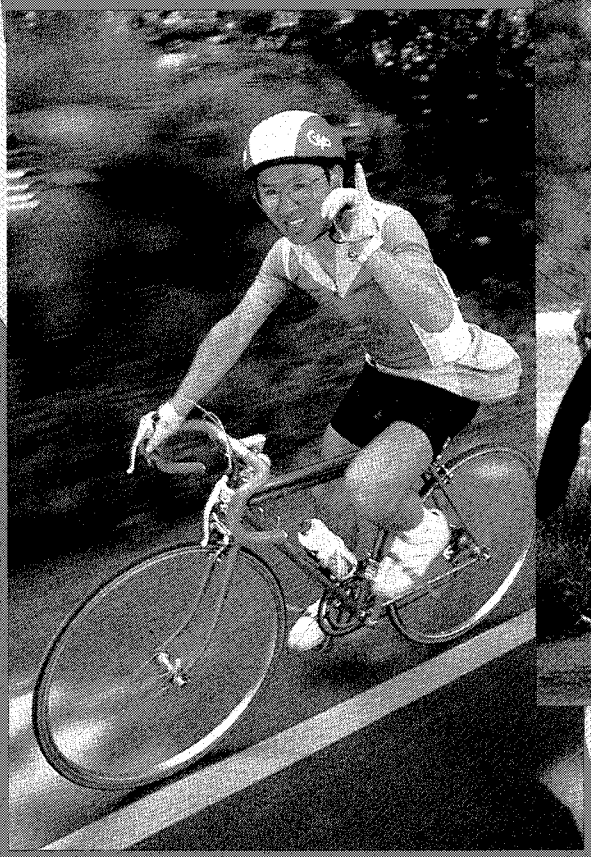
FINAL REPORT

The National Bicycling and Walking Study

Transportation Choices for a Changing America



U.S. Department
of Transportation

**Federal Highway
Administration**

Foreword

This report was prepared under contract for the Federal Highway Administration by Charlie Zegeer, Jane Stutts, Bill Hunter and Wayne Pein of the Highway Safety Research Center and C. David Feske, David Cheeney, Pamela McCarville and Christina Geiger of HDR Engineering, Inc.

Notice

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

The United States Government does not endorse product or manufacturers. Trademarks or manufacturers' names may appear herein only because they are considered essential to the object of this document.

This report does not constitute a standard, specification or regulation.

FINAL REPORT

The National Bicycling and Walking Study

Transportation Choices for a Changing America

Publication No. FHWA-PD-94-023

U.S. Department
of Transportation

Federal Highway Administration

For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-043143-3

Table of Contents

Executive Summary V

CHAPTER ONE
Introduction 1

Background for the Study 3

Report Focus and Layout 6

References 8

CHAPTER TWO
Bicycling and Walking in the United States Today 9

Current Levels of Bicycling and Walking 10
- Nationwide Personal Transportation Survey 10
- U.S. Census Survey 11
- Opportunities for Growth 12

Benefits Of Increased Bicycling and Walking 13
- Health and Physical Fitness Benefits 14
- Environmental Benefits 18
- Transportation Benefits 19
- The Special Benefits of Off-Road Trails 20
- Other Benefits 20

Factors Influencing the Decision to Bicycle or Walk 22
- Initial Considerations 22
- Trip Barriers 24
- Destination Barriers 25

Potential for Increasing Levels of Bicycling and Walking 26
- Government Commitment and Support 26
- Funding Levels 28
- Transportation and Land Use Planning 28
- Public Support for Bicycling and Walking 30
- Other Considerations 31

Program Objectives - A Framework for Action 35

References 37

CHAPTER THREE
Federal Action Plan 39

Past Activities 41
- Research and Special Studies 41
- Operational Programs 42
- Technical and Financial Assistance 43

Future Action Items for the U.S. Department of Transportation 44
- Discussion of the Action Items 44

Table of Contents

CHAPTER FOUR
Action Plans and Programs At The State Level 53

The Concept of Institutionalization 54

Examples of Successful State Programs 56
Minnesota 56
Florida 57
North Carolina 58
Oregon 60
Other State Programs 61

Action Plan For States 62

Measures Of Successful Programs 79
Increased Bicycling and Walking 79
Reduction in Crashes 80

Summary 81

References 82

CHAPTER FIVE
Action Plans And Programs At The Local Level 85

Examples of Successful Local Programs 87
Description of Programs in the United States 87
Other U.S. Local Experiences 92
Successful Local Programs in Other Countries 92

Local Action Plan 95

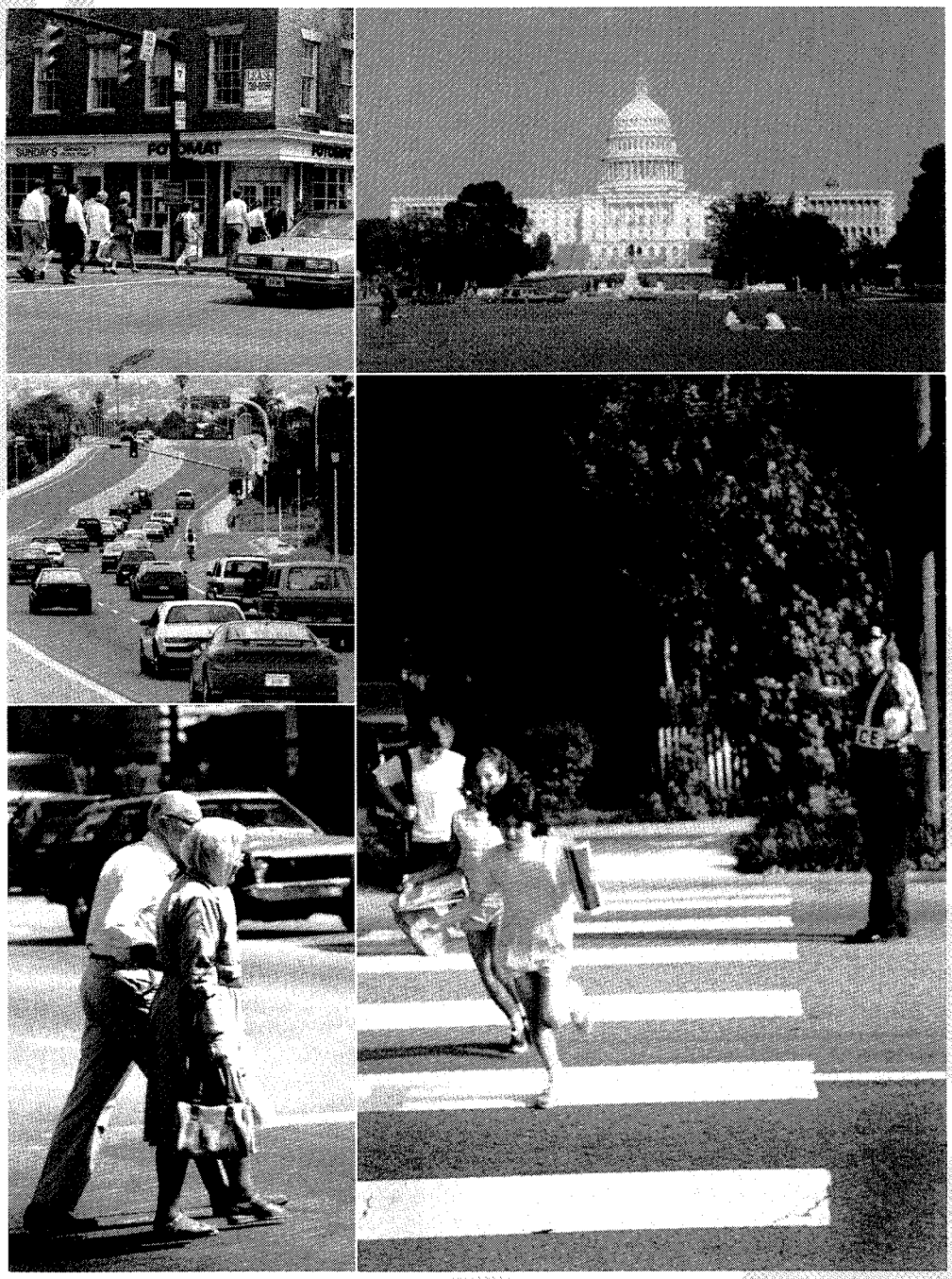
Measures of Successful Programs 116
Increased Bicycling and Walking 116
Reduction in Crashes 117

Summary 118

References 119

CHAPTER SIX
A Vision of the Future 123

Appendices A and B 127
Appendix A The National Bicycling and Walking Study 24 Case Study Reports 128
Appendix B Foreign Experiences 131



Executive Summary

Executive Summary

The current report draws upon all of the work completed to date in outlining a plan of action to promote bicycling and walking as viable transportation options for more Americans. The goals of doubling the current percentage of bicycling and walking trips and reducing by ten percent the number of pedestrians and bicyclists killed or injured are challenging, yet obtainable, and would reap significant transportation as well as other societal benefits.

Chapter 1. Introduction

This report is about enhancing the travel options of bicycling and walking. *The National Bicycling and Walking Study - Transportation Choices for a Changing America* presents a plan of action for activities at the Federal, State and local levels for meeting the following **goals**:

- To double the current percentage (from 7.9% to 15.8%) of total trips made by bicycling and walking; and
- To simultaneously reduce by ten percent the number of bicyclists and pedestrians killed or injured in traffic crashes.

The various activities of the National Bicycling and Walking Study have been carried out under the direction of a working group within the U.S. DOT that included representatives from the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), the Federal Transit Administration (FTA), and the Office of the Secretary of Transportation (OST). Public input to the study was also solicited through a "Notice and Request for Comments" appearing in the February 1991 Federal Register. Additional input was generated through meetings of State and local bicycle and pedestrian coordinators and a broad- based group of bicycling and walking experts from across the United States.

The report has been prepared as part of the National Bicycling and Walking Study mandated by the 1991 U.S. Department of Transportation Appropriations Act. Under the legislation, Congress directed the Secretary of Transportation to conduct a national study to:

1. Determine current levels of bicycling and walking and identify reasons why they are not better used as a means of transportation;

2. Develop a plan for the increased use and enhanced safety of these modes and identify the resources necessary to implement and achieve this plan;

3. Determine the full costs and benefits of promoting bicycling and walking in urban and suburban areas;

4. Review and evaluate the success of promotion programs around the world to determine their applicability to the role required of the U.S. Department of Transportation (DOT) to implement a successful program; and

5. Develop an action plan, including timetable and budget, for implementation of such Federal transportation policy.

Interim Report

An Interim Report was completed in November 1991. The report documented progress toward achieving the five study objectives, summarized available information, discussed additional information required, and outlined the approach to be used to collect such information. Research teams from across the country were selected to complete 24 "Case Studies" addressing specific areas of needed research and synthesis. A limited number of the case studies and the final report are available from the Federal Highway Administration, Office of Environment and Planning, Intermodal Division, HEP-50, 400 7th Street S.W., Washington DC 20590.

Other Research

Other research efforts are currently underway to augment the case studies. A model survey is being developed for better determining current levels of bicycling and walking in individual States and communities. Studies of the impact of various facilities on generating walking or bicycling trips, and of the safety effects of such facilities, are also in progress.

Chapter 2. Bicycling and Walking in the U.S. Today

Current Levels of Bicycling and Walking

A number of national surveys confirm that bicycling and walking are popular activities among Americans of all ages. An estimated 131 million Americans regularly bicycle or walk for exercise, sport, recreation, or simply for relaxation and enjoyment of the outdoors. However, as modes of transportation, bicycling and walking are just beginning to realize their potential. According to the 1990 Nationwide Personal Transportation Study (NPTS), 7.2 percent of all travel trips are currently made by walking and 0.7 percent by bicycling. If the goals of this study are achieved, the combined percentage would double to 15.8 percent. Considering that the average person makes twenty trips per week, this translates to an average of three travel trips per week made by bicycle or on foot rather than automobile trips.

Benefits of Increased Bicycling and Walking

Increased levels of bicycling and walking transportation would result in significant benefits in terms of health and physical fitness, the environment, and transportation-related effects. Research has shown that even low to moderate levels of exercise, such as regular bicycling or walking, can reduce the risk of coronary heart disease, stroke, and other chronic diseases; help reduce health care costs; contribute to greater functional independence in later years of life; and improve quality of life at every stage of life. A recent British Medical Association study concluded that the benefits in terms of life years gained from the increased physical activity of bicycling far outweigh any possible negative effects in life-years lost from injuries or fatalities.

Replacing automobile trips with non-motorized and non-polluting bicycling or walking trips would yield significant environmental benefits. According to *Plan B, The Comprehensive State Bicycle Plan For Minnesota,* public savings from reduced pollution, oil import, and congestion costs alone have been estimated at between

Increased levels of bicycling and walking transportation would result in significant benefits in terms of health and physical fitness, the environment, and transportation-related effects.

five and 22 cents for every automobile mile displaced by bicycling or walking. Increased use of these non-motorized transportation modes can help urban areas reduce their levels of ozone and carbon monoxide to meet air quality standards required under the 1990 Clean Air Act Amendments.

Efforts to facilitate bicycling and walking can also result in more general transportation benefits besides offering additional travel options for those who are unable to drive or who choose not to drive for all or some trips. Roadway improvements to accommodate bicycles, such as the addition of paved shoulders, have been shown to reduce the frequency of certain types of motor vehicle crashes. Urban area congestion can be reduced. Measures to reduce vehicle speeds which can encourage greater pedestrian activity in residential or downtown shopping and business areas also impact positively on motor vehicle safety. Greenways along waterways, railway lines, or other public rights of way yield recreational, educational, environmental, and aesthetic benefits in addition to providing corridors for walking and bicycling transportation. A general enhancement of the "livability" of our cities parallels a truly intermodal transportation system in which bicycling and walking are valuable components.

