however, seems to be the core problem currently inhibiting more effective overall management of greenways and surely remains the primary barrier to meeting future needs of the expanded 600-mile system.

This chapter primarily addresses costs of operating and maintaining a greenway system in Miami-Dade County. It provides a discussion of factors affecting maintenance costs, highlights unit costs of existing greenways systems, provides examples of specific maintenance activities and their costs, and lays out a line-item budget for operating and maintaining the planned greenway network in the county. In this section the reader will see three sets of cost figures relative to the planned 600-mile greenway system in the county.

Each of these figures provides an observation on likely costs that might be incurred by the county in operating its system.

The first observation is based on extrapolations of per mile unit costs of best practice communities to the county. The second set of figures is based on maintenance activities and costs identified in an important guidebook on greenways management and translated on a trail by trail basis to the county. The third set of figures is based on a hypothetical operational plan for the 600-mile county system, assuming completing the additional 500 miles over a ten-year period. This resulted in a hypothetical staffing plan and line item budget.

The final sections of this chapter discuss funding sources and organizational issues. Maintenance is only one function that has to be funded and managed in a comprehensive greenway program; obviously organizational structure and budget issues will influence all activities associated with greenway management. The right organizational structure should lead to clearly defined roles, responsibilities and funding for greenway management.

FACTORS AFFECTING MAINTENANCE COSTS

Several physical, operational and managerial factors impact maintenance costs. The most important of these are discussed next. Table 8 below summarizes these factors. For each of the major categories in Table 8, the specific factors have varying degrees of influence over short- and long-term maintenance costs.

TABLE 8 FACTORS AFFECTING MAINTENANCE COSTS

Physical	Operational	Managerial
Number of Miles	Usage	Staffing
Design	Jurisdiction	Intergovernmental
Construction	Equipment	Privatization
Landscaping	Amenities	Funding

Physical

Mileage. The more miles you have in a greenway system, the more it will cost to maintain. Moreover, increasing size and location will add to the complexity of managing such a system. After a point, a small but growing system will reach a critical mass where current organizational arrangements and funding may not be sufficient to ensure a successful program. At this time, the responsible organization will have to address both organizational structure and funding in order for the greenway program to be responsive, efficient and accountable.

Design. From the physical perspective, one of the most crucial factors is design. Bad design will lead to higher maintenance costs; good design will allow for more cost-efficient maintenance. For example, the width of the path will determine what equipment can be used for sweeping the path, including the time required for complete clearing of the path. A very wide path may require multiple sweeps to clean the path. A narrow path may require only one pass with sweepers, but may be too narrow for effective use. Sweeping is one of the

critical regular maintenance activities for a successful greenways program, especially for bicycles and roller blades use.

Construction. The quality of construction will determine long-term maintenance costs. A well-constructed trail following good design will generally require less maintenance over time. A poorly constructed trail even with good design will generally require more maintenance over time. Mixed use is also a factor affecting maintenance costs. Bicycles, roller blades and runners can use paved paths without much damage occurring, but may require wider trails to accommodate multiple use. Wider trails may require higher levels of maintenance, since it is unlikely, for example, that one sweeping would not clear the trail of debris. Off-road bicycling and equestrian activities may prove to be very hard on non-paved trails, especially if used soon after rain. Construction materials need to be geared to the primary use of the trails.

Landscaping. Landscaping is generally done for aesthetic reasons. Depending on the kinds of plants and other vegetation used and their placement near pathways, maintenance costs will be affected. Some plants may require frequent trimming to keep them off pathways, including trees with low growing limbs. Others may affect the pathways directly, such as roots pushing into pavement, making the trails bumpy or creating cracks and pot holes, decreasing trail enjoyment and increasing liability issues. Drainage is both a function of design and landscaping. Good drainage is critical to ensuring paved and off-road paths do not suffer from water damage, thus increasing maintenance costs.

Operational

Usage. It is obvious that the more use a facility gets, the higher the maintenance costs will be. Even with proper design and construction of trails, maintenance will be a recurring expenditure. As trails gain in popularity through promotional programs, growth in bike, running and equestrian clubs, a growing physically active population and eco-tourism, maintenance costs will increase. This, however, should be welcomed because it would mean that greenway programs are successful, contributing more to the quality of life of residents and visitors. However, low usage will likely lead to lower maintenance costs.

Accessibility may affect usage. If trails are difficult to get to and there is little or no parking for those wanting to use trails, usage may be low and thus maintenance costs will be lower. If accessibility is good, usage is likely to be higher and thus maintenance costs would likely be higher as well. Usage is in part a reflection of trail location and programming. Active advertising of trails should increase usage. Little or no promotion will likely result in only the most active trail users seeking out trails away from population centers. It should be noted that some planned trails are located in remote areas, and by design are meant to be somewhat inaccessible in order to maintain their purpose as more “natural” trails. This is especially true for the trails in the rural areas of the county where amenities would intrude on the pastoral qualities of the trail experience.

Equipment. Proper equipment may reduce the cost of maintenance by being more efficient and effective in task performance. Obtaining equipment specifically designed for paved trail

sweeping and fringe mowing could increase the speed of these two maintenance activities, which would require fewer people to do the tasks. The same would hold true for unpaved trails and other trail related maintenance items.

Amenities. Amenities include such things as bathrooms, trashcans, convenient parking, refreshments and other such items. Amenities on or near trails will likely increase trail usage and, thus, will affect maintenance. In particular such amenities as bathrooms located on more remote trails and trashcans will require periodic inspection, cleaning and trash removal. Concessions are likely to lead to more littering on trails as well, increasing maintenance costs. On the other hand, concessions can be a source of revenue to help offset maintenance and other operating costs. As mentioned above, certain trails are intended to be more natural than others and thus would not have some of the amenities as trails in the more urban areas of the county.

Management

Staffing. The organization of trail management will also affect maintenance costs. Various factors play a role in determining the level of maintenance costs, some more directly than others. A large, active trail system will likely require full-time administrative and program staff to provide overall management direction, program planning and implementation, contract monitoring, and volunteer coordination. A less active trail system may not require the same level of staffing. Such a trail system may only have a few full-time staff supplemented by part-time employees and volunteers to operate and maintain the greenway system.

Intergovernmental Coordination. It is a forgone conclusion in Miami-Dade County that the trail system will require intergovernmental coordination. Such efforts require appropriate staffing to ensure continued and, perhaps, better relationships among all the entities involved with greenways. At least four county departments have some role in greenways, as do the state of Florida, the South Florida Water Management District and two transportation-related authorities. Furthermore, this report does not address existing or planned greenways in cities. If the south and north greenway networks are built out completely, overall coordination of trail management, including city systems (perhaps on a case by case basis), will be an issue that will ultimately affect the costs of operating and maintaining a countywide greenway system. This may help determine its ultimate value to residents and visitors alike.

Privatization. Contracting for maintenance may offer a way to reduce annual maintenance costs as well. Some trail systems contract with private vendors for sweeping, mowing, litter removal and similar activities at costs below what their own staff could provide. The contracting option should be explored seriously for the planned Miami-Dade greenway system.

Funding. Funding is also an issue that affects maintenance levels and therefore costs. Obviously a trail system with little or no funding will not be able to provide much maintenance, which would inevitably lead to less than desirable trails. A system with

sufficient, perhaps dedicated funding should be able to provide adequate funding for maintenance.

Summary

Thus, a number of factors will affect maintenance costs of greenway systems. Several of these come in the planning, design and construction phases for trails. These phases offer the best opportunity to address long-term maintenance issues to help ensure that trails, once built, will be as cost-efficient to maintain as possible. Other factors that influence costs are dependent on usage, weather, and in some cases management decisions. In summary, the main points regarding maintenance costs are:

- Increasing the size of a greenway system will add to operational and maintenance costs and management challenges.
- Design of new pathways must be done incorporating future maintenance needs if long-term maintenance costs are to be kept low.
- Strong oversight of design, planning and construction contracts are essential to ensuring both good design and quality construction, no matter what use a trail is put to.
- Landscape design should be planned in conjunction with pathway managers and implemented with maintenance as well as aesthetic considerations in mind.
- If Miami-Dade County is committed to providing 600 miles of greenway trails, it should be prepared to provide a reasonable level of maintenance to ensure safe and attractive trails for program participants.
- To properly maintain trails, ensure that the right equipment is purchased, including a life cycle cost analysis.
- Amenities will add to the attractiveness of trails, which should lead to more usage and higher maintenance costs, some of which may be offset by concession revenues.
- Full-time in-house staff for operations and maintenance for an active trail system likely will be more expensive than a part-time staff with a relatively inactive trail system, or a system dependent on volunteers.
- Effective intergovernmental coordination may serve to spread the costs of operating and maintaining a trail network across governments, so the burden does not fall totally on one government. That is other governments may provide funding for or directly supply maintenance of greenways on their property or within their cities.
- Contracting for certain trail-related services may offer opportunities for cost-savings in the maintenance functions of trails.
- A clearly identified source of funding for trail maintenance, along with similarly identified roles and responsibilities may lead to more efficient use of trail management resources.
- The key to preparing for future maintenance and other operating costs of a greenway system in Miami-Dade County is the clear understanding that planning and construction funds will be available for building most, if not all, of the planned 600 new miles of greenways over the next decade. If this greenway system is

built, it will have to be maintained. Local funds of some kind appear to be the only sources for operating and maintaining greenways.

HIGHLIGHTS OF COSTS AND STAFFING OF EXISTING TRAIL SYSTEMS

A successful greenway program in Miami-Dade County ought to be viewed from a systemic perspective, allowing coordination of different actors and agencies from planning and construction to full-scale operation, to achieve optimal results and lowest life-cycle cost of the system. Because many of the factors described above require operational experience to ascertain their true costs, developing an operational budget, including maintenance, is a problematic exercise. Because of variability in factors influencing operating costs, the simplest approach to estimating a budget for operations and maintenance is to draw on experience and data from existing greenway programs. This method provides an order of magnitude to gauge spending levels, offering low, moderate and high unit costs examples, as highlighted in the next section.

Several communities around the country are operating greenway programs. These were described in Chapter 5 of this report as “best practice” systems. This section of the report highlights unit cost and staffing ratios from these “best practice” communities to the extent possible. Most of the case studies do not isolate budgets or staffing figures. Thus, it was difficult to get unit costs and staffing per mile ratios from these case studies. Subsequently the extrapolation of these figures to Miami-Dade County remains more art than science. Nevertheless, these figures help shed some light on potential costs and staffing for operating and maintaining the Miami-Dade County greenway system, and provide one of three sets of figures useful in estimating what it might cost the county to operate its planned 600-mile system.