Given these many benefits, it is not surprising that a recent Harris Poll showed that while five percent of respondents currently walk or bicycle as their primary means of transportation, two-and-a-half times this number would prefer to meet their transportation needs by walking or bicycling if better facilities were available. Survey results may overestimate actual behavior, but they do indicate areas to be addressed.

Potential for Increasing Levels of Bicycling and Walking

The potential does exist for increased

Bicycling and walking are popular activities among Americans of all ages.

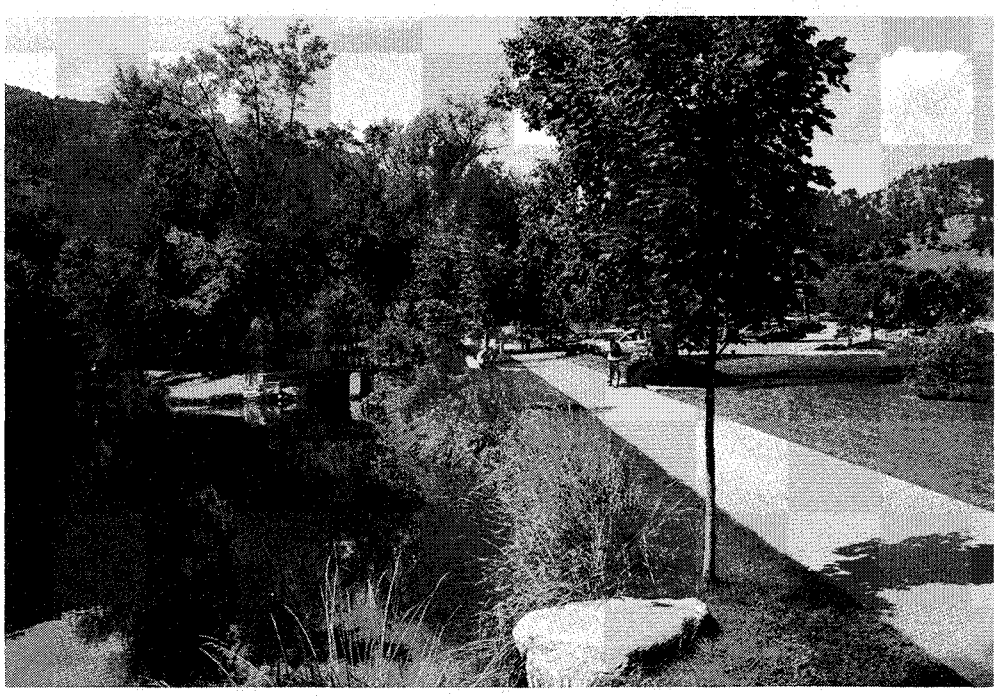
bicycling and walking transportation. Although distance and its companion factor, time, are frequently cited as reasons for not bicycling or walking, data from the NPTS show that more than a quarter of all travel trips are one mile or less, 40 percent are two miles or less, almost half are three miles or less, and two-thirds are 5 miles or less. Moreover, 53 percent of all people nationwide live less than two miles from the closest public transportation route, making a multimodal bicycle- or walk-transit trip an attractive possibility.

Concerns over weather and the carrying capacities of bicyclists and walkers have also been expressed. Proper clothing and equipment address some of these concerns. Perceived and documented safety issues must also be addressed.

While it may not always be possible to replace automobile work commutes with walking or bicycling commutes, only 21 percent of all trips involve travel to or from work. Thus, there are many opportunities to bicycle or walk for errands, shopping, visiting friends, and other trip purposes.

To realize this potential, changes to make bicycling and walking more viable and attractive transportation options must take place. The "four E's" of engineering, education, enforcement, and encouragement must each be individually optimized as well as coordinated into a cohesive promotional strategy. Origins and destinations — homes, workplaces, schools, grocery stores, restaurants, etc. — should be within reasonable walking or bicycling distances of each other. People also need safe routes to bicycle and walk that take them to destinations. Once at a destination they may need a place to park their bicycle and perhaps shower or change clothes.

Addressing these needs to encourage greater use of bicycling and walking transportation will require support



Greenways along waterways yield recreational, educational, environmental, and aesthetic benefits in addition to providing for walking and bicycling.

and commitment at every level of government. The remaining sections outline the steps that need to be taken at the Federal, State, and local levels to realize the National Bicycling and Walking Study's vision of creating greater transportation choices for a changing America.

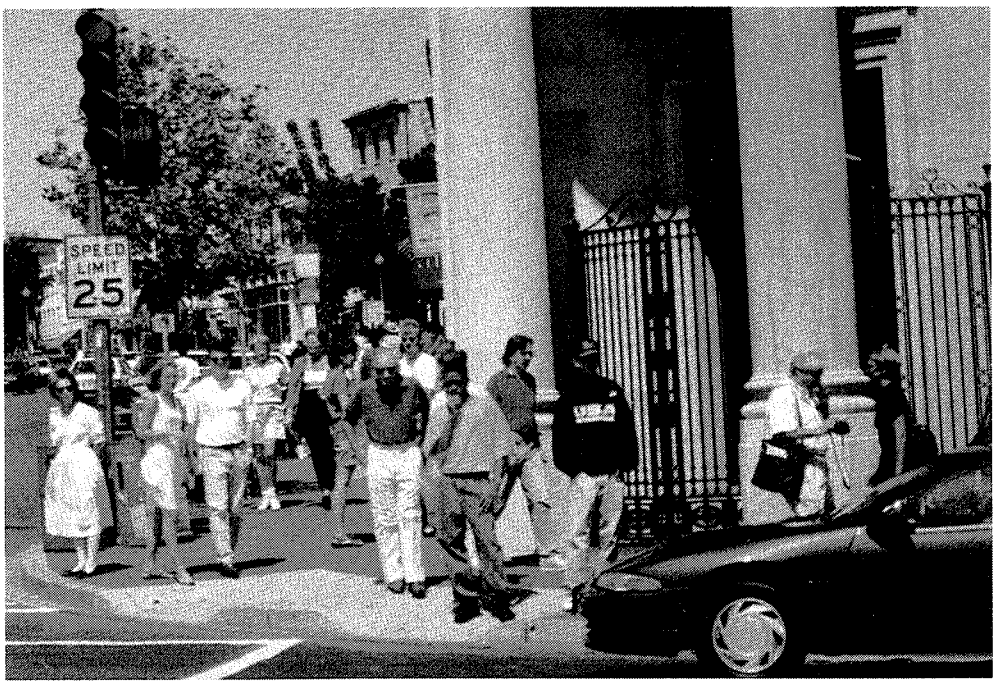
Chapter 3. Federal Action Plan

As stated in "Moving America, New Directions, New Opportunities: A Statement of National Transportation Policy, Strategies for Action" issued in February of 1990, it is Federal transportation policy to:

- Increase pedestrian safety through public information, and improved crosswalk design, signaling, school crossings, and sidewalks; and
- Promote increased use of bicycling and encourage planners and engineers to accommodate bicycle and pedestrian needs in designing transportation facilities for urban and suburban areas.

Additional government support for bicycling and walking is demonstrated in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The ISTEA is Federal legislation which recognizes the transportation value of bicycling and walking and offers mechanisms to increase consideration of bicyclists' and pedestrians' needs within the Nation's intermodal transportation system. Federal-aid funding is available from a number of ISTEA programs, and planning requirements for bicycling and walking are established for States and Metropolitan Planning Organizations (MPOs). Other provisions include the requirement that States establish and fund a bicycle and pedestrian coordinator in their Departments of Transportation, and the continuance of bicyclist and pedestrian safety as priority areas for highway safety program funding.

It is Federal policy to accommodate bicycle and pedestrian needs in designing transportation facilities in urban areas.



The various agencies of the U.S. Department of Transportation, including the Federal Highway Administration (FHWA), National Highway Traffic Safety Administration (NHTSA), Federal Transit Administration (FTA), and the Office of the Secretary of Transportation (OST), all have differing responsibilities in carrying out departmental policy and contributing to the goals of the National Bicycling and Walking Study. Nine Action Items are outlined in the box below.

Each Action Item encompasses specific activities such as:

- Investigate the development of a core bicycle and pedestrian curriculum for inclusion in transportation engineering courses at the undergraduate, graduate, and continuing education levels.
- Implement a national campaign to promote increased and safer use of bicycling and walking.
- Cooperate with other agencies and organizations to develop and promote a bicycle safety program for use at the local level.
- Establish a national non-motorized transportation center and clearinghouse.

Chapters 4 & 5. Action Plans and Programs at the State and Local Levels

States and local areas where successful bicycling and walking programs are considered to be in place are characterized by a higher level of integration of bicyclist and pedestrian needs throughout the policies, programs, and procedures of various government agencies. This process of

Federal Action Items

Action Item 1 Provide **technical guidance** in the interpretation of national transportation legislation and distribute other technical information.

Action Item 2 Fully **integrate consideration of bicyclist and pedestrian needs** into planning; design; operational policies and procedures; and suggested usage, accident rate, and evaluation methodologies.

Action Item 3 Provide **funding** for a bicycle- and pedestrian-friendly infrastructure that includes:

- New facilities and infrastructure retrofitting
- Education for all road users
- Enforcement programs for all road users.

Action Item 4 Provide initial and continuing **education and training** for planning and engineering professionals which encourages routine consideration of the needs of bicyclists and pedestrians.

Action Item 5 Conduct **promotion and awareness activities** to increase the level of bicycling and walking for all trip purposes, and to legitimize these travel modes within the transportation system.

Action Item 6 Carry out activities that increase the **safety** of bicycling and walking.

Action Item 7 Provide **outreach** to other government agencies and develop new public/private partnerships.

Action Item 8 Conduct **research** and develop effective methods of **technology transfer.**

Action Item 9 Serve as a **positive national presence and role model.**

Action Item 1

integration is known as "institutionalization," and results in programs which are comprehensive, have stable funding, and have worked to develop bicycling- and walking-compatible environments.

Using the above criteria, Minnesota, Florida, North Carolina, and Oregon are some States viewed as having successful programs. At the local level, cities such as Seattle, Portland, Boulder, Palo Alto, and Davis, and those of foreign countries, such as Groningen in The Netherlands and Osaka in Japan, seem to have discovered a working formula for what it takes to increase levels of bicycling and walking, a success that is reflected in their rating as among the world's best cities for these activities. These and other programs give us a guiding vision and a wealth of practical experience upon which to draw in developing a comprehensive long-term action plan.

Five major Action Items for State and local governments, each encompassing multiple subitems, are briefly highlighted on the following pages.

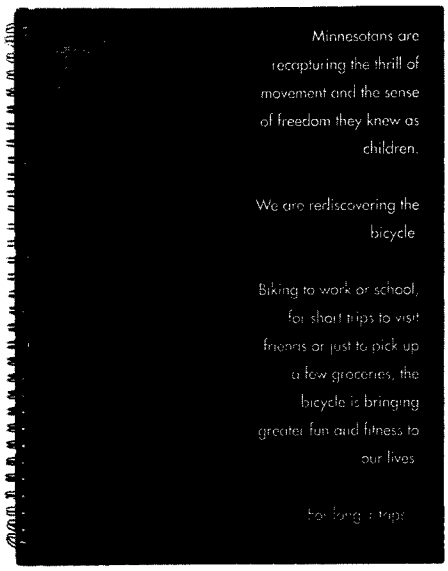
Action Item 1: Organize a Bicyclist/Pedestrian Program

Under ISTEA, States are required to appoint a **bicycle and pedestrian coordinator**. This person is typically the ingredient that holds together the process of building a bicyclist- and pedestrian-friendly environment.

While a coordinator and program staff often constitute a formalized "program," many communities without the benefit of a central contact person have already developed or have begun developing the necessary strategies to foster bicycling and walking. No mandate to establish a coordinator position at the local level currently exists. However, eight of the top 10 cities for bicycling as rated in *Bicycling* magazine have bicycling program coordinators.

Another critical element of the institutionalization of non-motorized transportation is a growing infrastructure of **supportive professionals within government agencies**, including engineers and planners who routinely incorporate bicyclist- and

Bicycle plan for the State of Minnesota.



pedestrian-friendly design features into relevant projects. Coordination between transportation offices and a broad spectrum of other government agencies helps ensure that the needs of bicyclists and pedestrians are addressed not only during project development but in project improvement and maintenance as well.

A Bicycle and/or Pedestrian Advisory Committee (BAC or PAC), comprised of both professional staff and citizens having expertise in bicycling and walking issues, can be an effective tool for generating response to non-motorized transportation needs. Decisions and input of an advisory committee are likely to reflect a balance between the enthusiasm of citizen members and the pragmatism of government employees. In the last 15 to 20 years, the bicycling community has made great strides through "grass roots" activities involving bicycling advisory committees. Pedestrian advocacy groups are just starting to emerge. Such grass roots initiatives serve to generate enthusiasm and cultivate community support.

Action Item 2: Plan and Construct Needed Facilities

Federal legislation such as ISTEA, the Clean Air Act Amendments, and the Americans with Disabilities Act, provide new opportunities to incorporate bicyclist and pedestrian considerations into transportation and other planning and programs. Cooperation between various planning organizations and the realization that a **multimodal and integrated transportation system** is a necessary component of our changing society are being driven by such legislation.

Today's emphasis on bicycle facilities focuses on providing a **combination** of ample road space to safely accommodate bicyclists and motorists side-by-side as well as separate multi-use trails exclusively for non-motorized use. Road space for bicyclists takes the form of marked bicycle lanes, wider outside lanes, and paved shoulders. Space for pedestrians includes facilities such as sidewalks, grade-separated crossings such as overpasses and underpasses, and pedestrian malls.

Action Item 2

A bicyclist- and pedestrian-friendly transportation network provides increased travel options and a supportive environment for bicycling and walking.

Recommended Action Plan for State and Local Governments

Action Item 1:
Organize a bicyclist/pedestrian program

Action Item 2:
Plan and construct needed facilities

Action Item 3:
Promote bicycling and walking

Action Item 4:
Educate bicyclists, pedestrians, and the public

Action Item 5:
Enforce laws and regulations

Action Item 2

A bicyclist- and pedestrian-friendly transportation network provides increased travel options and a supportive environment for bicycling and walking, at the same time encouraging and enforcing responsible behavior among bicyclists, pedestrians, and motorists. But facilities include more than pavement. Bicycle parking, pedestrian crossing signals, curb cuts and ramps, adequate lighting, and showers at work are just some of the other items needed.

Local governments can take a major step in fostering a more balanced transportation system by encouraging **mixed-use zones and compact land use development**. Key corridors can be reserved for bicyclist and pedestrian facility construction and the incorporation of greenways, thus enhancing transportation options, promoting efficient land use and development, creating buffer zones, and ensuring open space. In some instances, area-wide traffic management techniques, including "traffic calming," can help encourage bicycling and walking trips.

Under ISTEA, States and localities have a greater opportunity to develop more bicycling and walking projects. Many funding possibilities exist, and much can be accomplished by agencies other than just the Department of Transportation, including environmental, health, recreational, and educational agencies and departments. Private corporations may offer assistance as well.

In some locations, both on and off road facilities can be provided.

Action Item 3: Promote Bicycling and Walking

A **coordinated approach of public information and awareness programs to promote bicycling and walking yields the best results**. Such an approach may include events like bicycle- or walk-to-work days to encourage bicycling or walking trips to work and lead to more frequent use of these modes.

Magazines and other publications, advertisements and the news media, the involvement of trade organizations and other clubs, employer incentives (reimbursement, parking, "flextime"), and the publication of maps are other promotional methods. Holding conferences is a good way to bring together many elements of the bicycling and pedestrian community, give information, and strengthen group identity and a common mode of operation.

Action Item 4: Educate Bicyclists, Pedestrians, and the Public

Closely tied to promoting bicycling and walking, **education for all road users helps ensure safe travel habits**. Bicyclist/pedestrian programs typically maintain a variety of pamphlets, videos, brochures, and other resources pertaining to safe practices for individuals or groups. Working with the State Department of Education, the program may identify materials for distribution through the schools to ensure that children receive age-appropriate instruction in bicyclist and pedestrian safety education. Education for adults is also needed. The State Division of Motor Vehicles can institute education programs for motorists on safely interacting with bicyclists and pedestrians.

The goals are to double current levels of walking and bicycling and to reduce by 10% the number of bicyclists and pedestrians killed and injured in traffic crashes.

Action Item 5

Action Item 5: Enforce Laws and Regulations

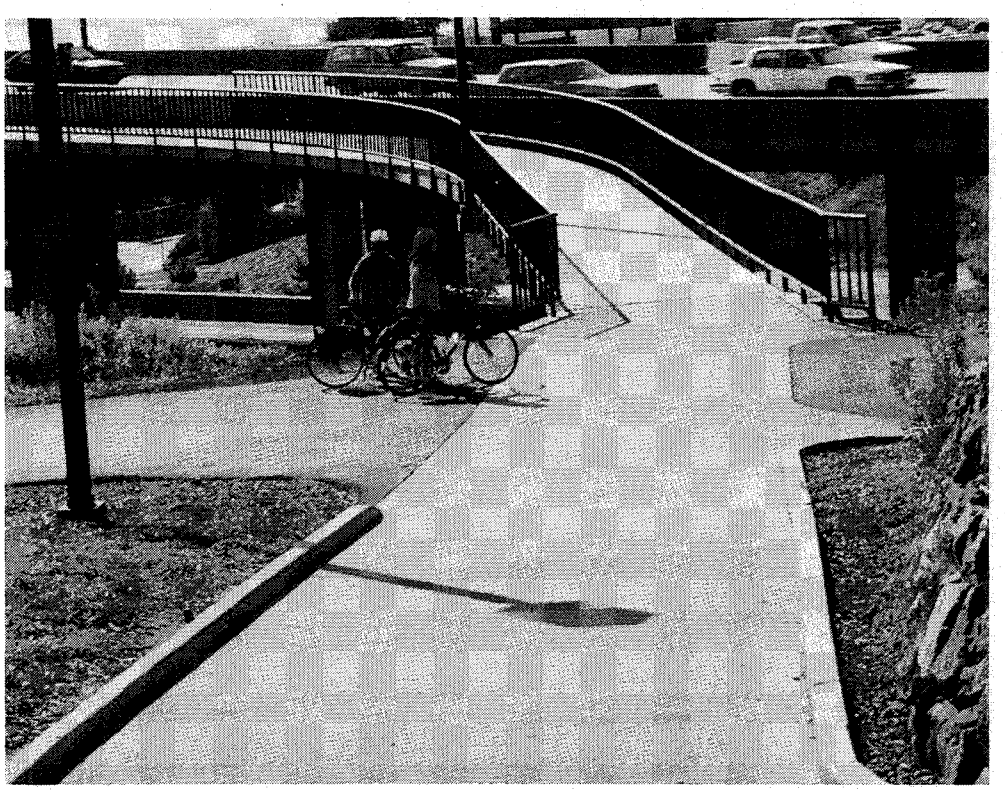
Effective enforcement entails the citing of pedestrian and bicyclist violations, as well as infractions of motor vehicle operators. Enhancing the safety of bicycling and walking will have the most success if enforcement, engineering, education, and encouragement efforts are coordinated.

States can take steps to encourage bicyclist and pedestrian enforcement at the local level, as well as examine vehicle codes which may include regulations or provisions that actually discourage bicycling and walking, such as not providing sidewalks for pedestrians. However, much of what can be done with regard to enforcement and regulation of bicyclist and pedestrian actions occurs at the local level. Areas with a high likelihood of infractions and motor vehicle crashes involving bicyclists and pedestrians, such as central business districts and schools, should be targeted for high enforcement, perhaps by using police patrol on bicycles. In many cases, revisions of local traffic rules or consideration of new laws is needed to promote and encourage safer bicycling and walking.

Chapter 6. A Vision of the Future

The vision of this program is a nation of travelers with new opportunities to walk or ride a bicycle as part of their everyday life. They may walk or bike to a carpool or bus or train as part of a new intermodal trip pattern, or they may find that they can walk or bike with safety and ease all the way to their destination. Many will find that they do not have to use a motor

Bicycling and walking can become attractive options and valuable components of America's transportation system.



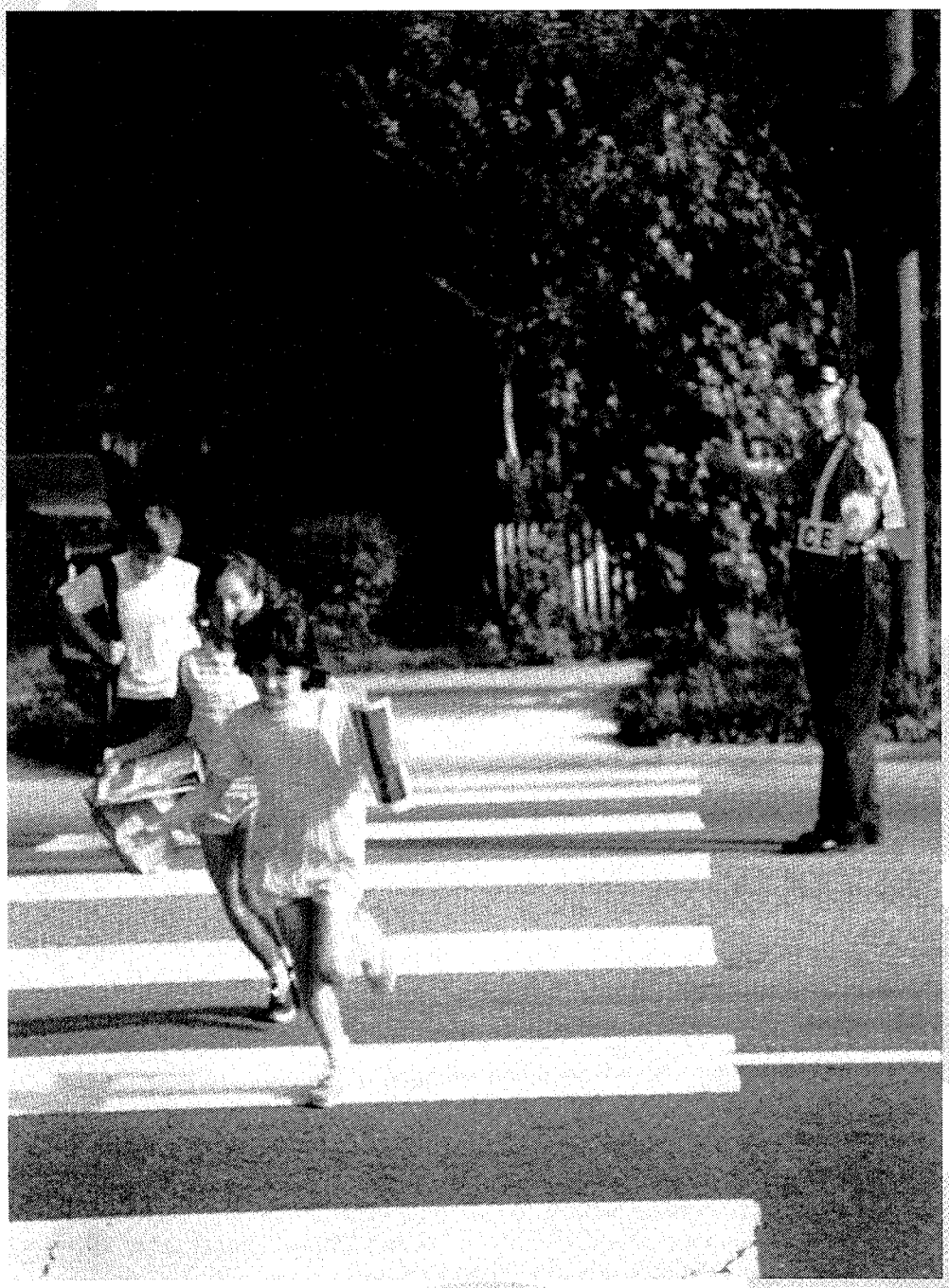
vehicle for trips to church, to work, to school, or to the store. They will like what they are doing for the community and for themselves. America will have a changed transportation system — better balanced to serve *all* travelers.

This is the vision — to create a changed transportation system that offers not only choices among travel modes for specific trips, but more importantly presents these options so that they are *real* choices that meet the needs of individuals and society as a whole. Making this vision a reality must begin now.

Conclusion

If we are to meet the goals of doubling the current levels of bicycling and walking in the United States while decreasing by 10 percent the number of crash-related injuries and deaths, coordinated and committed effort must be put forth at every level of government. In addition, government agencies, private organizations, and citizen groups must all work together to support one another's efforts to promote safe bicycling and walking.

We must continue working toward institutionalizing bicycling and walking into the Nation's transportation system at the Federal, State, and local levels. It is through this evolving and long-term process that the support, facility improvement, promotion, education, enforcement, and enthusiasm needed to achieve our stated goals will come. Bicycling and walking can then become attractive options and valuable components within our Nation's transportation system.



Chapter One

Introduction

Introduction

This report is about expanding **options** for personal transportation. In particular, it is about making the **changes** needed in America's transportation system to encourage greater use of human-powered travel modes. It is about two of the oldest and simplest — and in many ways most intelligent — means of transportation available. It is about **bicycling and walking.**

There are many reasons why Government, working with the private sector, should promote bicycling and walking.

There are many reasons why government, working with the private sector, should promote bicycling and walking. Bicycling and walking are healthy, non-polluting forms of personalized transportation. They do not consume limited natural resources and do not require a costly infrastructure to support, since they can largely use the existing infrastructure if it is modified to meet their needs. Walking and bicycling are available to all segments of society — people of all ages and socioeconomic levels. Increased bicycling and walking can help to alleviate some of the negative effects of intense motorization, including traffic congestion, air pollution, excessive noise, and destruction of the environment.

Bicycling and walking play key roles in the transportation systems of other developed nations, including Japan and most European countries. In Japan an estimated 15 percent of workers rely on bicycles for their commute to work, and in Dutch cities between 20 and 50 percent of all trips are typically made by bicycle (Lowe, 1989). Worldwide, bicycle production outpaces automobile production by a factor of three to one (Lowe, 1989). Of course, virtually everyone is a pedestrian during some part of every day.

Nevertheless, America's cities have "grown up" with the automobile. As a result, they have also grown *outward*, with people traveling increasingly long distances to everyday destinations such as work, school, and shopping. These greater distances have been made possible by and, in turn, have helped fuel the need for more automobiles and for more roadways. As a result, travel by foot or by bicycle has become a less desirable and often infeasible option. In many situations it is also perceived to be more dangerous and threatening. **This does not have to be the case.**

The primary objective of the National Bicycling and Walking Study is to increase the use of these two travel modes by developing a plan for making bicycling and walking safer and more appealing modes of personal transportation. It seeks to create a more balanced transportation system, by providing individuals with more travel options, and in the process make our communities more attractive and pleasant places for living and working. The effort will involve government, planners, designers, engineers, health professionals, educators, law enforcement officials and, most importantly, individual citizens working together to facilitate and accommodate non-motorized travel.

The specific goals of the plan are:

- **To double the percentage of total trips made by bicycling and walking in the United States— from 7.9 to 15.8 percent of all travel trips; and**

- **To simultaneously reduce by 10 percent the number of bicyclists and pedestrians killed or injured in traffic crashes.**

These goals are ambitious, but there

is an unprecedented climate of support for promoting bicycling and walking in the United States. The support comes from all levels, from individual citizens, local and State governments, the U.S. Department of Transportation (DOT), members of Congress, and even the Presidency. The policy of the Federal Highway Administration (FHWA), which is part of the U.S. DOT, states that "Bicycling and walking are two overlooked options in our national transportation mix. The FHWA is committed to working with the States to encourage their use and make them safer" (FHWA, 1990).