Indianapolis

Indianapolis has 50 miles of greenways in five corridors. Six of these miles are unpaved. Three city departments have different maintenance responsibilities, and the city uses volunteers to help with some of the maintenance activities. The administrative and maintenance budget for these greenways totals \$220,000 per year. This works out to \$4,400 per mile, a rough figure for annual maintenance costs. Two staff members in the city’s Parks Department are assigned to manage the greenways program, including planning, construction and maintenance. The Public Works Department is responsible for the maintenance activities with 11 employees assigned to maintenance. These employees, however, have non-greenway responsibilities as well. Assuming that four of the maintenance positions in effect work full time on greenways, then this system would have a staffing to mileage ratio of 1:13, one staff for every 13 miles of greenways.

Pinellas County

The Pinellas County Trail has 40 miles with an annual maintenance budget of \$149,000. Maintenance is done by contract with a private vendor, but also a number of volunteers help with litter removal, public information and security. This figure equates to \$3,725 per mile. In addition, the Trail received a \$270,000 budget for major repairs, erosion and root damage work. This works out to \$6,750 per mile. The management of the trail consists of eight full-

time staff at about \$238,000 per year, or \$29,750 per mile. This staffing is for operations only, because Pinellas contracts for all of its maintenance work. We estimated the Pinellas Trail to have two full-time maintenance staff, thus a staff to miles ratio of 1:20. It is interesting to note that the operations staffing figures for this trail are one staff for every five miles of trail.

Portland

Portland bicycle system has 181 miles, 46 miles of paths, 123 miles of lanes and 12 miles of boulevards. Maintenance is split between two departments. Management and maintenance funding totals \$150,000 per year of dedicated general transportation revenues. It is not clear how these dollars are used for the paths, lanes or boulevards. It is likely that the road maintenance budget covers the lanes and boulevards, since these are part of the street system in Portland. If the \$150,000 figure covers only the 46 miles of pathways, then the per mile cost would be \$3,261. Portland does have five staff assigned to planning and construction of its bicycle system, but the case study did not identify maintenance staff from the two departments providing this service. If the city had just two people assigned to maintaining just the 46 miles of paths, the staffing ratio for maintenance would be 1:23. Just for estimating purposes, we used this staffing ratio later in this section.

Seattle

Seattle bicycle network is considered one of the best in the country with 133 total miles of trails, bike lanes and signed bike areas. Again, while separate maintenance budgets were not available, the city estimated it spent \$6,000 per mile per year on maintenance. Staffing figures for maintenance were not available, but again for purposes of estimating staffing for the county, we assigned three staff to the Seattle system. This generated a staffing ratio of one staff for every 44 miles.

Thus, of the “best practice” communities reported here, the per mile maintenance cost ranged from a low of \$3,261 in Portland to a high of \$6,000 in Seattle with Indianapolis at \$4,400 per mile and Pinellas at \$3,725 per mile falling in the middle range.

In rough terms, then, if Miami-Dade’s trails follow these examples, one can expect the annual per mile maintenance costs for the total trail system (600 miles) to range from approximately \$2 to \$3.6 million. See Table 9 for estimates based on per mile costs of existing systems. While these are crude figures, they do serve as a planning guide for the county’s proposed system. With only 100 existing miles in the current trail system, the estimated annual costs range from a low of \$326,000 to \$600,000. Because of the multiple agencies in Miami-Dade involved in maintenance of these 100 miles and the lack of a separate line item budget within these agencies, there is no way to verify the accuracy of these estimates with real data.

In terms of staffing, which of course would likely constitute one of the larger cost centers in a greenways program, Miami-Dade would range from a low of 14 (based on the Seattle ratio) to a high of 46 (based on the Indianapolis ratio). These rough figures were based on the staffing per mile ratios of the “best practice” communities. Averaging the four extrapolations would

give you an estimated maintenance budget of \$2.61 million, \$4,347 per mile and 24 staff for the Miami-Dade system.

TABLE 9 ESTIMATED ANNUAL MAINTENANCE COST AND STAFFING LEVELS FOR MIAMI-DADE GREENWAYS BASED ON “BEST PRACTICE” PER MILE PER YEAR COSTS (600 MILES)

“Best Practice” Communities	Maintenance Cost per Mile per Year	Estimated Miami-Dade Annual Maintenance Budget (600 miles)	Estimated Staffing per Mile of Pathways +	Estimated Miami-Dade Staffing
Portland	\$3,261	\$1.96 million	1:23	26
Pinellas	\$3,725	\$2.24 million	1:20	30
Indianapolis	\$4,400	\$2.64 million	1:13	46
Seattle	\$6,000	\$3.60 million	1:44	14
Average	\$4,347	\$2.61 million	1:25	24

+ These staffing ratios are rough approximations. Because data were difficult to extract from the case studies, these extrapolations should be used with caution.

SPECIFIC COST ITEMS

Other research for this study examined specific kinds of maintenance activities that would be part of the county’s greenway system. Table 10 provides a list of the different types of maintenance activities associated with greenway maintenance.

TABLE 10 GREENWAY MAINTENANCE FUNCTIONS

Landscaping	Tread	Signage	Facilities	Trash Removal
Mowing Exotic Removal Adding Plants Trimming Plants Root Control Weed Removal Trail Edging	Sweeping Patching Resurfacing Adding Tread Striping & Stenciling Applying Sealer	Install Signs Repair signs Add & Repair Reflector Tape	Clean Restrooms Clean Drinking Fountains Repair Fixtures Trash Removal Graffiti Removal Replace Lighting Maintain Brochure Mailboxes Maintain Water Troughs for Horses	Empty Receptacles Repair Receptacles Litter Pick-up

Through our research, we were able to obtain cost estimates for various maintenance functions. It was interesting to note how costs fluctuated depending on the size of the facility. For example, a major problem for paths near trees is root problems. Table 11 summarizes costs of root pruning and repairing various lengths of pathways.

In their book, *Greenways, A Guide to Planning, Design, and Development*, Schwartz et. al. (1993) estimated a number of maintenance items identified with frequency and costs per year.

Table 12 summarizes a number of these items. It should be noted that the authors relied on several Colorado agencies to help identify these figures. Terrain, climate and (likely) labor costs in these Colorado areas differ from the Miami area. Thus, these figures may not precisely portray costs that might be observed in Miami-Dade County; however, these figures generally reflect real world experience and can serve as a useful benchmark for estimating costs that might occur in Miami-Dade County.

TABLE 11 ESTIMATES OF COST TO ROOT PRUNE AND REPAIR PATHWAYS

Section Size	Estimated Cost
10 foot	\$3,500
100 foot	\$4,500
240 foot	\$10,500
1 mile	\$70,000

Source: Miami-Dade County Department of Park and Recreation, 1999.

Using this table as a guide, we computed estimates for the proposed North and South Dade trails in Miami-Dade County. These are shown in Table 13. More details on these costs are contained in Appendix 5. The estimated total maintenance budget is \$1.35 million. Assuming that the maintenance budget would consume about 70 percent of the total operating budget for the greenway system, then the overall figure for operating a system for one year would be an estimated \$1.93 million. This works out to \$3,857 per mile for these 500 miles. Applied to the total 600-mile system, the estimated annual budget would be \$2.3 million.

The summary figures in Table 13 indicate an estimated annual cost for maintenance at \$2,700 per mile. As should be expected these costs fall below the average figures for the “best practice” communities, where the figures ranged from a low of \$3,261 to a high of \$6,000 per mile (See Table 9.). Not all of the trail maintenance items had fixed costs per mile assigned to them in Table 13. These items have variable costs, dependent more on usage and weather than number of miles.

Examining a few of the maintenance items in detail reveals why the \$2,700 amount is lower than the “best practice” communities. First, inspection costs were not included in Table 13. If volunteers did the inspection, perhaps the costs would be low or almost non-existent on a per mile basis. At the very least, someone would have to coordinate volunteer inspection and perhaps inspect the inspection. On high use trails, issues of liability may persuade administrators to use professional staff to reduce exposure to lawsuits. Asphaltting trails (filling in potholes, repairing surface problems) also could be a major expense item, and per mile costs were not included in the computations for Table 13.

Table 11 provided estimates of root pruning and repair of pathways. With many pathways shaded by trees with willow root systems, this could be an expensive maintenance item in Miami-Dade County. Root pruning and repairing a one-mile stretch was estimated to cost

\$70,000. Weed control and mowing cycles shown in Table 13 were based on Colorado weather cycles. With a year-round growing season in South Florida, weed control is likely to be a monthly activity, and mowing may have the same 12-times a year schedule. This would increase the per mile maintenance costs above the \$2,700 computed in Table 13.

TABLE 12 ESTIMATED MAINTENANCE ITEMS WITH FREQUENCY AND COSTS PER YEAR

Trail Maintenance Items	Frequency per Year	Cost per Year	Comments
Inspection	26	Varies	Can be done by volunteers.
Sweeping (paved)	18	\$1,300/per mile	Assumes a vacuum sweeper.
Asphalt trail	As required	Varies	Repair, seal, replace, patch.
Litter pickup	12	\$500/mile	Can be supplemented by volunteers.
Erosion control	As required	Varies	
Weed control	3	\$400/mile	
Mowing shoulders	3-4/per year	\$250/mile	Mow a 3'-5' wide shoulder.
Graffiti removal & minor repairs	As required	\$250/mile	Can be done by volunteers.
Toilets, drinking fountain service	As required	Varies	Use chemical or composting type in attractive vandal-resistant frame.

Source: Schwartz, Flink and Searns: page 298.

Finally, maintenance costs of amenities like drinking fountains and bathrooms were not included either. Such maintenance would also increase the \$2,700 per mile figure in Table 13. Maintaining amenities depends on kinds of materials used to build and furnish these kinds of facilities, their location, ease of access, and other factors limiting our ability to create a per mile value for costing purposes.

Table 13 captures the major maintenance activities that make up a sound maintenance program. Regional differences in weather and staffing costs, as well as other items listed in Table 10, will impact overall costs and, consequently, the benchmark per mile cost of operating and maintaining a greenway system. It should be noted that neither Table 12 nor 13 includes administrative or program costs, including construction management. Adding these items would obviously increase the per mile cost of a greenway system, perhaps to the figure computed in Table 13 (\$3,857 per mile for operations and maintenance) or to the average of the "best practice" community average of \$4,350 per mile.