It is within this context that the present report has been prepared to offer a plan of action for creating a more balanced transportation system, a system that recognizes the unique benefits of bicycling and walking to individuals as well as to communities across the nation. Consideration of the needs of bicyclists and pedestrians in all transportation programs is the vision of this study.

Background For The Study

The National Bicycling and Walking Study was mandated by the 1991 U.S. DOT Appropriations Act. As part of this legislation, Congress directed the Secretary of Transportation to conduct a national study to:

1. Determine current levels of bicycling and walking and identify reasons why they are not better used as a means of transportation.

2. Develop a plan for the increased use and enhanced safety of these modes and identify the resources necessary to implement and achieve this plan.

3. Determine the full costs and benefits of promoting bicycling and walking in urban and suburban areas.

4. Review and evaluate the success of promotion programs around the world to determine their applicability to the role required of the U.S. Department of Transportation (DOT) to implement a successful program.

5. Develop an action plan, including timetable and budget, for implementation of such Federal transportation policy.

Even before this legislation was passed, the groundwork had been laid for the U.S. Department of Transportation to provide unprecedented support for non-motorized transportation. A statement of national transportation policy issued in the February 1990 report, *Moving America - New Directions, New Opportunities,* asserted that it is Federal transportation policy to:

- Promote increased use of bicycling, and encourage planners and engineers to accommodate bicycle and pedestrian needs in designing transportation facilities for urban and suburban areas.

- Increase pedestrian safety through public information and improved crosswalk design, signaling, school crossings, and sidewalks (U.S. DOT, 1990).

The policy report further acknowledged that "the focus of transportation programs should be moving people and goods, not simply accommodating vehicles or modes. In some

"Without question, bicycling is an efficient, economical and environmentally sound form of transportation and recreation. Bicycling is a great activity for families, recreational riders and commuters. Hillary, Chelsea and I have bicycles..."

President Bill Clinton, Bicycling Magazine, November 1992.

cases, investments in alternative modes may be the best means for alleviating congestion and achieving other objectives in a transportation system, and resources should go to those alternatives if they represent a more cost-effective way to meet transportation needs."

"Bicycling and walking are two overlooked options in our national transportation mix."

FHWA, 1990

The 1990 Clean Air Act Amendments also have positive implications for bicycling and walking transportation. Under the requirements of this legislation, regions not in compliance with established air quality standards must reduce emissions to help bring them into compliance. Bicycling and walking improvements, both construction and non-construction, are approved Transportation Control Measures (TCMs) for attaining these goals and are eligible for special Congestion Mitigation and Air Quality Improvement Program (CMAQ) funding.

Greatest support for renewed government interest in bicycling and walking has come from the 1991 Intermodal Surface Transportation Efficiency Act, or ISTEA (pronounced "ice tea"). ISTEA represents a significant change in national transportation policy, offering greater flexibility to the States and individual localities in developing plans and programs for meeting their transportation needs. It recognizes the transportation value of bicycling and walking and offers mechanisms for increasing consideration of bicyclists' and pedestrians' needs within the national transportation system.

Under ISTEA all States and metropolitan planning organizations (MPOs) are required to develop transportation plans that incorporate programs and facilities for pedestrians and bicyclists. There are currently approximately 360 MPOs representing urbanized areas of 50,000 or more population. Pedestrian and bicycle projects must be included in the plans for these areas to permit funding under the ISTEA. States are also required to establish and fund bicycle and pedestrian coordinator positions to develop programs for promoting and facilitating the increased use of non-motorized modes of transportation.

A number of Federal funding sources have been made available to support these activities under ISTEA. They include National Highway System Funds, Surface Transportation Program Funds (including Transportation Enhancement), Congestion Mitigation and Air Quality Improvement Program Funds, Federal Lands Highway Funds, Scenic Byways Program Funds, and National Recreation Trails Funds. In addition, Section 402 and Federal Transit Funds continue to be available for bicycle and pedestrian projects.

Another outgrowth of ISTEA has been the creation of an Office of Intermodalism within the U.S. Department of Transportation. This office has primary responsibility for coordination between the different modes of transportation. The ISTEA provides new opportunities and strong encouragement for transportation agencies to work together in improving pedestrian and bicycle access, particularly access to public transportation.

The National Bicycling and Walking Study itself was initiated in early 1991. A working group within the U.S. DOT—including representatives from the FHWA, the National Highway Traffic Safety Administration (NHTSA), the Federal Transit Admin-

istration, and Office of the Secretary of Transportation—was established to provide direction to the study. Information on current levels of bicycling and walking was sought through a survey of FHWA field offices. Public input was solicited through a Notice and Request for Comments in the Federal Register published February 5, 1991. By August, more than 500 comments had been received, almost all strongly supportive of efforts to improve conditions for bicycling and walking.

Additional input was solicited through meetings with key individuals from across the country. A meeting of State and local bicycle and pedestrian coordinators was held in May 1991 to provide general guidance to the study and to identify additional research needs. In August, 1991, a group of more than 40 national experts representing a diversity of interests in bicycling and walking was convened in Chapel Hill, North Carolina, to provide input to the project's objectives and review a draft interim report.

The Interim Report for the National Bicycling and Walking Study was completed in November 1991 (FHWA, 1991). Its purpose was to document progress toward achieving the five study objectives: it summarized available information, discussed what additional information was required, and outlined the approach to be used to collect this information.

After publication of the Interim Report, teams of researchers from across the country were selected to complete 24 Case Studies. A listing of the Case Study topics is included in Appendix A, and a limited number of completed report copies are available from the FHWA. The information gained from these Case Studies formed the basis for much of this report.

Other research efforts are currently underway to augment the Case Studies. These include the development of a model survey for determin-

Americans strongly support efforts to improve conditions for walking and bicycling.

ing current levels of bicycling and walking in individual States and communities, a study of the impact of various facilities on generating walking or bicycling trips, and a plan for studying the safety effects of such facilities. These studies are expected to yield timely information for States and localities to use in planning and conducting their bicycle and pedestrian programs.

Consideration of the needs of bicyclists and pedestrians in all transportation programs is the vision of this study.

Report Focus And Layout

The primary purpose of this report is to recommend a plan of action for achieving the study goals of doubling the percentage of bicycling and walking trips, while decreasing by 10 percent the number of crash-related injuries and deaths. Accomplishing these goals will require a coordinated and committed effort at **every** level of government — Federal, State and local. It also demands that government agencies, business, and private organizations work together to support one another's efforts to promote bicycling and walking, for example, by forming public-private partnerships. Transportation departments may take the lead, but planning, recreation, parks, education, health and other departments and organizations all must become involved.

Chapter 2 looks at current levels of bicycling and walking, the potential for increased use, and the benefits of these changes. Chapter 3 presents an action plan for programs and activities at the national level, and Chapters 4 and 5 do the same for the State and local levels. Chapter 6 presents a challenge for the future.

The action plans presented are comprehensive in scope, covering activities directed at increasing public awareness of the benefits of non-motorized transportation, improving facilities to make bicycling and walking more viable and attractive transportation options, providing

The specific goals of the plan are:

- **To double the percentage of total trips made by bicycling and walking in the United States from 7.9 to 15.8 percent of all travel trips; and**
- **To simultaneously reduce by 10 percent the number of bicyclists and pedestrians killed or injured in traffic crashes.**

needed educational and law enforcement support, and "institutionalizing" bicycling and walking into the nation's transportation system.

Throughout the report, examples are offered of successful walking and bicycling programs both in this country and abroad. Insights are provided into what it is like to live in a community where bicycling and walking are integral components of the overall transportation system. Lastly, evidence is offered to support the belief that it is possible to derive significant societal as well as personal benefits from providing more opportunities for bicycling and walking transportation.

References

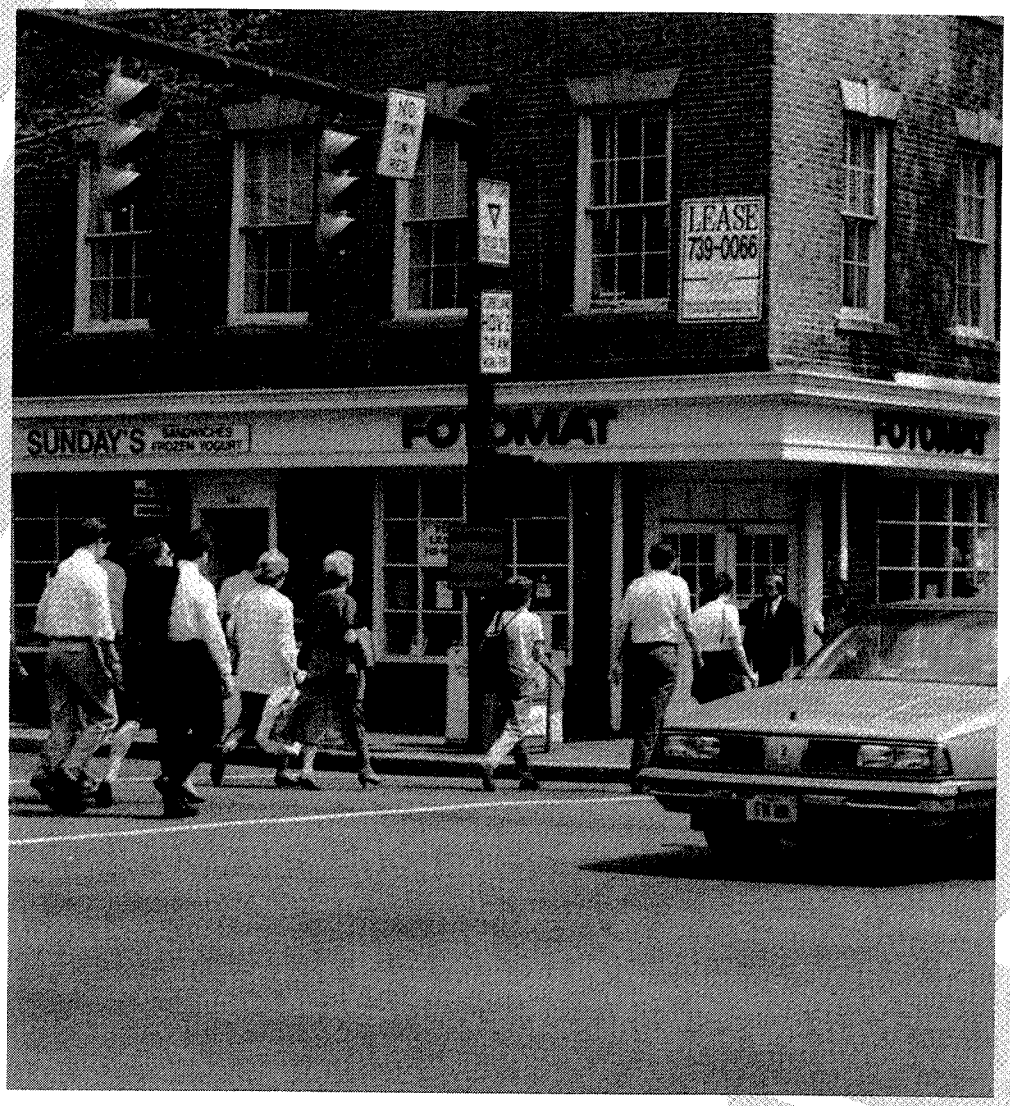
Federal Highway Administration. **Bicycle and Pedestrian Facilities in the Federal-Aid Highway Program** (pamphlet). Washington, D.C.: U.S. Department of Transportation, September 1990.

FHWA Publication No. FHWA-PD-92-008. **National Bicycling and Walking Study - Interim Report**. Washington, D.C.: U.S. Department of Transportation, November 1991.

Lowe, M. "The Bicycle: Vehicle for a Small Planet." Worldwatch Paper 90. Washington, D.C.: Worldwatch Institute, September 1989.

U.S. Department of Transportation. **Fatal Accident Reporting System 1990**. Washington, D.C.: U.S. Department of Transportation, National Highway Traffic Safety Administration, December 1991.

U.S. Department of Transportation. **Moving America - New Directions, New Opportunities. A Statement of National Transportation Policy, Strategies for Action.** Washington, D.C.: U.S. Department of Transportation, February 1990.



Chapter Two

Bicycling And Walking In The United States Today

Bicycling and Walking in the United States Today

Before developing an action plan for increasing levels of bicycling and walking, it is important to know what the current levels are and to identify the benefits that would be derived from increased bicycling and walking. This chapter addresses these issues and also discusses factors influencing the decision to bicycle or walk and the potential for increasing use of these two travel modes in the United States.

Current Levels Of Bicycling And Walking

A number of surveys confirm that bicycling and walking are activities enjoyed by increasing numbers of Americans of all ages:

- A 1982-1983 Nationwide Recreation Survey reported that 28% of respondents had bicycled during the past three months, up from just nine percent in 1960 (U.S. Department of the Interior, 1986).

- The Bicycle Institute of America estimates that 96 million Americans bicycled at least once in the past year. The majority (54%) of these were adults (BIA, 1991).

- According to a National Sporting Goods Associations survey, exercise walking drew 71.3 million participants in 1990, making it one of the fastest growing participant sports (NSGA, 1991).

- A Harris Poll conducted in December 1991, found that nearly half (46%) of American adults age 18 or above had bicycled within the past year. The same survey reported that 73% of adults had walked outdoors specifically for exercise. Over half had walked on at least 10 occasions during the last mild weather month, and 17% had walked on 30 or more occasions (Pathways for People, 1992).

Bicycling and walking are clearly popular activities, whether for sport, recreation, exercise, or simply for relaxation and enjoyment of the outdoors. As the following surveys indicate, however, their potential as modes of transportation, is just beginning to be realized.

Nationwide Personal Transportation Survey

The primary source of information on utilitarian as well as recreational bicycling and walking in the United States is the Nationwide Personal Transportation Survey (NPTS). The survey is conducted approximately every seven years. The first three were home interview surveys; the most recent, conducted in 1990, was a telephone survey. The survey is conducted throughout the year and includes information on the travel of persons aged five and above.