ESTIMATED STAFFING AND LINE-ITEM BUDGET FOR THE MIAMI-DADE GREENWAY NETWORK

Overview

As the third means for estimating the costs of operating and maintaining the 600-mile Miami-Dade greenway system, we created a hypothetical operating plan that resulted in a table of organization and line item budget. We used information from Miami-Dade County's 1999

pay plan and budget preparation documents, and made a number of assumptions about cycle times of routine maintenance activities. This translated into staffing requirements, which led to salary and fringe benefit figures. This line item budget and proposed staffing charts are shown in Tables 14, 15 and 16. In summary, based on the hypothetical budget, the estimated per mile costs for operating and maintaining the complete 600-mile system totals \$3,007 per mile with total expenditures estimated at \$1.8 million (in current dollars). See Appendix 6 for details about the assumptions used in preparing data for Tables 14, 15 and 16.

TABLE 13 ESTIMATED MAINTENANCE COSTS FOR THE PROPOSED MIAMI-DADE NORTH AND SOUTH GREENWAY TRAILS (500 MILES)

South Dade Trails	Estimated Annual Cost	North Dade Continued	Estimated Annual Cost
Biscayne	\$97,740	Lake Belt	\$83,700
Black Creek	45,900	Lehman	9,720
Princeton	42,660	Ludlam	29,700
Mowry	29,700	Memorial	43,200
Everglades	58,050	Merrick	28,080
Keys	69,390	Miami River	56,430
Krome	47,250	Miccosukee	75,060
South Dade	69,390	Miller Link	6,750
Southern Glades	34,020	M-Path	26,730
Tallahassee	16,200	Oleta Link	6,750
Total South Dade	\$510,300	Perimeter	24,300
North Dade Trails		Snake Creek	50,220
Atlantic	\$45,360	Snapper Creek	28,350
Beacon	18,630	Turnpike	37,260
Commodore	40,770	Unity	20,250
East-West	21,330	Venetian Link	11,070
Gold Coast	56,160	West Kendall	29,700
Krome	52,380	Total North Dade	\$842,130
Total North and South Dade Trails		\$1,352,430	
Maintenance Cost per Mile		\$2,700	
Including estimated operating costs per mile*		\$3,857	Total = \$2.3 million

* Assumes maintenance costs total 70 percent of budget; other operating costs would total \$1,157.
Source: Schwartz, Flink and Searns, as computed by FIU Institute of Government, February 1999.

This per mile cost figure is lower than any of the per mile figures of the “best practice” communities (See Table 9), which ranged from \$3,261 to \$6,000 per mile. Estimated staffing shows 32 full-time employees. These figures are explained in Table 17. The hypothetical staffing per mile ration indicates one staff for every 19 miles, which is slightly lower than the estimates for Portland (1:23) and Pinellas County (1:20). The staffing ratios for the “best practice” communities may only include maintenance staff. For the hypothetical budget, the maintenance only staffing ratio is one staff per 29 miles, which is slightly higher than those

for Portland (1:23) and Pinellas County (1:20) but lower than for Seattle (1:44). As indicated previously, the staffing ratios for the best practice cities are not that reliable and comparisons should be used with caution.

The primary purpose of the hypothetical budget is to create third set of figures to compare with “best practice” communities and the figures computed based on data provided in the book *Greenways: A Guide to Planning, Design, and Development* by Schartz et. al. (1993). By examining these three sets of figures and reviewing the assumptions and caveats concerning the hypothetical line-item budget, decision-makers should have a fairly clear picture of reasonable costs associated with operating and maintaining a 600-mile greenway system.

Obviously, budgets are based on political as well as managerial decisions made in light of many other legitimate, competing claims on financial resources. As the greenway system in Miami-Dade County continues to grow, depending on availability of capital funding, decisions on how to operate and maintain the system will become a more important part of the budget process. The success or failure of the greenways system may depend largely on the ability of those with responsibility for the system to negotiate reasonable funding amidst all other competing claims on these resources. In other words, the primary issue for the greenway system may not be the budget per se, but rather organizational strength in competing for scarce resources.

While this hypothetical budget is by no means perfect, it does provide a useful gauge for decision-makers as the grapple with other funding concerns. These figures along with data presented previously and summarized in Table 17 below provide a workable context for greenway construction decisions. Table 17 provides an overall-funding context for policymakers and managers to help them in budget decision-making. The table shows a low estimate of \$1.8 million to a high estimate of \$2.6 million with an average for the three different estimating methodologies of \$2.2 million. The Miami-Dade greenway system will be constructed in phases. This will allow county staff to gauge financial impact on a per mile basis and determine performance of the system (demand, use and satisfaction) incrementally. This will allow for relatively small, manageable funding increases before committing future construction dollars to vastly increase the size of the system. An incremental approach will allow those responsible for the system to gain experience and refine operating and maintenance techniques to be discovered almost on a pilot basis to develop and apply best practices in the county.

With federal, state and other funds being earmarked for greenway construction, the time is ripe for considering the operation impacts of managing a system as potential large as 600 miles. Such a system, if properly built and marketed, will add to the quality of recreational life as well as offer an alternative means of transportation for residents and visitors to this county. With this in mind, it is also timely to consider to issues that would directly impact the overall success of a major urban greenway system: dedicated funding and management.

TABLE 14 BUDGET FRAMEWORK FOR OPERATIONS AND MAINTENANCE OF GREENWAY NETWORK

(ALL DOLLARS IN 1999 FIGURES)

	1999-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	
Miles of Greenway Trails in Operation	150	200	250	300	350	400	450	500	550	600	
Administration											
Staff											
Director	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Operations Coordinator	1.0	1.0	2.0	2.0	2.0	3.0	3.0	3.0	4.0	4.0	rounded 1 per 150 miles
Recreation Specialist 2		0.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0 rounded 1 per 250 miles
Administrative Secretary 1		1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0 roughly 1:5 ratio
Recreation Specialist 1		0.0	0.0	0.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0 rounded 1 per 350 miles
Total	2.0	3.0	5.0	5.0	6.0	8.0	8.0	8.0	11.0	11.0	
Personnel Costs											
Salaries (Occ Code/mid-point or entry level of range or Step 5)											
Director (7325/mid-point)	\$75,868	\$75,868	\$75,868	\$75,868	\$75,868	\$75,868	\$75,868	\$75,868	\$75,868	\$75,868	PR Regional Mana
Operations Coordinator (7292/mid)	\$51,155	\$51,155	\$102,310	\$102,310	\$102,310	\$153,465	\$153,465	\$153,465	\$204,620	\$204,620	Parks Operations C
Recreation Specialist 2 (7304/step 5)	\$0	\$0	\$31,662	\$31,662	\$31,662	\$63,324	\$63,324	\$63,324	\$63,324	\$63,324	Recreation Special
Administrative Secretary 1(0061/entry)	\$0	\$22,776	\$22,776	\$22,776	\$22,776	\$22,776	\$22,776	\$22,776	\$45,552	\$45,552	Administrative Sec
Recreation Specialist 1 (7303/step 5)	\$0	\$0	\$0	\$0	\$26,806	\$26,806	\$26,806	\$26,806	\$53,612	\$53,612	Recreation Special
Regular	\$127,023	\$149,799	\$232,616	\$232,616	\$259,422	\$342,239	\$342,239	\$342,239	\$442,976	\$442,976	
Overtime											
Other											
Subtotal Salaries	\$127,023	\$149,799	\$232,616	\$232,616	\$259,422	\$342,239	\$342,239	\$342,239	\$442,976	\$442,976	
Fringe Benefits											
FICA (6.2% up to \$68,400)	\$7,412	\$8,825	\$13,959	\$13,959	\$15,621	\$20,756	\$20,756	\$20,756	\$27,001	\$27,001	
MICA (1.45%)	1,842	2,172	3,373	3,373	3,762	4,962	4,962	4,962	6,423	6,423	
Retirement (11%)	13,973	16,478	25,588	25,588	28,536	37,646	37,646	37,646	48,727	48,727	
Health (\$4,350/FTE)	8,700	13,050	21,750	21,750	26,100	34,800	34,800	34,800	47,850	47,850	
Other (\$600/FTE)	1,200	1,800	3,000	3,000	3,600	4,800	4,800	4,800	6,600	6,600	
Subtotal Fringe Benefits	\$33,127	\$42,324	\$67,670	\$67,670	\$77,619	\$102,965	\$102,965	\$102,965	\$136,602	\$136,602	
Subtotal Personnel Costs	\$160,150	\$192,123	\$300,286	\$300,286	\$337,041	\$445,204	\$445,204	\$445,204	\$579,578	\$579,578	
Operating											
Communications	2,000	3,000	5,000	5,000	6,000	8,000	8,000	8,000	11,000	11,000	\$1,000 per person
Risk	2,000	3,000	5,000	5,000	6,000	8,000	8,000	8,000	11,000	11,000	\$1,000 per person
Fleet Maintenance	3,000	3,000	6,000	6,000	7,500	10,500	10,500	10,500	13,500	13,500	\$1,500 per professional staff
Fleet Replacement	2,000	2,000	4,000	4,000	5,000	7,000	7,000	7,000	9,000	9,000	\$1,000 per professional staff
Travel	1,000	1,500	2,500	2,500	3,000	4,000	4,000	4,000	5,500	5,500	\$500 per person
Office Supplies	600	900	1,500	1,500	1,800	2,400	2,400	2,400	3,300	3,300	\$300 per person
Printing	7,500	10,000	12,500	15,000	17,500	20,000	22,500	25,000	27,500	30,000	\$50 per 50 miles
Subscriptions/Memberships	1,000	1,500	2,500	2,500	3,000	4,000	4,000	4,000	5,500	5,500	\$500 per staff
Other	800	1,200	2,000	2,000	2,400	3,200	3,200	3,200	4,400	4,400	\$400 per staff
Subtotal Operating Costs	\$19,900	\$26,100	\$41,000	\$43,500	\$52,200	\$67,100	\$69,600	\$72,100	\$90,700	\$93,200	
Capital											
Computers	4,000	2,000	4,000	0	2,000	16,000	0	0	6,000	0	\$2,000 per professional staff
Other	400	600	1,000	1,000	1,200	1,600	1,600	1,600	2,200	2,200	\$200 per staff
Subtotal Capital Costs	\$4,400	\$2,600	\$5,000	\$1,000	\$3,200	\$17,600	\$1,600	\$1,600	\$8,200	\$2,200	
Total Costs of Administration	\$184,450	\$220,823	\$346,286	\$344,786	\$392,441	\$529,904	\$516,404	\$518,904	\$678,478	\$674,978	
Administrative Costs per Mile	\$1,230	\$1,104	\$1,385	\$1,149	\$1,121	\$1,325	\$1,148	\$1,038	\$1,234	\$1,125	