The 1990 NPTS interviewed 48,385 persons living in 22,317 households (Research Triangle Institute, 1991). Each respondent was asked to provide information on all travel during a recent 24-hour period, including the purpose of the trip, distance traveled, and travel mode. Information was collected for each segment of multimodal trips, such as a walk to a bus stop or bicycle ride to a rail station.

Results revealed that only one out of five trips involves travel to or from work, and less than two percent involve on-the-job travel. The largest portion of trips (42%) are family or personal business travel, which includes trips to the grocery store, to

the doctor or dentist, or to transport a child to school. Social or recreational travel accounts for another quarter of trips. This category includes visits to friends or relatives, trips to a park or sporting event, as well as "pleasure driving" and vacation trips (see Figure 1). Overall, 7.2% of all trips were by walking and 0.7 percent by bicycling.

The percentage of bicycling trips is essentially the same as reported in the 1983 NPTS results, while the percentage of walking trips is down slightly from the 8.5% previously recorded (Klinger and Kuzmyak, 1986). The 1990 survey also showed walking to be a frequent component of multimodal trips, although these accounted for only one percent of all trips. All total, an estimated 18 billion walking trips and 1.7 billion bicycling trips were made in 1990 (Research Triangle Institute, 1991).

More than half of the bicycle trips and a third of the walking trips were for social or recreational purposes. Family and personal business travel, along with school and church-related travel, were also significant contributors (see Figure 2).

Average length of a travel trip was 0.6 mile for walking, and 2.0 miles for bicycling. As expected, non-motorized modes were used to a greater extent in central city areas, with their higher densities and compactness, than in the suburbs or rural areas. More than 11 percent of all trips in central cities were by walking or bicycling.

U.S. Census Survey

A second source of information on utilitarian bicycling and walking is the U.S. Census "Journey to Work" survey. The survey is conducted every ten years and is targeted toward participants in the work force aged 16 or above. It is important to note that the U.S. Census survey only reports on travel to and from work, excluding trips to school, shopping,

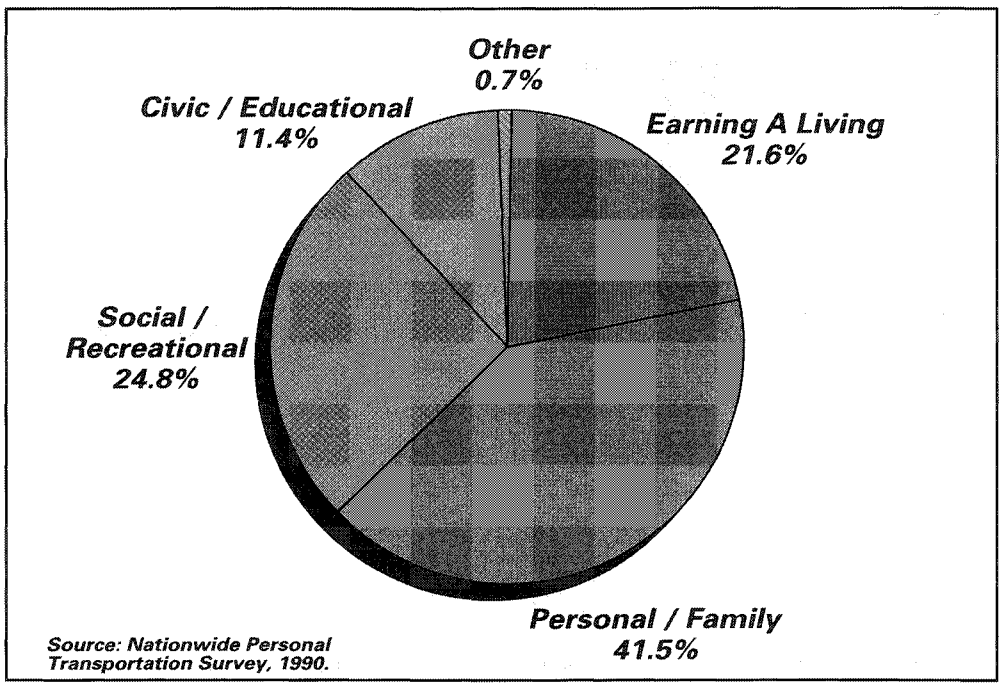


Figure 1. Daily Trips by Purpose for All Travel Modes

and other frequent destinations. Data are collected for a one-week period during the last week in March, making it likely that bicycling and walking trips are underreported for many parts of the country due to cold weather. Moreover, only the predominant transportation mode is requested, so that occasional bicycling and walking trips as well as bicycling and walking trips made to access transit or other travel modes are not recorded.

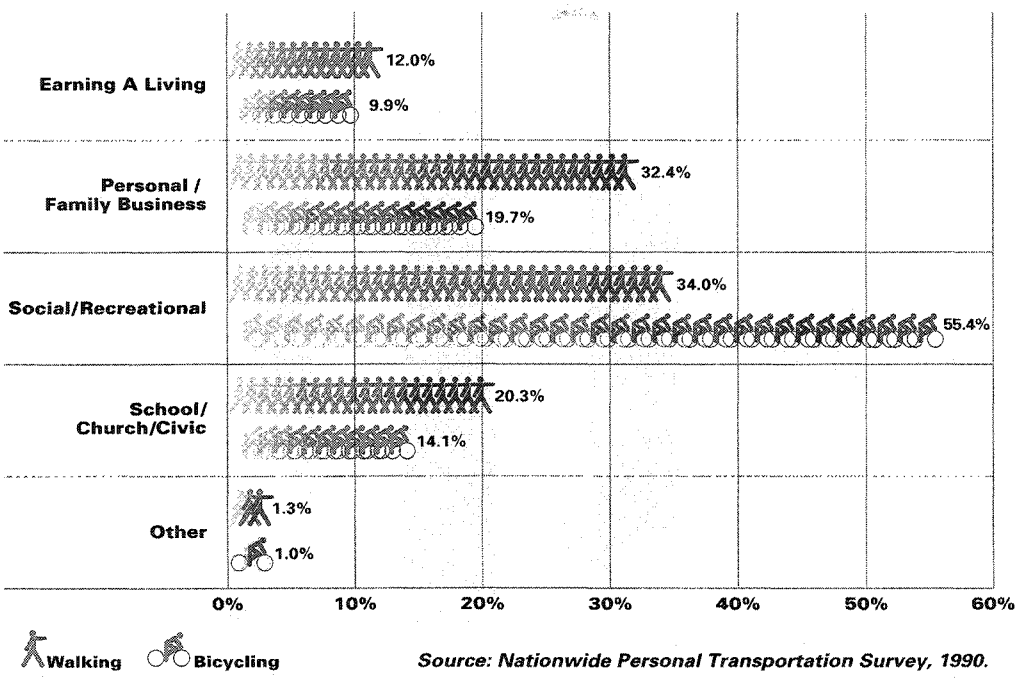
With these limitations in mind, in 1990 an estimated 4.5 million people (4.0 percent of all workers) commuted to work by walking, and just under one-half million (0.4 percent) commuted by bicycle. These are national averages; some cities had much higher percentages of people walking or bicycling to work. It should be noted, however, that the overall percentages for 1990 are down slightly from the 1980 Census results, which showed 5.3 percent of persons commuting by walking and 1.4 percent by bicycling.

Opportunities for Growth

Madison, Wisconsin; Portland and Eugene, Oregon; Davis, California; and Boulder, Colorado, are all places that enjoy relatively high levels of bicycling and walking for transportation as well as recreation and fitness. These and other U.S. "success stories" will be documented in later chapters of this report. Considering these successes, as well as the high levels of bicycling and walking in many European cities, it is clear that the transportation potential of walking and bicycling in the United States has barely been tapped.

As examples, in Delft, The Netherlands, bicycles are used for 43 percent of all travel trips, and in Muenster, Germany, they are used for more than a third of all trips (FHWA Publication No. FHWA-PD-92-037, The National Bicycling and Walking Study Case Study No. 16: Study of Bicycle and Pedestrian Programs in European Countries, 1992). Like the

Figure 2. Walking and Bicycling Trips by Purpose



Source: Nationwide Personal Transportation Survey, 1990.

United States, Japan is a highly motorized society; in Tokyo, however, non-motorized transportation constitutes one-fourth of all travel (Case Study No. 17).

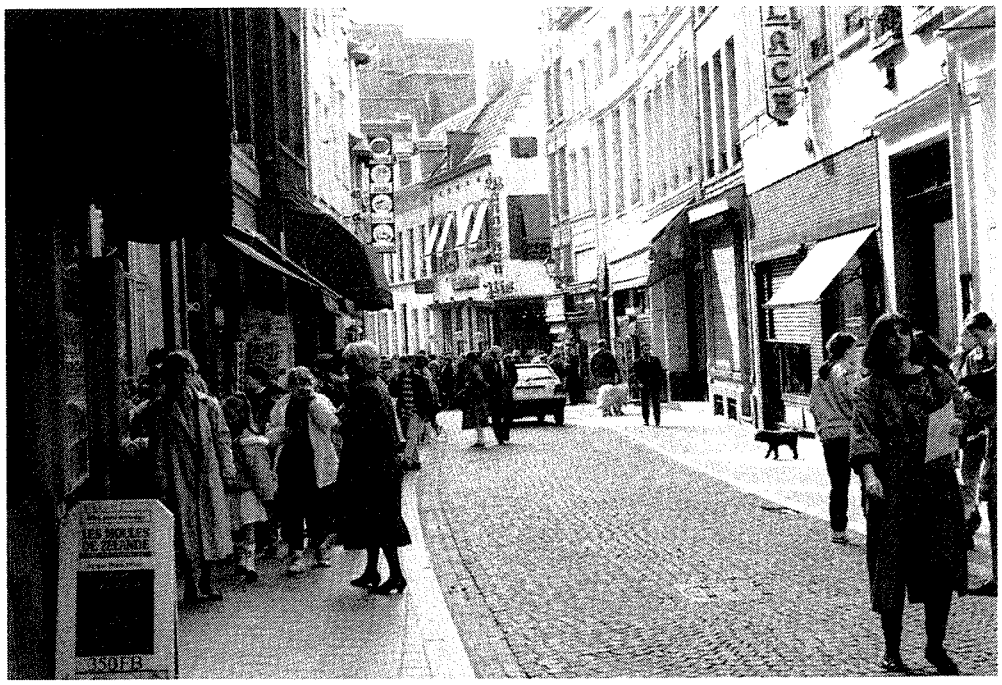
These cities and many others in Europe, Asia, and other parts of the world provide strong evidence that bicycling and walking are more than just good ways of staying fit and enjoying the outdoors. They are modes of travel that can reduce the need for automobile trips and play an important role in the overall transportation system.

The following section highlights some of the benefits of increased levels of bicycling and walking.

Benefits Of Increased Bicycling And Walking

The positive consequences of bicycling and walking as healthy modes of transportation, or as purely recreational activities, span across many aspects of our lives. They can be expressed in terms of the benefits of bicycling and walking as physical activities, the benefits from displaced automobile usage, and the benefits of non-motorized transportation facilities. Economic rewards both to the individual and to society are also realized through reduced health care costs, decreased pollution abatement costs, and the decreased purchase of oil, among others.

As more of America's cities are faced with the environmental, traffic, health, land use, and safety problems that come with increased auto dependency, they must find alternative ways to meet transportation needs without further sacrificing the quality of their living environment. Promoting bicycling and walking can be among the most cost effective ways to meet these needs.



Many foreign countries have streets that provide a safe and pleasant environment for pedestrians.

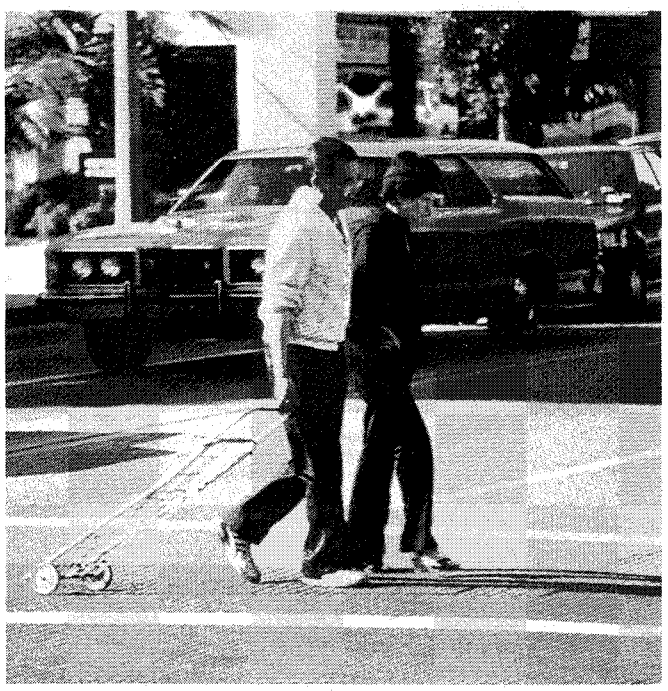
Health and Physical Fitness Benefits

The beneficial impact of regular physical activity on health is far reaching, and its role in the prevention and management of coronary heart disease, hypertension, obesity, diabetes, osteoporosis, and depression is well established. Activity that builds muscular strength, endurance, balance, and flexibility has been shown to protect against injury and disability. Physical activity can also help individuals in the correction of certain health-impairing behaviors such as cigarette smoking and alcohol abuse (FHWA Publication No. FHWA-PD-93-025, The National Bicycling and Walking Study Case Study No. 14: Benefits of Bicycling and Walking on Health, 1992). Bicycling and walking are ideal forms of exercise to accomplish all of these positive outcomes, and can help contribute to the current national goal of reducing the costs of health care.

Physical activity need not be unduly strenuous for an individual to reap significant health benefits. Studies have shown that even small increases in light to moderate activity, equivalent to sustained walking for about 30 minutes a day, will produce measurable benefits among those who are least active. Low to moderate levels of exercise, which can include bicycling and walking, have also been shown to have a positive health effect on stroke, cancer, arthritis, and all causes of disease combined.