TABLE 15 BUDGET FRAMEWORK FOR OPERATIONS AND MAINTENANCE OF GREENWAY NETWORK

(ALL IN 1999 FIGURES)

	1999-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09
Number of Miles	150	200	250	300	350	400	450	500	550	600
Operations										
Trail Maintenance										
Staff										
Park Ranger (Inspection+)	2.0	2.0	3.0	3.0	4.0	4.0	5.0	5.0	6.0	6.0 one/100 miles
Maintenance other (Signs, litter)	1.0	1.0	2.0	3.0	3.0	3.0	4.0	4.0	5.0	5.0 one/120 miles
Maintenance (Sweeping)	1.0	2.0	2.0	3.0	3.0	3.0	4.0	4.0	5.0	5.0 one/120 miles
Maintenance (Mowing)	1.0	2.0	2.0	3.0	3.0	3.0	4.0	4.0	5.0	5.0 one per 120 miles
Total	5.0	7.0	9.0	12.0	13.0	13.0	17.0	17.0	21.0	21.0
Personnel Costs										
Salaries (Occ Code/Step 5)										
Park Ranger (7227, step 5)	\$33,280	\$33,280	\$49,920	\$49,920	\$66,560	\$66,560	\$83,200	\$83,200	\$99,840	\$99,840
Maintenance (7250, step 5)	\$21,439	\$21,439	\$42,878	\$64,316	\$64,316	\$64,316	\$85,755	\$85,755	\$107,194	\$107,194
Maintenance (7250, step 5)	\$21,439	\$42,878	\$42,878	\$64,316	\$64,316	\$64,316	\$85,755	\$85,755	\$107,194	\$107,194
Maintenance (7250, step 5)	\$21,439	\$42,878	\$42,878	\$64,316	\$64,316	\$64,316	\$85,755	\$85,755	\$107,194	\$107,194
Regular										
Overtime										
Other										
Subtotal Salaries	\$97,596	\$140,474	\$178,553	\$242,869	\$259,509	\$259,509	\$340,466	\$340,466	\$421,422	\$421,422
Fringe Benefits										
FICA (6.2% upto \$68,400)	\$6,051	\$8,709	\$11,070	\$15,058	\$16,090	\$16,090	\$21,109	\$21,109	\$26,128	\$26,128
MICA (1.45%)	1,415	2,037	2,589	3,522	3,763	3,763	4,937	4,937	6,111	6,111
Retirement (11%)	10,736	15,452	19,641	26,716	28,546	28,546	37,451	37,451	46,356	46,356
Health (\$4,350/FTE)	21,750	30,450	39,150	52,200	56,550	56,550	73,950	73,950	91,350	91,350
Other (\$600/FTE)	3,000	4,200	5,400	7,200	7,800	7,800	10,200	10,200	12,600	12,600
Subtotal Fringe Benefits	\$42,952	\$60,848	\$77,850	\$104,695	\$112,748	\$112,748	\$147,647	\$147,647	\$182,545	\$182,545
Subtotal Personnel Costs	\$140,548	\$201,323	\$256,403	\$347,565	\$372,258	\$372,258	\$488,113	\$488,113	\$603,968	\$603,968
Operating Costs										
Communications	5,000	7,000	9,000	12,000	13,000	13,000	17,000	17,000	21,000	21,000 \$1,000 per person
Risk	5,000	7,000	9,000	12,000	13,000	13,000	17,000	17,000	21,000	21,000 \$1,000 per person
Contracts	75,000	100,000	125,000	150,000	175,000	200,000	225,000	250,000	275,000	300,000 \$500 per mile
Sign Shop	6,000	8,000	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000 J57/50*2000
Fleet Maintenance	7,500	10,500	13,500	18,000	19,500	19,500	25,500	25,500	31,500	31,500 \$1,500 per person
Fleet Replacement	5,000	7,000	9,000	12,000	13,000	13,000	17,000	17,000	21,000	21,000 \$1,000 per person
Utilities	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000 miles/50*500
Repair Materials	15,000	20,000	25,000	30,000	35,000	40,000	45,000	50,000	55,000	60,000 \$100 per mile
Office Supplies	250	350	450	600	650	650	850	850	1,050	1,050 \$50 per mile
Operating Supplies	1,000	1,400	1,800	2,400	2,600	2,600	3,400	3,400	4,200	4,200 \$200 per person
Other	250	350	450	600	650	650	850	850	1,050	1,050 \$50 per person
Subtotal Operating Costs	121,500	163,600	205,700	252,600	289,900	322,400	374,100	406,600	458,300	490,800
Capital										
Machinery & Equipment	6,000	8,000	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000 miles/50*2000
Other	2,500	3,500	4,500	6,000	6,500	6,500	8,500	8,500	10,500	10,500 \$500 per person
Subtotal Capital Costs	\$8,500	\$11,500	\$14,500	\$18,000	\$20,500	\$22,500	\$26,500	\$28,500	\$32,500	\$34,500
Total Costs of Operations	\$270,548	\$376,423	\$476,603	\$618,165	\$682,658	\$717,158	\$888,713	\$923,213	\$1,094,768	\$1,129,268
Total Cost of Admin. & Operations	\$454,998	\$597,246	\$822,889	\$962,950	\$1,075,099	\$1,247,061	\$1,405,116	\$1,442,116	\$1,773,246	\$1,804,246
Administration Costs per Mile	\$1,230	\$1,104	\$1,385	\$1,149	\$1,121	\$1,325	\$1,148	\$1,038	\$1,234	\$1,125
Operating Costs Per Mile	1,804	1,882	1,906	2,061	1,950	1,793	1,975	1,846	1,990	1,882
Total Costs per Mile	3,033	2,986	3,292	3,210	3,072	3,118	3,122	2,884	3,224	3,007

Source: Estimated by Florida International University, Institute of Government

TABLE 16 STAFFING FOR GREENWAYS

	1999-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09
Miles of Greenway Trails in Operation	150	200	250	300	350	400	450	500	550	600
<i>Administration</i>										
Staff										
Director	1	1	1	1	1	1	1	1	1	1
Operations Coordinator	1	1	2	2	2	3	3	3	4	4
Recreation Specialist 2	0	0	1	1	1	2	2	2	2	2
Administrative Secretary 1	0	1	1	1	1	1	1	1	2	2
Recreation Specialist 1	0	0	0	0	1	1	1	1	2	2
Subtotal	2	3	5	5	6	8	8	8	11	11
<i>Operations</i>										
Trail Maintenance										
Staff										
Park Ranger	2	2	3	3	4	4	5	5	6	6
Maintenance	3	5	6	9	9	9	12	12	15	15
Subtotal	5	7	9	12	13	13	17	17	21	21
Total	7	10	14	17	19	21	25	25	32	32
Miles per Administrative Staff	75	67	50	60	58	50	56	63	50	55
Miles per Maintenance Staff	30	29	28	25	27	31	26	29	26	29
Miles per total Staff	21	20	18	18	18	19	18	20	17	19
# of field operators to coordinator	5.0	7.0	4.5	6.0	6.5	4.3	5.7	5.7	5.3	5.3

Source: Estimated by Florida International University, Institute of Government

TABLE 13 OVERALL FUNDING ESTIMATES BASED ON THREE MODELS

“Best Practice” Average	Schwartz, Flink and Searns, as adjusted	Line Item Budget	Average of All Three
\$2,610,000	\$2,300,000	\$1,804,000	\$2,238,000

FUNDING

The current funding situation in Miami-Dade County government for the existing 100 miles of greenways finds bicycle and other pathway maintenance incorporated in the general maintenance budgets of several departments. No specific line item exists just for greenway maintenance. These departments, Park and Recreation, Transit and Public Works, rely on general fund revenues, user fees and gas taxes. It is not possible to link revenue sources to the maintenance of greenway systems.

- One key question, then, is if 600 more miles of greenway paths are built in the county – as planned, how will operations and maintenance be funded?

The best practice communities mostly used general fund or gas tax revenue and several different operating departments to provide maintenance service. None of these communities had anywhere near 600 miles of trails, which in the future will likely put Miami-Dade in a unique position with perhaps the largest, year round greenway system in any urban area in the country. Operating and managing such a system will be a significant undertaking. Thus, the issue of funding becomes critical to the success of the entire program.

Several funding options have been discussed in the literature (Schwartz et. al., 1993, p. 305). These and other options are discussed next.

Endowments

Endowments are unusual for municipal recreational service delivery, but offer a unique way to dedicate funding for this specific service. Finding a source for the endowment is the first difficult task and the second is getting enough money in the endowment to generate recurring operating expenses over time. An endowment to fund recurring operating and maintenance costs of \$2 million a year would require about \$40 million in base funding (assuming 5 percent interest). This option has a very low probability of happening. Grants could also be a source of funding, especially from foundations or other organization looking to test the viability of greenway systems as alternative transportation means as well as for recreational use.

Special Districts

Special districts have been used in some areas, charging those who benefit directly from the greenway to pay for its upkeep. Most of these existing districts are near rivers where commercial development such as restaurants and hotels exists and there is a correlation

between use and the commercial activity. Some of the county's greenways may lend themselves to commercial development, but it is unlikely that the nexus between commercial activity and greenway use would be strong enough to create a special district. If it were possible, it is likely that such development may be so limited that taxing these properties would not generate enough revenue to fund maintenance.

User Fees

User fees can be effective where access to greenway systems can be controlled, or use limited to one type of user. It is unlikely, however, that controlled access and limited use will occur in the county's greenway system. Walkers, runners, bicyclists, and skaters use the existing 100 miles of pathways in the county, and egress and ingress are generally not restricted. With few exceptions most of the planned greenway systems will have multiple entrance and exit points, making it virtually impossible for staff to collect a user fee. Thus, this option has very limited value for Miami-Dade County.

As part of the research for this project, we attempted to estimate the number of bicycles sold in the county each year, thinking that a use fee on such sales might generate sufficient revenue to cover operating and maintaining a greenway system. Chapter 3 discusses this research in some detail. Our estimates suggest that between 80,000 and 100,000 bicycles may have been sold in 1997, based on a partial survey of retailers and information from the National Bicycle Dealer's Association (NBDA). These sales include a large number of children's bicycles. The vast majority of bicycles sold are done so by major retailers such as Toys-R Us, and not by specialty bicycle stores. If one wanted to assess a fee on bicycles sold to cover operating and maintenance costs of \$2 million per year, the fees could range from \$20 to \$30 per bicycle as shown in Table 18.

TABLE 14 ESTIMATED REVENUE FROM USER FEE ON BICYCLES SOLD

1,000s	Fee Per Bicycle Sold/Revenue Generated		
Sold	\$10	\$20	\$30
70	\$700,000	\$1,400,000	\$2,100,000
80	\$800,000	\$1,600,000	\$2,400,000
90	\$900,000	\$1,800,000	\$2,700,000
100	\$1,000,000	\$2,000,000	\$3,000,000
110	\$1,100,000	\$2,200,000	\$3,300,000

Source: Florida International University, Institute of Government

The county may not have the legal authority to assess such a fee, and thus, would require state legislative approval, which may be problematic. Further, administering such a fee may prove costly as well. It is likely that a large number of such sales may be to individuals who may never use the greenway system, and of course such a fee would not be assessed directly on other potential users: runners, skaters, walkers, and in some cases equestrians. Moreover, some bicycles only cost \$40 to \$50 dollars; others can cost several thousand dollars. So the issue of equity also comes into play.

Gas Taxes

Gas taxes seem a likely source of revenue to help subsidize a greenway system. The State of Oregon earmarks one percent of gas tax for bicycle transportation. In Miami-Dade County, however, all available gas tax levy for operating purposes has already been imposed. Several cents of the capital gas tax revenue has not yet been levied, but this could not be used for operating purposes. If other transportation funds were made available to the county, such as a new sales tax levy, then perhaps existing operating gas tax revenue could be earmarked for the greenway system. Until this happens, gas taxes are not an option for funding greenways.

Other General Revenues

Absent a dedicated source of revenue, the only other alternative for funding greenway maintenance programs is through general revenues of the managing government. For Miami-Dade County, this means using its countywide general fund budget as the source of funds for greenway maintenance. Since the 600 miles of greenway would be a countywide resource, this source of funding is appropriate for operating and maintaining the system. However, tax pressures as exemplified by the countywide millage rate being near the 10-mill cap, the division of responsibility among several county departments, and the intergovernmental nature of the greenway system make competition for countywide funding problematic. It is unlikely that a split greenway management program can compete successfully with other county programs, including those within the same departments that have partial responsibility for greenways, for these scarce resources. The next part of this chapter addresses organizational issues.

ORGANIZATIONAL ISSUES

As exemplified in the case studies in Chapter 4, the majority of greenway systems are managed by several agencies within the same government. These agencies, for the most part, have written memorandums of understanding that clearly spell out roles and responsibilities. To some extent, the same situation exists in Miami-Dade County. Like the other jurisdictions, the county's current greenway network is relatively small with about 100 miles of pathways. Even with this small size, it was difficult in some cases to determine who had what responsibility for operating and maintaining the pathways. In other cases where this information was known, it was not possible to distill specific cost information, since the greenway costs were included in other budget areas. Thus, as the system expands to the planned size of 600 miles, then, management becomes a more central question in terms of responsibility, efficiency, effectiveness and accountability.

It seems there are five choices available for managing the current and future greenway system:

1. Continue the status quo with blurred lines of responsibility and no identifiable source of funding.
2. Strengthen the current situation by clarifying memorandums of understanding.

3. Strengthen the current situation by clarifying memorandums of understanding and providing earmarked funding for carrying out these roles among the various departments with current responsibility.
4. Create a special county agency charged with the responsibility for managing the greenway network with its own budget and staff.
5. Create a special county or quasi-county agency (authority) charged with the responsibility for managing the greenway network with its own dedicated source of funding.

In general as one moves from option 1 to option 5, responsibility becomes centralized, funding earmarked, and the chances of a successful greenway program greater. While greenway issues naturally cross departmental boundaries, since they involve streets, pavement maintenance, recreation, and construction, that does not mean that one agency cannot be equipped to deal with cross functional issues. Already several models of independent or quasi-independent agencies exist in Miami-Dade County. Examples include the Public Health Trust, the Homeless Trust, Miami Art Museum, Museum of Science and the Viscayans.

The critical issue, however, is not organizational structure per se; that is, organizing structures can range from the current multi-agency control to special purpose control if the central issue is adequately addressed. The central issue is how best to ensure that the greenway system gains a significant voice in fighting for and obtaining funding and other resources to operate and maintain a 600-mile part urban part rural greenway system to meet the needs of residents and visitors who use the system. In a diverse community with multiple competing needs it seems apparent that to accomplish this goal, greenway system management needs to move from its current position as described in option one listed above towards option five. This issue is explored more fully in the final chapter of this report.

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CHAPTER 7: RECOMMENDATIONS

With about 20 percent of the 600 mile greenway network in operation now and detailed plans for the remaining 500 miles in place, Miami-Dade County has the luxury of taking an incremental approach to improving the management and maintenance of its system based upon miles added in any given year. While the existing 100 miles of greenways are not perfectly maintained and users have expressed some dissatisfaction with the system, the steps needed to improve it are relatively few and inexpensive. The county has the opportunity to provide better service to customers of greenways before facing the challenges of an expanded system.

If changes are not made to the existing greenway operational practices, adding new miles will only strain current management and maintenance services. As was seen in the “best practice” communities, planning and coordination are integral components in making successful greenways, trails, and pathway systems. This chapter offers policy and program recommendations for establishing a comprehensive management and maintenance system for present and future needs based on issues discussed in this report.

The recommendations have been organized into three groups: administration, funding and possible long term options. As the previous chapter concluded, one option is merely to continue the current program (status quo) and not make any changes. This option is not discussed in this chapter, since it requires no further elaboration, nor is it recommended. Each of the recommended options is defined below. Parts 1 and 2 are part of an interim plan. Part 3 considered long term option. These parts are explained in more detail in the remainder of this chapter.

- **Part 1:** Strengthen and clarify agreements and memorandums of understanding and establish an interagency coordinating committee.
- **Part 2:** Provide dedicated funding to carry out the functions outlined in the memorandums of understanding.
- **Long Term:** Evaluate the feasibility of a county agency or department with its own budget and staff, or a quasi-county agency (authority) with its own dedicated source of funding, charged with the responsibility of managing and maintaining the network.

Each part is modeled in part after examples found in the “best practice” communities. Part 1 follows the example of Phoenix, Portland and Seattle. Even though multiple agencies are involved in the maintenance and management of their systems, they have detailed memorandums of understanding and maps that clearly outline responsibilities of each agency. They also meet periodically to amend the memorandums. This system has worked well for Phoenix, Portland and Seattle, which all have over 100 miles of non-motorized facilities.

Phase 2 follows the example of the Indianapolis Greenways and Portland. Both of these areas have a dedicated source of funding for the management and maintenance of non-motorized facilities. The long term options include the creation of a comprehensive maintenance management system based on the Indianapolis greenways model. Indianapolis created one entity with its own budget and staff to oversee all the functions related to its greenway network. It also consolidated all maintenance functions under one department. Although we did not find a model of a greenways authority in any of the "best practice" communities, other areas around the country have established successful trail authorities. The Homeless Trust and the Public Health Trust serve as successful models for authorities in Miami-Dade County.

To be successful, a greenways program in Miami-Dade County does not have to implement one of the long term solutions. Several best practice communities are in effect in part 1; however, these communities have strong advocacy groups and longer bicycling tradition than those existing in this county. This gives them more leverage to access general fund dollars and to raise the visibility of their greenways programs.

INTERIM PLAN

The interim plan represents activities that the county can realistically undertake within the next two years. It retains the existing multi-jurisdictional management structure with some additional coordination mechanisms added, and creates an annual line item for maintenance. This is the least burdensome approach for staff requirements, structural changes and funding allocations that can satisfactorily address the current management and maintenance problems. The county can easily implement this plan with a Resolution from the MPO Governing Board, an Administrative Order by the County Manager, and funding approved by the Board of County Commissioners. Below are the main components of the interim plan.

Part 1

Develop New Memorandums of Understanding

1. Representatives from all agencies and municipalities in charge of managing and maintaining non-motorized facilities will meet to develop a new memorandum of understanding for all the existing trail/greenway/ pathway facilities in Miami-Dade County. The memorandum of understanding will outline a maintenance program and will assign responsibility for the Bike & Ride and locker programs.
2. Representatives from all agencies in charge of managing and maintaining non-motorized facilities will develop a memorandum of understanding outlining a maintenance plan for all of the proposed facilities that have been approved by the county. This includes the South and North Dade Greenway Networks.
3. All the memorandums of understanding will include a maintenance schedule and will outline the geographic areas and the specific tasks assigned to each department.

4. A map that visually depicts the areas of responsibility should accompany each memorandum of understanding.
5. The memorandums of understanding will comply with all the maintenance requirements and guidelines found in TEA-21, the Miami-Dade Comprehensive Plan, the Bicycle Facilities Plan, AASHTO guidelines and the South Florida Water Management District.
6. All the agencies will meet periodically to update the memorandums of understanding.

Establish an Interagency Task Force

1. The County Manager should appoint a staff person to serve as bicycle/pedestrian coordinator for the Park and Recreation Department and the Miami-Dade Transit Agency (MDTA).
2. The County Manager should establish an Interagency Task Force consisting of the bike coordinators from the MPO, Public Works, Park and Recreation, MDTA, and FDOT. The Task Force should also have a representative from the Bicycle/Pedestrian Advisory Committee (BPAC), the Miami-Dade Police Department, the South Florida Water Management District, the utility companies, and any other agency or municipality that has a direct or indirect impact on the maintenance and management of trails/greenways/pathways.
3. The MPO Bicycle/Pedestrian Coordinator will serve as chair of this Task Force.
4. The Task Force will meet quarterly at a minimum, and will be the principal coordinating entity for bicycle, trail and greenway facilities.
5. The Task Force will review all planning, design, construction, landscaping, maintenance, management, repair, funding, safety and security activities related to non-motorized facilities, excluding sidewalks. In doing this, the Task Force will be responsible for assuring that such activities address maintenance needs and facilitate usage.

Part 2 : Increase Funding for Maintenance of Greenways and Trails

1. The County should allocate monies from the general fund for routine and emergency maintenance of bicycle, trail and greenway facilities --separate from sidewalks. As the mileage increases, the funds allocated for maintenance should also increase.
2. The interagency task force will prepare a list of facilities that are eligible to receive the maintenance funds, as well as a list of specific maintenance activities that can be funded.
3. The County manager should direct all the departments responsible for maintaining the existing trails to establish an annual line item within their budget for facility maintenance.

The departments will base the budget on the list of priorities prepared by the Interagency Task Force.

Privatization of Maintenance Functions and Sale of Vending Rights.