Possibly as important as the measurable health benefits are the less tangible benefits, such as improved mental outlook and enhanced well-being, that are associated with physical activity and recreation. Some of the personal benefits of outdoor activities such as bicycling and walking include improved self-image, greater self-reliance, improved social relationships, and enhanced sense of independence and freedom. Bicycling and walking are easily acces-

"Regular physical activity increases life expectancy, can help older adults maintain functional independence, and enhances quality of life at each stage of life" – Healthy People 2000



sible means of outdoor recreation available to and appropriate for all segments of society. They offer significant health benefits while accommodating commuting, utilitarian, social, and recreational trip purposes.

Our sedentary lifestyle. Although the health benefits of physical activity are clear, the 1985 National Health Interview Survey showed that:

> Forty percent of all adults are almost completely sedentary;
>
> Only 7.5 percent or roughly 1 of 13 persons over age 18 reach appropriate physical activity levels; and
>
> Non-compliance with exercise programs is about 50 percent after six months (National Center for Health Statistics, 1990).

Exercise, which was once an integral part of vigorous daily life from childhood onwards, has now been relegated to a consciously sought out leisure activity.

Bicycling and walking in daily life. A recent U.S. Centers for Disease Control handbook, *Promoting Physical Activity Among Adults*, states that "... the most effective activity regimens may be those that are moderate in intensity, individualized, and incorporated into daily activity." Bicycling and walking are healthy modes of transportation that incorporate these components. Bicycling or walking to work, school, shopping, or elsewhere as part of one's regular day-to-day routine can be both a sustainable and a time-efficient exercise regimen for maintaining an acceptable level of fitness. Moreover, two activities can be accomplished at once — travel and exercise.

Meeting national health goals. Regular physical activity benefits all age groups: children are an opportune target for healthy development; adolescents and young adults lay the

"... the most effective activity regimens may be those that are moderate in intensity, individualized, and incorporated into daily activity."

Promoting Physical Activity Among Adults

Combating Heart Disease – the Nation's #1 Killer.

According to current estimates of the American Heart Association, which recently touted its support of regular aerobic physical activity as playing a role in the prevention of cardiovascular disease, more than 69 million Americans have one or more forms of cardiovascular disease. Coronary heart disease, affecting approximately six million Americans and causing about 1.5 million heart attacks and 500,000 deaths a year, is the leading cause of death in the United States.

All cardiovascular diseases cost the United States as much as $135 billion annually (U.S. DHHS, 1991). Much of this is preventable through an increase in societal physical activity. Yet, in 1988 only $13.6 million, or less than $1 of every $500 of health promotion expenditures, was spent by Government in the areas of physical fitness and exercise (Brown, et al., 1991).

Because more people are at risk of coronary heart disease due to physical inactivity than to any other single risk factor such as cigarette smoking, lack of exercise has an especially great impact on public health. Bicycling and walking for transportation and recreation can help to fill America's physical activity void and make a major contribution to enhancing societal health.

foundation for chronic disease prevention; middle-aged adults have the opportunity to assume personal responsibility for their health through lifestyle changes; and older adults can better maintain functional independence.

As an example of the benefits of changed social norms, the reduced public acceptance of certain risks such as smoking or drunken driving has led to many lives saved.

"Many of the leading causes of death for persons age 25-64 are preventable, wholly or in part, through changes in lifestyle. Not only can adults change established lifestyles, social norms related to health can be changed as well."

Healthy People 2000

Societal acceptance and adoption of bicycling and walking as healthy modes of transportation and recreation can help achieve the following physical activity and fitness objectives outlined in Healthy People 2000:

- Increase moderate daily physical activity to at least 30 percent of people, and
- Reduce sedentary lifestyles to no more than 15 percent of people.

Life-years lost versus life-years gained. Approximately 6,500 pedestrians and 850 bicyclists are killed each year in collisions with motor vehicles (U.S. DOT, 1991). Many thousands more are seriously injured. Although the common assumption is that large increases in the numbers of persons bicycling and walking will lead to similarly large increases in persons killed or injured by motor vehicles, this relationship is not conclusive. And it does not have to happen.

The key may lie in first working to create safer, more friendly environments, both physical and social, for bicyclists and those who walk. Then, once people are drawn to greater use of these modes, their numbers may reinforce their greater safety on the roadway as they become more fully accepted as legitimate users of the transportation system. In addition to improved facilities, increased public awareness, education, and law enforcement all play important roles in creating safer environments for bicyclists and pedestrians.

Increased Bicycle Use = Increased Bicycle Crashes?

- **A prerequisite of increased bicycling and walking is an increase in real and perceived safety. This must first be attained through improved engineering, education, and enforcement measures.**
- **A decrease in motor vehicle use may improve the safety of existing bicyclists and pedestrians. Motorists who are novice bicyclists may be more sympathetic to the presence of non-motorists.**
- **Increases in non-motorized travel may give rise to demand for further measures to enhance bicyclist and pedestrian safety.**
- **Motorists may be more likely to anticipate the presence of bicyclists on the roadway, and more accustomed to sharing the roadway with bicyclists.**

A study of bicycle-motor vehicle crashes in King County, WA (incorporating Seattle and nine additional cities with populations over 15,000) reported a decrease in crash rates from 30 per 100,000 population in 1985-1986 to 10 per 100,000 in 1990 (Miller, et al., 1992). The authors state that "such a significant drop in accident rates over an extended period of time is difficult to readily explain, particularly given the dramatic growth in bicycling activity in King County during the study period."

A Swedish study examining bicyclist risk found that, while the total number of bicyclist "conflicts" with motor vehicles (defined as a situation where two road users are on a collision course) increased with increasing bicyclist flow at non-signalized intersections, the number of conflicts per bicyclist decreased. The study concluded that "bicyclists seem to benefit from the presence of each other in terms of personal safety at non-signalized intersections." It was hypothesized that, with an increase in bicyclist flow, motorist perception of bicyclists also increases (Brundell-Freij and Ekman, 1991). A similar result was found in Orlando, FL, where greatly increased amounts of bicycling citywide were accompanied by significantly reduced bicycle-motor vehicle crashes (Burden, personal communication).

While it is difficult to predict precisely the injury outcome of increased bicycling and walking, the overall health impact of increased levels of bicycling and walking will almost certainly be positive due to the many health benefits already identified. As noted in a 1992 publication of the British Medical Association,

> *Policy decisions regarding bicycling have focused on the relatively high injury rate among bicyclists rather than being based on the benefits of bicycling, including healthy longevity... Although a direct quantitative analysis is not possible due to a lack of conclu-*

Benefits to Employers from Increased Bicycling and Walking

Increased employee fitness through commuting by bicycling and walking can result in significant benefits to employers. Corporate-sponsored fitness programs, in addition to improving individual employees' health status, can contribute to an upgraded corporate image; increased worker satisfaction and productivity; and decreased absenteeism, employee turnover, injury rate, and health care costs (Burke, 1992).

Unlike the high cost of typical employee fitness programs, encouraging commuting by bicycling and walking can be a cost-effective means for a company to improve the health of its employees. Conducting a promotional program and providing shower/locker rooms and secure bicycle parking facilities are relatively inexpensive investments that can return high dividends.

Employers may also benefit financially through avoided automobile parking facility costs, which are far more expensive than bicycle parking facilities. Bicycling and walking can also be important components of a company's transportation management strategy to help ensure compliance with Clean Air Act requirements.

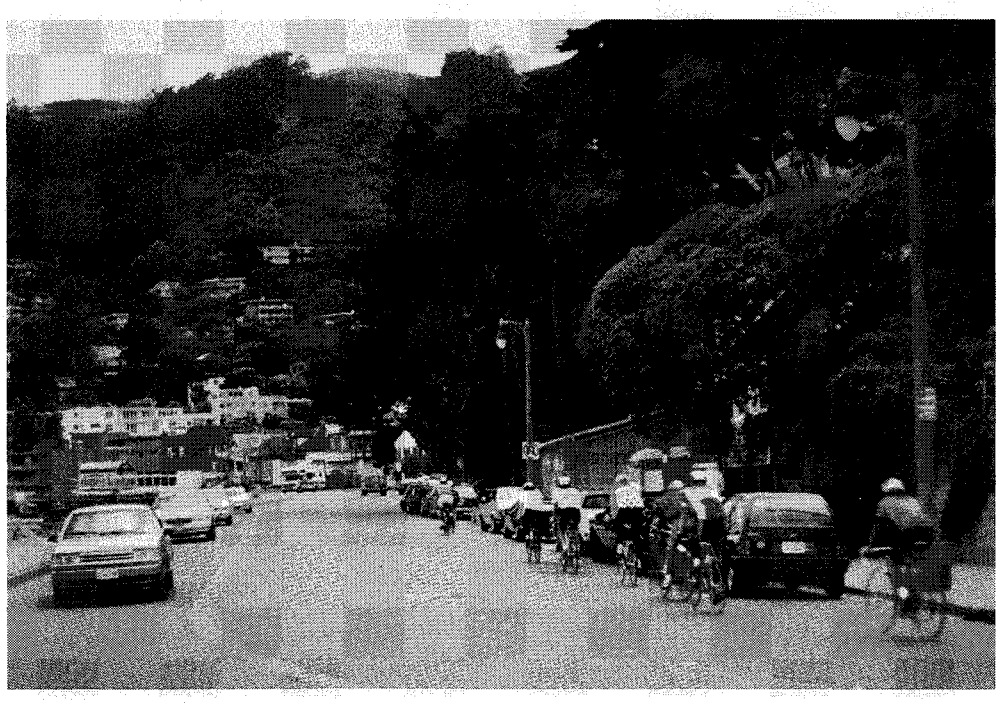
sive data, existing evidence would suggest that, even in the current hostile traffic environment, the benefits gained from regular cycling are likely to outweigh the loss of life through cycling accidents for the current population of regular cyclists.
(Adapted from Hillman, 1992)

Environmental Benefits

Bicycling and walking do not consume petroleum products and are non-polluting modes of transportation. It has been estimated that in the United States in 1991, bicycling and walking were equivalent to between 7.6 and 28.1 billion motor vehicle miles, saving 370 to 1,340 million gallons of gasoline and 4.4 to 16.3 million metric tons of exhaust emission air pollution. In the process they also saved CFC emissions — a leading cause of ozone depletion — since these emissions are a significant by-product of automotive air conditioning units (FHWA Publication No. FHWA-PD-93-015, The National Bicycling and Walking Study No. 15: The Environmental Benefits of Bicycling and Walking, 1992).
Of equal importance to the absolute amount of pollution displaced is that non-motorized transportation does not contribute pollution to the immediate ground level urban environment where people live and work. According to the American Lung Association, total urban air pollution adds at least 50,000 additional respiratory illness cases annually nationwide.

Bicycling and walking replace short distance motor-vehicle trips, which are the least fuel-efficient and generate the most pollution per mile traveled. Carbon monoxide emissions from mobile sources (cars, trucks, buses, etc.) can be as high as 90% of all emissions in urban areas. Under the 1990 Clean Air Act Amendments, ozone and carbon monoxide non-attainment areas must take pollution reduction actions to meet air quality standards. Measures to increase the use of non-polluting bicycling and walking transportation can be effective ways to achieve compliance.

Bicycling and walking offer environmental benefits as well as personal health and fitness benefits.



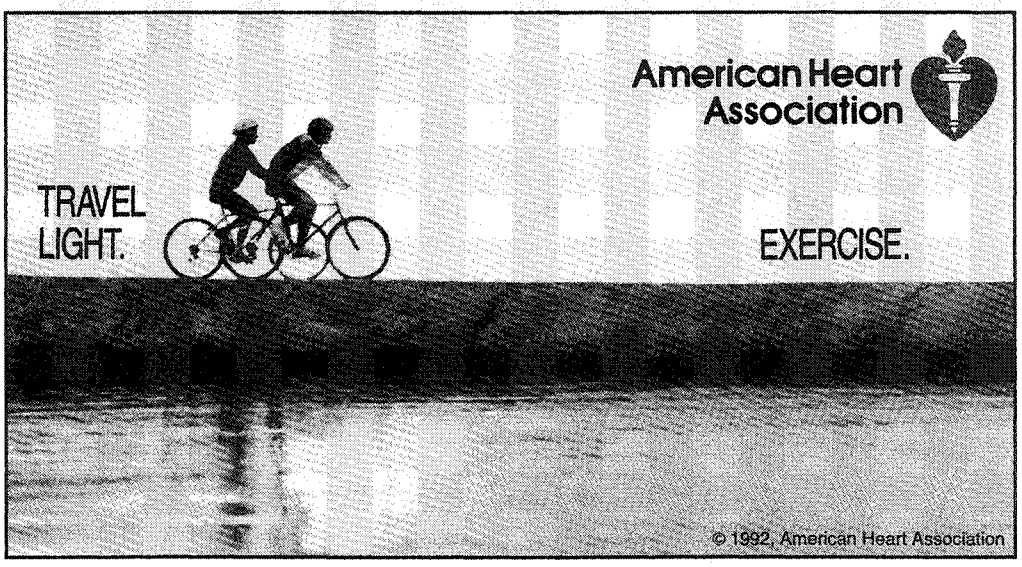
Other environmental benefits of bicycling and walking result from reducing the negative environmental impacts from drilling, refining, transporting, storing, and disposing of petroleum products.

Transportation Benefits

Transportation benefits can accrue in several ways. Roadway improvements to increase the safety of bicyclists and pedestrians can also enhance safety for motorists. As an example, the addition of four-foot wide paved shoulders on rural, two-lane roads has been shown to reduce run-off-road, head-on, and sideswipe motor vehicle crashes by 29 percent, while eight-foot wide shoulders yielded a 49 percent reduction (Zegeer and Council, 1991). Widening improvements can also result in a decrease in the rate of normal roadway edge degradation, thus increasing road longevity and saving money in maintenance costs. These benefits are in addition to enhancing the safety and attractiveness of the roadway for use by bicyclists and pedestrians.