1. Each department responsible for the maintenance and management of non-motorized facilities will conduct a cost analysis of their maintenance functions and determine whether privatization may be appropriate as a cost reduction strategy.
2. Each department responsible for the maintenance and management of non-motorized facilities should explore the possibility of selling vending rights at appropriate trails. The revenue generated from this activity will help fund the maintenance and management of trails and greenways.
3. In order to benefit from economies of scale and guarantee continuity and consistency of service, different departments should consider entering into joint contracts for maintenance services.

LONG- TERM OPTIONS

As greenways network grows and additional funding sources become available additional management and maintenance options should be explored. These include:

Creation of Miami-Dade Greenways Department

1. A new unit or department charged with the responsibility of managing and maintaining the entire trail/greenway/pathway network. The department will be responsible for the following functions: management, maintenance operations, risk management and community affairs. For the purpose of this report, we will refer to this entity as the Greenways Department.
2. The Greenways Department will have its own budget. Revenues from the county's general fund will serve as the source of funding. The total amount of funds needed to operate the department will depend on the size of the network. Based on the budget estimates made in Chapter 5, costs will range from approximately \$1.8 million to \$2.6 million to operate a system of 600 miles. These figures include operational and staffing costs--based on the 1999 hypothetical budget.
3. The Greenways Department will have its own staff. The total staff needed is dependent on the size of the network. Assuming the department performs routine maintenance in-house and does not privatize these functions, the department should generally follow the staffing and funding figures identified in Chapter 5.

4. The Greenways Department will take on all the responsibilities of the Interagency Task Force. The Interagency Task Force will continue to operate, but on an advisory capacity to the Greenways Department.
5. The Department will be responsible for coordinating all the design, planning, construction, repair and security activities related to trails, greenways, and pathways.
 - The bicycle coordinators from the MPO, Public Works, Park and Recreation, MDTA and FDOT will serve as liaisons between their departments and the Greenways Department.
 - The Interagency Task Force will continue to make interagency decisions and policies, but subject to the approval of the Greenways Department and the County Commission.
 - The Department will take over all trail, greenways and bicycle/pedestrian programs and activities, such as the risk management program, the maintenance request program, the Bike & Ride program, the locker program and bicycle/pedestrian publications.
 - The Department will be responsible for developing a promotional and volunteer program to encourage usage, advocacy and support of the non-motorized network.
6. The county will consolidate all the routine and repair maintenance functions within the Greenways Department.
 - Prior to consolidating the functions, the should conduct an analysis to assess whether it is more cost effective for the department to have its own maintenance staff and equipment or whether it should contract out all or some of the routine maintenance services.
 - The Greenways Department will contract out all maintenance repair functions, including emergency repairs and capital improvements, to Public Works or a private vendor. This would include pothole repairs, resurfacing of pathways and tree trimming. Based on the 1999 estimates outlined in Chapter 5, the contract might be approximately \$75,000 in the first year and \$350,000 when the 600 miles are constructed.
7. The department will be responsible for seeking additional sources of revenue through grants, special events and fundraising activities.

Creation of Miami-Dade Greenways Authority

1. The county could create an authority charged with carrying out all the functions related to the trail/greenway/pathway network, including administration, maintenance, risk management, contract management, community relations and fundraising.

2. The authority will have its own dedicated source of funding. Before creating the authority, the county should conduct a feasibility study to determine whether it should earmark the dedicated source of funding from operating gas tax revenue.
3. The authority will take over all the responsibilities of the Greenways Department. It will also have the same staffing and funding requirements.
4. The county will centralize all the design, planning, construction and management functions related to trails, greenways and pathways within the authority. The authority will contract county agencies or private sector vendors to carry out these functions. The departments formally in charge of these responsibilities will assist on an advisory capacity.
5. The county will centralize all the routine and repair maintenance functions within the authority, as was the case with the Greenways Department.
6. The Interagency Advisory Board and the Bicycle/Pedestrian Advisory Committee (BPAC) will report to the authority.
7. The county will continue to provide self-insurance coverage for the authority. This will protect the authority from any liability.
8. The authority will create a 501c3 non-profit organization that will focus on fundraising and volunteer development. As an organization that can receive tax deductible contributions, the non-profit will focus on obtaining grants and establishing an endowment. It will also serve as a forum to encourage usage and political support.

CONCLUSION

The recommendations provide several alternatives for establishing a comprehensive management and maintenance program for non-motorized facilities in Miami-Dade County. The recommendations range from an interagency task force to an authority with its own dedicated source of funding. As was mentioned earlier, however, organizational structure is only one aspect of creating a successful management and maintenance program. Success will be dependent on five key elements: funding, interagency cooperation, public support, oversight and phased construction of new facilities. Funding, of course, is the most important factor. Without adequate funding, the management and maintenance of trails, greenways and pathways will not receive priority.

With plans to build as many as 500 new miles of non-motorized facilities, Miami-Dade County must make a critical choice. It can decide to retain the current structure and possibly face many problems as the system begins to grow; or it can address the deficiencies in the system and begin to build a bicycle/pedestrian-friendly community. A successful system of trails, greenways and pathways can improve the quality of life of residents, provide alternative means of transportation and enhance the economy of areas near trails. Although developing a bicycle/pedestrian-friendly management system will represent a financial investment of

approximately \$1.8 million annually, the status quo may also prove to be expensive in the long run in terms of repairs and potential liability.

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APPENDIX 1: BUSINESS SURVEY

BUSINESS SURVEY

Business Name _____ Manager/Owner _____

Sales and Employment Section: Please note that your answers to questions 1-4 will be strictly confidential.

1. How long have you been in business? _____
2. How many employees do you have? _____
_____ Full Time
_____ Part Time
3. What are your estimated gross sales per year? _____
4. Indicate number of units sold per year.

Item	Number of Units Sold Per Year	Sale Price of Most Expensive Unit	Sale Price of Least Expensive Unit	Average Sale
Bicycles	_____	_____	_____	_____
Skates	_____	_____	_____	_____
Shoes	_____	_____	_____	_____
Clothing	_____	_____	_____	_____

Customer Service Section: The answers to the following questions may be released to the public with your permission.

5. Do you provide any of the following information to your customers

___ Brochures on lanes/trails/greenways ___ Bike maps
___ Newsletters ___ Safety
___ Other _____

If no, would you like to receive information to distribute? ___ Yes ___ No

If yes, what improvements would you make?

6. Do you sponsor or organize special events for your customers? ___ Yes ___ No

If yes, what kind of events?

What is the average turn out?

What facilities do you use?

Is there a charge for these events?

7. Do you sponsor a recreational or sports organization? ☐ Yes ☐ No

If yes, what is the name of the organization/s and what is the total membership?

How often does it meet and what is the average turnout?

8. Are you aware that there are various proposals to build as many as 500 new miles of multi-purpose trails/bikeways in Miami-Dade County? ☐ Yes ☐ No

Would you like more information on these plans? ☐ Yes ☐ No

9. Do you give permission to for us to release your answers to questions 5-8? ☐ Yes ☐ No

APPENDIX 2: USER SURVEY AND SURVEY RESULTS

TRAILS/GREENWAYS/BIKEWAY USER SURVEY

The Institute of Government at Florida International University is conducting a study for Miami-Dade County's Bicycle/Pedestrian Program concerning the management and maintenance of paths, trails, and greenways. Your answers to the following questions will help Miami-Dade County to provide better services in the future. Thank you for participating.

1. What trails/bikeways do you use most frequently? Give name or location.

2. How often do you use the trails/bikeways per year?

☐ 1-5 times a year ☐ 6-11 times a year ☐ 1-3 times a month ☐ 1-2 times a week
☐ 3-7 times a week

3. Which of the activities below most closely describe your use?

<input type="checkbox"/> Commuter cycling	<input type="checkbox"/> Recreational biking	<input type="checkbox"/> Mountain biking
<input type="checkbox"/> Skating	<input type="checkbox"/> Running/jogging	<input type="checkbox"/> Commuter walking
<input type="checkbox"/> Fitness walking	<input type="checkbox"/> Casual walking	<input type="checkbox"/> Equestrian
<input type="checkbox"/> Other _____		

4. Please list any expenditure you made related to this activity during the last 12 months.

Clothing (clothing, shoes, boots, hats, etc.)	\$ _____
Equipment (bikes, horse trailers, horse, etc.)	\$ _____
Accessories (bike racks, water bottles, helmets, radios, spare parts, saddles, etc.)	\$ _____
Books, guides, maps, etc.	\$ _____
Membership/subscriptions, program fees, etc.	\$ _____
Other	\$ _____

5. Overall, how satisfied are you with the trails/bikeways? (Circle one number)

Very Satisfied						Very Unsatisfied
1	2	3	4	5	6	7

6. To what extent do you feel the following items are problems on the trails/bikeways? (Circle one number for each item.)

	Not a Problem						Major Problem
Overall maintenance of the trail/bikeway	1	2	3	4	5	6	7
Litter and glass	1	2	3	4	5	6	7
Poor surface (pot holes, cracks, etc.)	1	2	3	4	5	6	7
Overgrown trees or plants	1	2	3	4	5	6	7
Vandalism	1	2	3	4	5	6	7
Narrow width	1	2	3	4	5	6	7
Too crowded	1	2	3	4	5	6	7
Dangerous road intersections	1	2	3	4	5	6	7
Personal safety	1	2	3	4	5	6	7
Lack of restrooms	1	2	3	4	5	6	7
Lack of drinking water	1	2	3	4	5	6	7
Parking at access points	1	2	3	4	5	6	7
Lack of services (food and drink, bike repairs, etc)	1	2	3	4	5	6	7
Other (please specify)	1	2	3	4	5	6	7

7. Would you be willing to pay a recreational fee² to help build and maintain the trails/bikeways? _ Yes _ No

8. Would you like to receive more information regarding any of the following?

☐ Bike on trains ☐ Bike on buses ☐ Bike lockers ☐ Bike Map
☐ Safety brochure ☐ Everglades Trail Map
☐ South Dade Greenway Plan (Summary) ☐ North Dade Greenway Plan

Comments on maintenance issues:

Comments on funding the maintenance of trails/bikeways:

Additional comments:

USER SURVEY RESULTS

APPENDIX 3: CONTACTS WITHIN MIAMI-DADE AGENCIES

Miami-Dade County Public Works Department

Roger Hernstadt	375-2940	Administration
John Patterson	592-3115	Road and Bridge
Jeff Cohen	375-1912	Bike Coordinator
Javier Bustos	375-2392	Engineering Services

Parks And Recreation Department

Bob Scharbert	662-1888	Administration
Marty Washington	755-7860	Planning
Pat Brady	755-7910	Administration

Miami-Dade Transit Agency (MDTA)