High motor vehicle speed is a primary causal factor in a large percentage of all roadway crashes and is a major deterrent to would-be bicyclists and pedestrians. Speed reduction or "traffic calming" measures are being used successfully by a number of U.S. jurisdictions, particularly in neighborhood and downtown settings. Again, the benefits are twofold: first, in improving the safety of the roadway for all users, and second, in encouraging greater use of non-motorized travel.

Another potential transportation benefit is reduced roadway congestion. Annual costs of congestion have been estimated at $100 billion or more at the high end, while the FHWA estimates urban freeway congestion costs to reach $50 billion by the year 2005 (Case Study No. 15). Bicycling and walking require less space per traveler than automobiles, both in terms of roadway space and parking requirements. Thus, greater reliance on non-motorized travel can help to decrease roadway congestion if conflicts between users can be reduced. Moreover, avoided



costs of new roads or automobile parking facilities could be directed toward far less expensive bicyclist and pedestrian improvements.

The Special Benefits of Off-Road Trails

Off-road trails are one part of a comprehensive network of walking and bicycling facilities that can yield a variety of benefits (FHWA Publication No. FHWA-PD-92-040, The National Bicycling and Walking Study Case Study No. 7: Transportation Potential and Other Benefits of Off-Road Bicycle and Pedestrian Facilities, 1992). Transportation benefits may include increased safety, additional travel options and opportunities for multimodal travel, and the improved linkage of existing non-motorized transportation facilities.

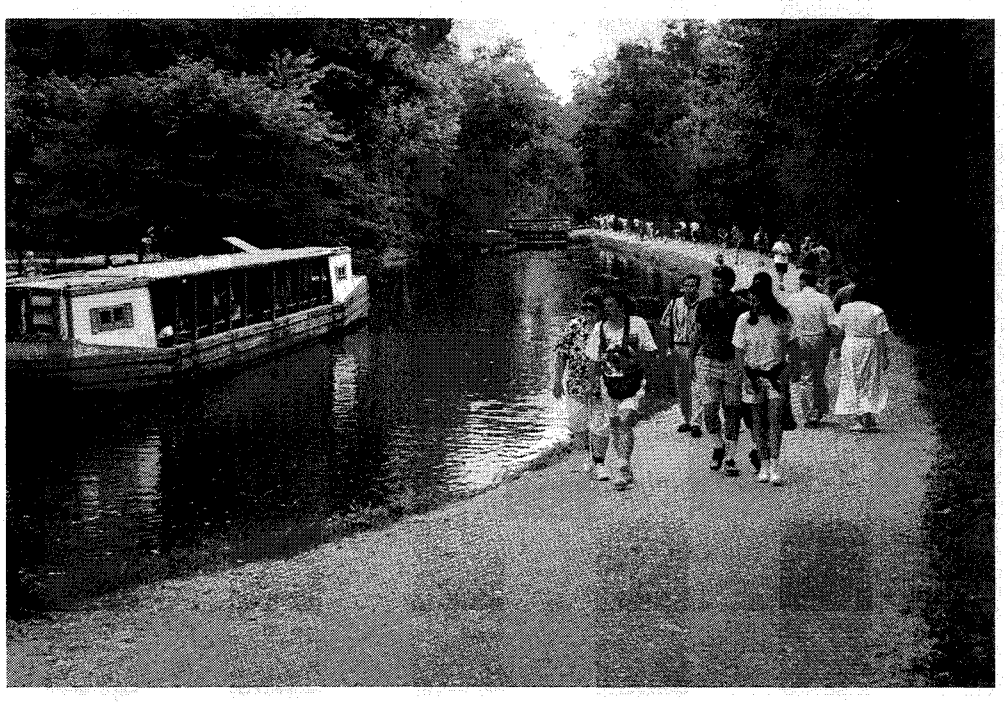
An off-road multi-use trail can function as a linear park or greenway, and in this capacity offer additional broad-based benefits. In contrast to standard "compact" park designs, linear parks are narrow stretches of parkway running alongside waterways, abandoned railway lines, power easements, etc. They may provide opportunities for public access to shorelines, or a habitat for wildlife in urban settings.

Linear parks and trails offer park visitors more opportunities for different and varying experiences than are possible in traditional compact parks. A well-designed system of urban linear trails creates recreational as well as travel opportunities that are more easily accessible to larger numbers of people. In addition, they can link isolated park fragments, turning a disorganized system of open space into an integrated, multipurpose recreation system (see "The Many Benefits of Off-Road Trails").

Other Benefits

Bicycling and walking, and the presence of the facilities to accommo-

Trails offer many transportation and recreational opportunities.



The Many Benefits of Off-Road Trails

Depending on its location and design, a separate bicyclist/pedestrian path can not only serve a transportation function, but may also function as a linear park or greenway (Case Study No. 7). Benefits include:

Transportation

Trails can significantly increase the percentage of bicycling and walking commuter and other utilitarian trips, improve safety, increase access, and promote intermodal travel. In the Chicago area, census zones where five linear trails exist averaged 15.6 percent of commuter trips by bicycle, compared to only one percent for the region as a whole.

Recreational

Trails provide an easily accessible outdoor resource for many forms of recreation in addition to bicycling and walking. Healthy People 2000 calls for greatly increased community availability and accessibility of physical activity and fitness facilities to include more miles of hiking, bicycling, and fitness trails.

Economic

Off-road trails can produce income from shared utility leases, increase the value of neighboring real estate, generate income from tourists and other users, create jobs for trail development and maintenance, and protect existing corridors from development.

Planning Tool

Trails and other greenway corridors promote parkland development, wetland preservation, and environmental protection. They preserve undeveloped lands in urban areas and separate and buffer competing land uses.

Environmental

Environmental benefits fall into the categories of wildlife preservation, water quality protection, storm water management, preservation of vegetation, and other benefits such as serving as a fire break.

Educational

A trail corridor often encompasses several different environments along its route and can be thought of as an outdoor classroom full of educational materials. Value is realized by the scientific community, educators, and students through a wide range of studies such as biology, history, and art.

Historical and Cultural

Off-road trails can educate and increase awareness about the history and culture of a region, aid in the preservation of historic sites, and provide a location for cultural events.

Additional Quality-of-life Benefits

Increases in the quality-of-life associated with off-road trails are realized through expressions of community character and pride, aesthetics of the local environment, economic revitalization of the community, access to the outdoors, opportunities for socialization, and easy freedom of mobility.

date these modes, can promote community cohesion and help foster a heightened sense of neighborhood. Strolling or bicycling through the community or neighborhood can encourage personal contact and give neighbors an opportunity to get to know one another.

Measures to facilitate safe bicycling and walking permit practical freedom of travel choice and increased travel options for everyone, including those who cannot or who choose not to own a car or drive a car for all trips, those who do not live near transit, or those who otherwise have limited travel options.

Considering the many health, environmental, transportation, economic, and other quality-of-life benefits already discussed, the question remains as to why Americans have not more widely embraced bicycling and walking as modes of transportation.

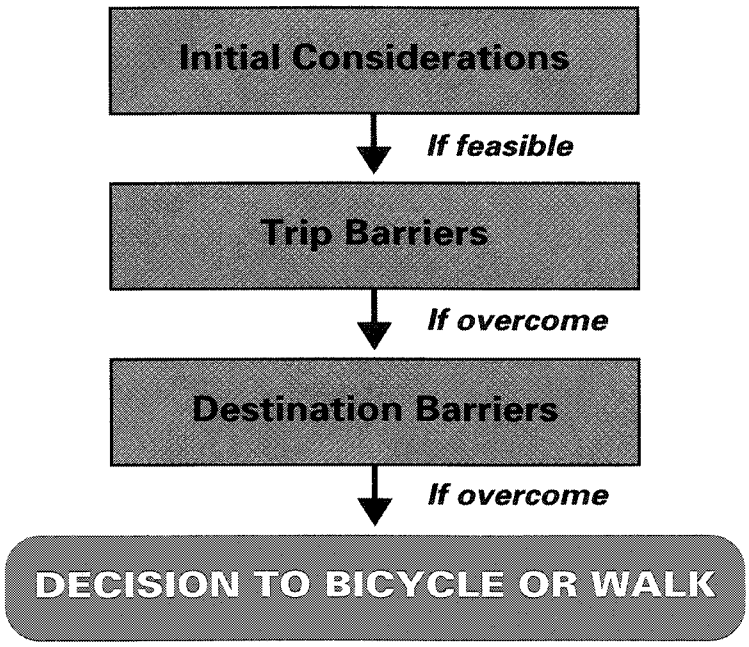
Factors Influencing The Decision To Bicycle Or Walk

Many factors influence choice of travel mode and, in particular, the decision to bicycle or walk. These factors operate at different levels in the decision process. A recent analysis identified a three-tiered hierarchy of factors categorized according to initial considerations, trip barriers, and destination barriers (FHWA PD-93-041, the National Bicycling and Walking Study Case Study No. 1: Reasons Why Bicycling and Walking Are and Are Not Being Used More Extensively as Travel Modes, 1992) (see Figure 3).

Initial Considerations

Many people may never seriously consider the transportation options of bicycling and walking. Overcoming the status quo of automatically relying on a car to travel the three miles to work or three blocks to the drugstore is

Figure 3. Factors in the Decision to Bicycle or Walk



Adapted from Goldsmith, 1992

an important first step in broadening the base of bicyclists and walkers. Activities such as "Bike to Work" days have been successfully employed in many communities to increase awareness of bicycling and walking as viable means of transport.

Distance, or its companion factor, time, is often cited as a reason for not bicycling or walking. According to 1990 NPTS results, the average length of a travel trip is nine miles. Trips to work are slightly longer, while shopping and other utilitarian trips are shorter. More importantly, 27 percent of travel trips are one mile or less; 40 percent are two miles or less; and 49 percent are three miles or less (see Figure 4). All of these trips are within reasonable bicycling distance, if not within walking distance.

Individual attitudes and values are also important in the decision to bicycle or walk. People may choose not to bicycle or walk because they perceive these activities as "uncool," as children's activities, or as socially inappropriate for those who can afford a car. Others may have quite different values, viewing bicycling and walking as beneficial to the environment, healthful, economical, and free from the problems of contending with traffic or finding parking. These and the many other benefits of bicycling and walking described in the previous section are key motivators for many persons not only to begin bicycling and walking, but also to continue to do so on a regular basis.

Individual perceptions (and misperceptions) also play a role in the decision process. Safety concerns such as travelling at night must be addressed. Although walking and bicycling can be accomplished at low levels of exertion, some people perceive that these activities are beyond their capabilities. (FHWA Publication No. FHWA-PD-93-031, The National Bicycling and Walking Study Case Study No. 4: Measures to Overcome Impediments to Bicycling and Walking, 1992). While a very small propor-

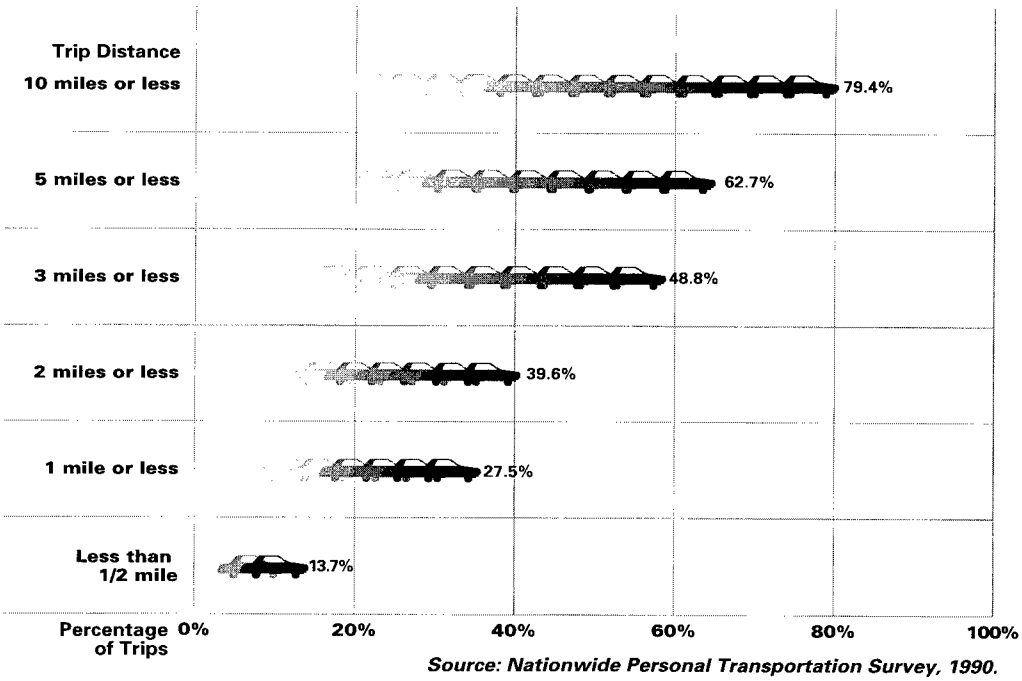


Figure 4 Daily Trip Distances

Source: Nationwide Personal Transportation Survey, 1990.

tion of the population may not have the physical capabilities to walk to a destination or ride a bicycle, for most people these activities are well within their abilities, and as stamina and skill increase such activities become easier and more enjoyable.

Finally, there are situational constraints that, while they may not totally preclude the decision to bicycle or walk, do require additional planning and effort. Examples include needing a car at work, having to transport items that are heavy or bulky, and needing to drop off children at day-care. While these situations may make it more difficult to bicycle or walk, they often can be overcome with advance planning. More analysis of these issues would be useful. If bicycling and walking are not appropriate for one particular trip, a number of trips in which bicycling and walking are viable options are usually present during the course of a day or week.