Aleberto Parjus	375-3204	Planning
Suzie La Plant	637-3753	Planning
Sgt. Hobson	639-3181	Corrections
Ron Steiner		FDOT

Florida Department Of Transportation (FDOT)

Contacts:	377-5894	David Henderson, Bike Coordinator
Ron Steiner	470-5351	District, Maintenance Engineer

South Florida Water Management District (SFWMD)

Scott Thorpe	242-5433 ext 7001	Operations and Maintenance
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Miami-Dade County Expressway Authority (MDX)

Roberto Garcia	637-3277	Financial Administrator
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Florida Turnpike Authority

Miami-Dade County Metropolitan Planning Office (MPO)

Jeff Hunter	375-1735	Bicycle/Pedestrian Coordinator
Jae Manzella	375-1735	Assistant Bicycle/Pedestrian Coordinator

APPENDIX 4: CONTACTS IN “BEST PRACTICE” AREAS AND NATIONAL ORGANIZATIONS

Indianapolis Greenways

Tom Olsen, Vice Chairman
Indy Greenways Committee
(317) 297-1283
Ray Irven,
(317) 327-7431

Phoenix

Jim Burke, Deputy Director
Parks, Recreation and Library Department
(602) 534-1870

John Severt,
Traffic Department, Bicycle Program
(602) 262-1650

Portland

Mia Birk, Coordinator
Bicycle and Community Traffic Safety Programs
Bureau of Traffic Management, Department of Transportation
(503) 823-7082

Seattle

Peter Lagerwey, Bicycle and Pedestrian Coordinator
Department of Transportation
(206) 684-5108

APPENDIX 5: GREENWAY/TRAILS MANAGEMENT AND MAINTENANCE SURVEY

Miami-Dade County, in conjunction with Florida International University and The Redland Conservancy, is conducting a study to recommend a management/maintenance entity for its proposed 600 plus mile greenway/trails/bike system.

If your existing greenway/trails/bike system has 100 miles or more, and if you have a dedicated source of funding, regularly scheduled maintenance, privatized maintenance, a multi-jurisdictional system or a combination of any of these, we would like to encourage you to participate in our survey. Please contact Kitty Roedell or Rosa Davis at (619) 274-1997 (Princess Hotel).

General

1. Name: _____
2. Title: _____
3. Organization: _____
4. County/City: _____
5. Number of Miles in System: _____
Paved _____
Unpaved _____
6. Estimated Number of Users: _____
Bikers _____
Walkers _____
Runners _____
Skaters _____
Other _____
7. Have you had really good experience with bike/skate/walk groups working well together?
 - a) What can you learn from such experiences?

Management

1. Do you have a singular management entity that is in charge of your bicycle/trail/greenway system?
 - a) If yes, please describe the entity. If no, go to question 2.
 - b) Do you have line items in budget to pay for this?
 - c) How many management staff does the entity have?
 - d) Who has final approval for policy and budget decisions: a city council; county board of commissioners; appointed board; state officials; some other entity?
 - e) If appointed, who does the appointing?

2. If you do not have a singular management entity, and there is more than one organization in charge of management, name the organizations.
 - a) If you have multiple entities, who coordinates their efforts?
 - b) How is it coordinated?
 - c) Do they have line items to pay for this coordination?
 - d) How many management staff is involved?
 - e) Who has final approval for policy and budget decisions: a city council; county board of commissioners; appointed board; state officials; some other entity?
 - f) If appointed, who does the appointing?
 - g) Does this structure work effectively?
3. Are there different agencies that plan, construct, and manage/maintain the bike paths?
 - a) If yes, what are they?
 - b) Are their efforts coordinated?

Maintenance

1. Do you have a regularly scheduled maintenance program?
2. Do you have a line item budget for maintenance?
3. Who is in charge of the maintenance of the bike paths?
 - a) If you have more than one entity responsible for maintenance, name all organizations that are involved.
 - b) Please estimate how much of the maintenance is done by each organization. (percentage)
 - c) What type of maintenance is provided by each organization.
4. Is maintenance privatized?
 - a) Fully or partly? Estimate percentage.
 - b) What maintenance services are provided?
 - c) What is the duration of the contract?
 - d) What is the amount of the contract?
 - e) Are there performance standards in the contract? If so what are they?
 - f) If you do not have performance standards, could you provide examples of what might be good performance criteria?
5. What percentage of the maintenance do volunteers or organized volunteer programs perform? (i.e. Boy Scouts or Correctional Programs)
 - a) What are the best success stories of joint efforts between volunteer groups keeping pathways clear and public bodies making repairs?
6. Do you have a spot check program or a formal method for the general public to register complaints regarding the bike paths? (i.e. comment cards or 1-800 number)
7. What type of equipment do you use to maintain the paths?
 - a) Estimate annual cost of equipment.

- b) Do you own or lease the equipment?
 - c) What is the normal replacement cycle for the equipment (How long will it last under normal use?)
8. Does your system mark “lanes” on pathways?
 9. Do you know if anyone uses different texture or color paving for street bike lanes?
 10. Is anyone using concrete, composites or polymers in pathway construction?
 11. Has anyone looked into factory-produced pathway surfaces?
 12. Are there any new patching materials that you are aware of?
 13. Does anyone use golf carts (or the like) for specialized maintenance crews dedicated to pathway work?

Budget (If possible, please mail us a copy of your program’s budget. See contact list in the back.)

1. Do you have a dedicated source of funding for management/maintenance?
 - a) If so, what is it?
 - b) If not, how is management/maintenance funded?
 - c) Is the funding part of the general revenues of the jurisdiction? Or is it earmarked in the general revenue, such as a portion of a gas tax?
2. How much do you spend annually on maintenance (operations)? _____
 - a) Routine maintenance _____
 - b) Repairs _____
3. How much do you spend annually on management (administration)?
4. Give cost estimate per mile for:

Maintenance	_____
Management	_____
Maintenance/Management	_____

 - a) Do your total administrative and maintenance costs include overhead for generic support services, such as personnel and finance?
5. Do you have a capital budget for future development and purchase of trails?
 - a) If yes, what is the source of funding?
6. In your opinion, how should we finance maintenance, management, and future development of trails?

Other

1. Do you have any studies, reports, surveys, videos, budgets etc. that may be of assistance to us?
2. Please tell us of 3 or 4 jurisdictions around the country, which you think, are models for the development of greenway/trails/bike systems in terms of management/maintenance?
 - a) Why are they models?

Contacts:

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APPENDIX 6: COST ESTIMATES FOR TRAILS

<i>South Dade Greenway Plan</i> Trail	Average Frequency	Cost/Mile	Estimated Annual Cost	Cost/mile
Biscayne Trail				
Miles	36.2			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$ 47,060	
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile	18,100	
Erosion control	As required	Varies		
Weed control	3	\$400/mile	14,480	
Mowing shoulders	3-4/per year	\$250/mile	9,050	
Graffiti removal & minor repairs	As required	\$250/mile	9,050	
Toilets, drinking fountain service	As required	Varies		
			<u>\$ 97,740</u>	\$ 2,700
Black Creek Trail				
Miles	17			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$ 22,100	
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile	8,500	
Erosion control	As required	Varies		
Weed control	3	\$400/mile	6,800	
Mowing shoulders	3-4/per year	\$250/mile	4,250	
Graffiti removal & minor repairs	As required	\$250/mile	4,250	
Toilets, drinking fountain service	As required	Varies		
			<u>\$ 45,900</u>	\$ 2,700
Princeton Trail				
Miles	15.8			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$ 20,540	
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile	7,900	
Erosion control	As required	Varies		
Weed control	3	\$400/mile	6,320	
Mowing shoulders	3-4/per year	\$250/mile	3,950	
Graffiti removal & minor repairs	As required	\$250/mile	3,950	
Toilets, drinking fountain service	As required	Varies		
			<u>\$ 42,000</u>	\$ 2,700
Mowry Trail				
Miles	11			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$ 14,300	
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile	5,500	
Erosion control	As required	Varies		
Weed control	3	\$400/mile	4,400	
Mowing shoulders	3-4/per year	\$250/mile	2,750	
Graffiti removal & minor repairs	As required	\$250/mile	2,750	
Toilets, drinking fountain service	As required	Varies		
			<u>\$ 29,700</u>	\$ 2,700

Southern Glades Trail

Miles	12.6			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	16,380
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		6,300
Erosion control	As required	Varies		
Weed control	3	\$400/mile		5,040
Mowing shoulders	3-4/per year	\$250/mile		3,150
Graffiti removal & minor repairs	As required	\$250/mile		3,150
Toilets, drinking fountain service	As required	Varies		
			\$	34,020
			\$	2,700

Tallahassee Connector

Miles	6			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	7,800
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		3,000
Erosion control	As required	Varies		
Weed control	3	\$400/mile		2,400
Mowing shoulders	3-4/per year	\$250/mile		1,500
Graffiti removal & minor repairs	As required	\$250/mile		1,500
Toilets, drinking fountain service	As required	Varies		
			\$	16,200
			\$	2,700

Subtotal South Dade Network			\$	510,300
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Total Miles / Cost per Mile	189		\$	2,700
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Flagler Trail

Miles	14.9			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	19,370
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		7,450
Erosion control	As required	Varies		
Weed control	3	\$400/mile		5,960
Mowing shoulders	3-4/per year	\$250/mile		3,725
Graffiti removal & minor repairs	As required	\$250/mile		3,725
Toilets, drinking fountain service	As required	Varies		
			<hr/>	<hr/>
			\$	40,250
				\$ 2,700

Gold Coast Trail

Miles	20.8			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	27,040
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		10,400
Erosion control	As required	Varies		
Weed control	3	\$400/mile		8,320
Mowing shoulders	3-4/per year	\$250/mile		5,200
Graffiti removal & minor repairs	As required	\$250/mile		5,200
Toilets, drinking fountain service	As required	Varies		
			<hr/>	<hr/>
			\$	56,160
				\$ 2,700

Krome Trail

Miles	19.4			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	25,220
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		9,700
Erosion control	As required	Varies		
Weed control	3	\$400/mile		7,760
Mowing shoulders	3-4/per year	\$250/mile		4,850
Graffiti removal & minor repairs	As required	\$250/mile		4,850
Toilets, drinking fountain service	As required	Varies		
			<hr/>	<hr/>
			\$	52,380
				\$ 2,700

Lake Belt Trail

Miles	31			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	40,300
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		15,500
Erosion control	As required	Varies		
Weed control	3	\$400/mile		12,400
Mowing shoulders	3-4/per year	\$250/mile		7,750
Graffiti removal & minor repairs	As required	\$250/mile		7,750
Toilets, drinking fountain service	As required	Varies		
			<hr/>	<hr/>
			\$	83,700
				\$ 2,700

Miami River Trail

Miles	20.9			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	27,170
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		10,450
Erosion control	As required	Varies		
Weed control	3	\$400/mile		8,360
Mowing shoulders	3-4/per year	\$250/mile		5,225
Graffiti removal & minor repairs	As required	\$250/mile		5,225
Toilets, drinking fountain service	As required	Varies		
			\$	56,430
			\$	2,700

Miccosukee Trail

Miles	27.8			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	36,140
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		13,900
Erosion control	As required	Varies		
Weed control	3	\$400/mile		11,120
Mowing shoulders	3-4/per year	\$250/mile		6,950
Graffiti removal & minor repairs	As required	\$250/mile		6,950
Toilets, drinking fountain service	As required	Varies		
			\$	75,060
			\$	2,700

Miller Link

Miles	2.5			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	3,250
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		1,250
Erosion control	As required	Varies		
Weed control	3	\$400/mile		1,000
Mowing shoulders	3-4/per year	\$250/mile		625
Graffiti removal & minor repairs	As required	\$250/mile		625
Toilets, drinking fountain service	As required	Varies		
			\$	6,750
			\$	2,700

M-Path

Miles	9.9			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	12,870
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		4,950
Erosion control	As required	Varies		
Weed control	3	\$400/mile		3,960
Mowing shoulders	3-4/per year	\$250/mile		2,475
Graffiti removal & minor repairs	As required	\$250/mile		2,475
Toilets, drinking fountain service	As required	Varies		
			\$	26,730
			\$	2,700

Turnnpike Trail

Miles	13.8			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	17,940
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		6,900
Erosion control	As required	Varies		
Weed control	3	\$400/mile		5,520
Mowing shoulders	3-4/per year	\$250/mile		3,450
Graffiti removal & minor repairs	As required	\$250/mile		3,450
Toilets, drinking fountain service	As required	Varies		
			\$	37,260
			\$	2,700

Unity Trail

Miles	7.5			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	9,750
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		3,750
Erosion control	As required	Varies		
Weed control	3	\$400/mile		3,000
Mowing shoulders	3-4/per year	\$250/mile		1,875
Graffiti removal & minor repairs	As required	\$250/mile		1,875
Toilets, drinking fountain service	As required	Varies		
			\$	20,250
			\$	2,700

Venetian Link

Miles	4.1			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	5,330
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		2,050
Erosion control	As required	Varies		
Weed control	3	\$400/mile		1,640
Mowing shoulders	3-4/per year	\$250/mile		1,025
Graffiti removal & minor repairs	As required	\$250/mile		1,025
Toilets, drinking fountain service	As required	Varies		
			\$	11,070
			\$	2,700

West Kendall Trail

Miles	11			
Inspection	26	Varies		
Sweeping (paved)	18	\$1,300/mile	\$	14,300
Asphalt trail	As required	Varies		
Litter pickup	12	\$500/mile		5,500
Erosion control	As required	Varies		
Weed control	3	\$400/mile		4,400
Mowing shoulders	3-4/per year	\$250/mile		2,750
Graffiti removal & minor repairs	As required	\$250/mile		2,750
Toilets, drinking fountain service	As required	Varies		
			\$	29,700
			\$	2,700

Total North Dade Greenway	311.9		\$	842,130	\$	2,700
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Total South and North Greenway	501			1,352,430	\$	2,700
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APPENDIX 7: GENERAL ASSUMPTIONS FOR LINE-ITEM BUDGET

The line-item budget and staffing figures shown in Chapter 6 were computed based on a number of assumptions and using several data sources. This appendix describes how the figures were computed. Modifying these assumptions would alter the budget and staffing figures.

BASIC ASSUMPTIONS

- These figures exclude all construction costs. In other words, all of the costs associated with planning, design and construction of the actual pathways were not part of the hypothetical budget nor was any staff associated with such activities included in the staffing figures.
- The total system was assumed to be completed in phases over a ten-year period and staffing and associated operating costs matched the ten-year completion cycle.
- Design and construction were assumed to be done in accordance with best practices for such systems, leading to lower lifetime maintenance costs.
- Out-year figures were not adjusted for inflation.
- Operations and maintenance were assumed to be carried out by a unit of Miami-Dade County government charged with the responsibility for the 600-mile system.
- Use of the system was assumed to be moderate.
- Major landscaping maintenance costs (other than mowing and weed control) were not included in the figures.

Using different assumptions would change the per mile cost figure of this hypothetical budget. Modifying several of these assumptions generally would lead to an increase in the per mile cost of operating and maintaining a greenway system. In particular, by including major landscaping costs, construction planning, design and management costs, and less than “best practice” in construction itself (including materials), we would see an increase in the per mile figure. If the assumptions about use (changing to low rather than moderate) and not using all county staff (assuming privatization of some of the services would be at a lower cost than the county could provide) were changed, then the per mile cost would be reduced.

The remainder of this section explains how the hypothetical budget and staffing figures were derived, beginning with discussion of assumptions used to create the figures in Tables 14, 15 and 16 in Chapter 6.

EXPLANATION OF LINE ITEMS AND STAFFING

The ten-year schedule for completing construction of the remaining 600 miles of the greenways system is, perhaps, ambitious, but it can be done. Construction decisions should be made with as full an understanding of the recurring operating impacts of the new facilities

as possible. As indicated previously, if the county builds the system, it will have to operate and maintain it. Budget planners can easily adjust to a different construction schedule.

Administration

In order to use existing pay plan data to compute salary costs, we used occupation codes and associated step five or mid-range salary figures from the county's Department of Park and Recreation for the greenway agency. (We could have identified other departments and occupation codes to use for this operation, but the salary and fringe figures would likely be similar. Using data from Park and Recreation occupation codes does not necessarily mean that this department should have responsibility for the greenway system.) Consequently, the position of greenway director was assigned occupation code 7325, Park and Recreation Regional Manager, with a mid-range salary of \$75,868. This person's responsibilities include overseeing all operating and maintenance functions, maintaining interdepartmental and intergovernmental relations and the administrative functions of the agency. The agency will have only one director regardless of the number of miles in the system.

The Operations Coordinator provides the day to day supervision of the trails. The occupation code for this position is 7292, with a mid-range salary of \$51,155. This person's responsibilities are tied more to activities, programs and maintenance services directed related to trail usage. Each Operations Coordinator is responsible for approximately 150 miles of trails. So as the system, expands from 150 to 600 miles, this function increases from 1 staff to 4. As the field operations staff increases, the ratio of coordinators to operations field staff remains about 1:4 (see the bottom of Table 16).

A Recreation Specialist 2 assists the Operations Coordinator. This position uses occupation code 7304, at step 5 salary of \$31,662. Approximately one Recreation Specialist 2 is required for every 250 miles of trails. This person would spend most of his or her time in the field, monitoring activities of park rangers and maintenance workers and assisting people using the trails.

Eventually two Recreation Specialist 1's (occupation code 7303, at step 5 salary of \$26,806) would be added to the administrative staff. These positions would assist the Recreation Specialist 2 in fieldwork, covering for vacations, training, meetings and times when trail usage would be particularly high.

The agency is initially supported by one secretary, occupation code 0061, at step 5 salary of \$22,776, until other staffing increases along with the number of miles. Then a second secretarial position is added. This staffing generally maintains a ratio of support to administrative staff of 1:5.

From year one to year ten, miles grow from 150 to 600, a 300 percent increase, and administrative staff increase from 2 to 11, or 450 percent, reflecting in part the understaffing that currently exists as the program gets started. Overall per mile administrative costs decline from \$1,230 in year 1 to \$1,125 in year ten, a decrease of 9 percent, reflecting some economies of scale in overhead as more miles come on line. Fringe benefits were calculated

in accordance with figures provided in the county's *Annual Budget Submission Manual Guidelines*. For the most part, operating line item costs were estimated by using a dollar figure for employee. In general, they closely reflect figures shown in the county's Budget Manual for operations of similar size. For example, communication costs were budgeted at \$1,000 per person per year for office telephones and field radio communication, risk insurance at \$1,000 per person per year, and operating supplies at \$300 per person per year. Operating costs do not include rental of office space. Capital costs reflect the purchase of a computer for each staff person and other support equipment. Communications costs could increase if cell telephones rather than radios were used for fieldwork.

Operations and Maintenance

A 600-mile greenway system would be the largest urban system in the United States. With even moderate use, significant operational and maintenance activities would have to be undertaken to keep the system in good operational condition. As with administration, the occupation codes and related salaries used here were based on codes assigned to the county's Department of Park and Recreation.

Park Rangers (occupation code 7227, step 5 salary of \$16,640) would work primarily in the field as inspectors and troubleshooters. The number of Park Rangers was based on having one ranger for approximately every 100 miles of pathway. This ranger would be responsible for trail inspections. With this staffing level, complete trail inspections could be done once a month with about 8 miles per day or about 40 miles per week. These positions would grow from two to six as the system is built out.

Maintenance positions (occupation code 7250, step 5 salary of \$21,439) consisted of three different sets of activities. The first set of maintenance positions, which begins in year one with one person and ends up with four when the system reaches 600 miles, has responsibility for litter, graffiti, and sign maintenance. It was assumed that one of these maintenance positions would be needed for approximately every 120 miles of trails.

The second set of maintenance positions covers sweeping and the third mowing of greenways. For sweeping, we assumed a weekly cycle time with each worker effectively sweeping six hours per day (allowing for travel, setup, and removal time). The sweeping equipment was assumed to travel at 4 miles per hour. Thus, each worker could complete 24 miles per day. As trail miles increase from 150 to 600, sweeping positions increase from one to five to maintain the same cycle time and effective work hours. In a similar manner, mowing cycles were assumed to be once per month with six effective work hours per employee and a mowing speed of two miles per hour. It was also assumed that both sides of the path had to be mowed, which in effect doubles the number of miles that have to be mowed on a monthly basis. This would require one position in the first year, increasing to five by the time the full 600-mile system was finished.

As with administrative positions, operating costs were generally computed on a per employee basis using the same costs as the operating line items for administrative positions. The contract line item which begins at \$75,000 in the first year and ends at \$350,000 in the year

all 600 miles are built assumed \$500 per mile for repair maintenance that would be contracted to the Public Works Department or a private vendor. This would include repairing potholes, tree limb removal and other expensive resurfacing tasks. Signs were budgeted at \$40 per mile. Equipment costs were assumed to be \$1,500 per position per year for sweeping and mowing with additional equipment expenses running at \$500 per employee on the maintenance side.