Trip Barriers

Even with a favorable disposition toward bicycling and walking, reasonable trip distances, and absence of situational constraints, many factors can still encourage or discourage the decision to bicycle or walk. One of the most frequently cited reasons for not bicycling or walking is fear for safety in traffic. (Case Study No. 4). Given the prevailing traffic conditions found in many urban and suburban areas — narrow travel lanes, high motor vehicle speeds, congestion, lack of sidewalks, pollution, etc. — many individuals who could meet their transportation needs by bicycling or walking do not, simply because they perceive too great a risk to their safety and health.

Perceptions of safety as well as actual safety problems must be addressed at the local level. Locational constraints such as a lack of alternative to high speed, high motor vehicle volume roadways must be carefully handled. Adequate facilities can help overcome

Because of their small size at least eight bicycles can fit in the space required to park one automobile, allowing great flexibility in locating bicycle parking – even right next to the destination.

many of these safety concerns, whether these be sidewalks for walking, smooth shoulders, wide curb lanes, bicycle lanes, or off-road paths for the enjoyment of both bicyclists and walkers. Traffic calming measures are another way to enhance bicycle and pedestrian safety and accommodation.

Traffic safety can also be improved through education and law enforcement activities. Training opportunities that help bicyclists feel more competent riding in traffic, campaigns that remind motorists to "share the road," and efforts to cite motorists who fail to yield to pedestrians at intersections are just a few examples.

Even communities with well designed bicycling and walking facilities can still be plagued by problems of access and linkage. A beautifully designed and constructed off-road facility is useless to the bicyclist or pedestrian who cannot traverse a narrow bridge or cross a freeway to get to it. Similarly, facilities that do not connect neighborhoods to shopping areas or downtown businesses may never achieve their intended purpose of increased use of non-motorized travel modes. Directness of the route and personal safety and security considerations are also important factors in people's decisions to bicycle or walk.

Environmental factors could also be considered in this category of trip barriers. Examples include hilly terrain, extreme temperatures, high humidity, and frequent or heavy rainfall. Like many of the other trip barriers cited, these are to a great extent subjective and have been dealt with by those already engaging in these activities, many of whom have effectively overcome these difficulties. For potential users, these issues must be addressed and overcome if that is possible.

Destination Barriers

Facility and infrastructure needs do not stop with arrival at the work site or other destination. Many bicyclists are discouraged from becoming bicycle commuters because once at work they have no place to safely park their bicycle and no place where they can shower and change (although if the trip is made at lower levels of exertion, showering and changing clothes may not be neccessary). The absence of showers and changing facilities can also serve as a barrier to those wanting to incorporate a walk or run into their daily work commute or lunch break.

Secure bicycle parking deserves special attention. The availability of parking is a prerequisite for automobile use; the same holds true for bicycling. Bicyclists are further burdened by the possibility of theft or damage to their bicycles. A Baltimore survey of bicyclists reported that 25 percent had suffered theft, with 20 percent of those giving up bicycling as a result. In New York City, bicycle theft numbers in the thousands annually. Even when parked securely, bicycles are frequently exposed to damage from rain and other environmental conditions. Secure parking areas for bicycles are necessary before bicycle use will increase.

Destination barriers can also take a less tangible form, such as a lack of support from employers and co-workers. Such support can be particularly important for sustaining a long-term commitment to bicycling or walking transportation. In some cases this support may be tangible, such as a discount on insurance costs or reimbursed parking expenses. In other cases it may be less tangible but equally important, such as allowing a less formal dress code or establishing

The Alza Corporation in Palo Alto, CA, pays its employees $1 for each work day they bicycle, walk, or carpool to work; and the City of Palo Alto reimburses seven cents per mile for business travel on bicycle.

a policy of "flextime." The latter might allow employees to adjust their work schedules so that, for example, they do not have to commute during the heaviest traffic times or in darkness.

To summarize, a variety of factors enter into an individual's decision to bicycle or walk for utilitarian purposes. Some of these, such as trip distance, must be considered at the very outset of the decision process. Others, such as route selection, parking, and response from co-workers, come into play later in the process. All must be addressed if current levels of bicycling and walking are to be increased.

"There has never been a better time to promote bicycling than now."

Bicycle Federation of America

Potential For Increasing Levels Of Bicycling And Walking

What is the potential for increasing bicycling and walking in the United States? Can the relatively high levels of bicycling and walking found in cities such as Davis, California and Portland, Oregon be duplicated in other communities? Can U.S. cities approach the high usage levels found in some European and Asian cities?

Clearly if aggregate levels of bicycling and walking are to be increased, changes must occur to remove the barriers previously discussed. This section identifies a variety of factors that impact on the potential of bicycling and walking as viable transportation modes in the United States. Together they form a basis for the action plans presented in the remainder of the report.

Government Commitment and Support

Support for bicycling and walking must be found within the Federal Government, and State and local government offices. Whereas individuals and private organizations can accomplish much in increasing public awareness, identifying needs, etc., it is primarily government that is responsible for creating safer and more appealing places to bicycle and walk. This is accomplished not only through direct improvements to the roadway environment, but also through planning, policymaking, and other government activities. Support and commitment at every level of government are thus the keys to significant increases in the use of bicycling and walking as modes of transportation.

As noted in the Introduction, the Federal Government is firmly committed to support for bicycling and walking. The ISTEA legislation of 1991 makes significant additional commitments to the future of bicycling and walking transportation in the United States.

States are responding to the challenges of the ISTEA legislation, and many are already ahead of its requirements. As mandated, bicycle and pedestrian coordinators have been identified in all 50 States, and a number of States are in the process of developing bicycle and pedestrian plans. Metropolitan planning organizations (MPOs) and individual communities are also beginning to respond to the mandates and opportunities of the ISTEA legislation.

Together, these events offer strong encouragement for the future of bicycling and walking transportation in the United States. As stated on the cover of a recent brochure produced by the Bicycle Federation of America, "There has never been a better time to promote bicycling than now."

ISTEA Funding Sources for Bicycle and Pedestrian Projects

National Highway System (NHS) Funds (Section 1006) may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System (other than the Interstate System).

Surface Transportation Program (STP) Funds (Section 1007) may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or nonconstruction projects (such as brochures, public service announcements, and route maps) related to safe bicycle use. Ten percent of STP funds are used for "Transportation Enhancements" which include the provision of facilities for bicyclists and pedestrians.

Congestion Mitigation and Air Quality Improvement (CMAQ) Program Funds (Section 1008) may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or nonconstruction projects (such as brochures, public service announcements, and route maps) related to safe bicycle use.

Federal Lands Highway Funds (Section 1032) may be used to construct pedestrian walkways and bicycle transportation facilities in conjunction with roads, highways, and parkways at the discretion of the department charged with the administration of such funds.

Scenic Byways Program Funds (Section 1047) may be used to construct facilities along scenic highways for the use of pedestrians and bicyclists.

National Recreational Trails Fund (Section 1302) monies may be used for a variety of recreational trails programs to benefit bicyclists, pedestrians, and other nonmotorized and motorized users. Projects must be consistent with a Statewide Comprehensive Outdoor Recreation Plan required by the Land and Water Conservation Fund Act.

Section 402 Funding Pedestrian and bicyclist safety remain priority areas for highway safety program funding. Title II, Section 2002, of the ISTEA addresses State and community highway safety grant program funds. The priority status of safety programs for pedestrians and bicyclists expedites the approval process for these safety efforts.

Federal Transit Funding Title III, Section 25 of ISTEA, continues to allow transit funds to be used for bicycle and pedestrian access to transit facilities, to provide shelters and parking facilities for bicycles in or around transit facilities, or to install racks or other equipment for transporting bicycles on transit vehicles.

"The infrastructure for automobile travel includes not only the street and highway system, but also safe levels of lighting, ubiquitous parking facilities, and a proliferation of signs, signals, and controls aimed at ensuring a safer driving environment... it is perhaps this type of commitment to a mode that is needed to insure its acceptability and success."

Robinson, 1981

Funding Levels

Commitment implies funding, and vice versa. The recent ISTEA legislation makes substantial sums of money **available** to State and local jurisdictions to construct facilities and to develop programs and materials for promoting bicycling and walking. While funding is available, however, individual States and local jurisdictions are **not required** to use the funds for pedestrian and bicycle projects. ISTEA provides a total of $122 billion for highways under Title 23, approximately half of which can be flexed to transit, bicyclist, or pedestrian programs.

Specific sources of funding for bicycling and walking projects or programs include the National Highway System (NHS) funds, Surface Transportation Program (STP) funds including set-aside Transportation Enhancement Activities (TEA) allocations, Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds, Federal Lands Highway funds, Scenic Byways Program funds, and the National Recreational Trails Fund, as well as Section 402 and Federal Transit Funding. Within each of these categories, bicyclist and pedestrian needs must compete with other highway/motorized projects for funding.

Federal funding of transportation activities in regions which are in noncompliance with national ambient air quality standards is dependent on the local implementation of various Transportation Control Measures (TCMs) specified in the Act. Bicycling and walking improvements, both construction and non-construction, are approved TCMs for reducing emissions to help bring ozone and carbon monoxide nonattainment areas into air quality compliance. Funded at $6 billion over six years, the Congestion Mitigation and Air Quality Improvement Program provides additional resources for transportation projects and programs that are listed as TCMs in the Clean Air Act, that are included in the SIP (State air quality Implementation Plan), or that will have air quality benefits or be likely to contribute toward attainment of a national ambient air quality standard. While the program is aimed at States with non-attainment areas, every State will receive at least 0.5 percent of each year's apportionment. States without non-attainment areas may spend the funds on eligible activities in the Surface Transportation Program.

The U.S. DOT and the EPA have agreed that a wide range of bicycling and pedestrian projects and programs meet eligibility requirements for CMAQ funds. These include the construction of bicyclist and pedestrian facilities, non-construction projects related to safe bicycle use, and State bicycle and pedestrian coordinator positions for promoting and facilitating the increased use of non-motorized modes of transportation. Also eligible are public education, promotional, and safety programs for using such facilities.

Transportation and Land Use Planning

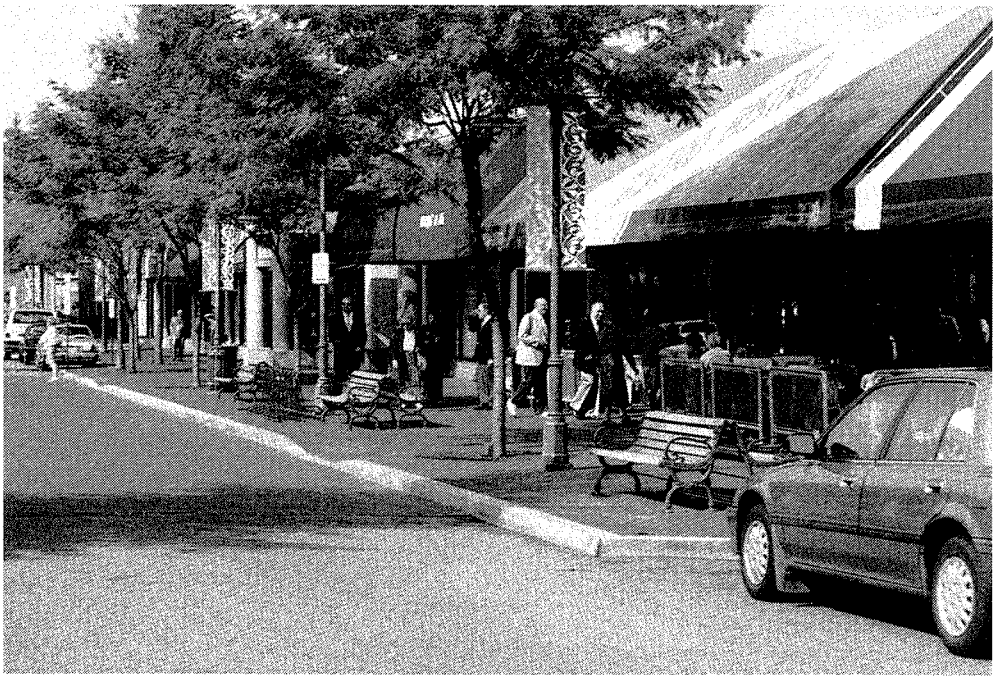
Another key factor is land use planning. Particularly for walkers, long trip distances have been identified as a primary deterrent to greater reliance on non-motorized transportation. Local zoning ordinances that separate business and shopping areas from living areas and the "urban sprawl" that characterizes many American cities strongly favor automobile travel

over bicycling or walking. Increasing the density of development of existing areas by providing a more compact mixture of residential, commercial, and employment centers can attract more use of bicycling and walking transportation.

Major alterations in transportation and land use strategies can only be accomplished over considerable time. However, a growing number of communities are emphasizing more "human scale" development, particularly in downtown shopping and business areas, with a positive impact on bicyclists and pedestrians. Reducing the number of travel lanes, slowing the speed of traffic, and in some instances restricting motor vehicle traffic altogether are some of the "pedestrian-and-bicycle friendly" measures that have helped to revitalize a number of downtown areas.

Even without these kinds of changes to the physical environment, there is still considerable room for increasing levels of bicycling and walking. As noted earlier, the 1990 NPTS data shows that two out of five travel trips are two miles or less, and nearly half are three miles or less. These trips offer strong potential for conversion to bicycling and walking, even under present conditions of "urban sprawl."

In examining the potential of bicycling and walking as travel modes, it is also important to re-emphasize that less than one-fourth of all trips involve travel to or from work or work-related business. The largest proportion of trips relate to family and personal business or are social or recreational trips. These "non-work" trips may actually be the most amenable to bicycling or walking as travel modes, since they often do not face the same rigid constraints in terms of distance, attire, urgency, time of the day, etc., typically associated with home-to-work trips. Transportation Control Measures (TCMs) can also be used to address these "non-work" trips.



Downtown shopping areas can be made "pedestrian and bicycle friendly" by emphasizing human scale development through the use of trees, seating, narrowed streets, attractive pavings, and the addition of bicycle parking.

Public Support for Bicycling and Walking

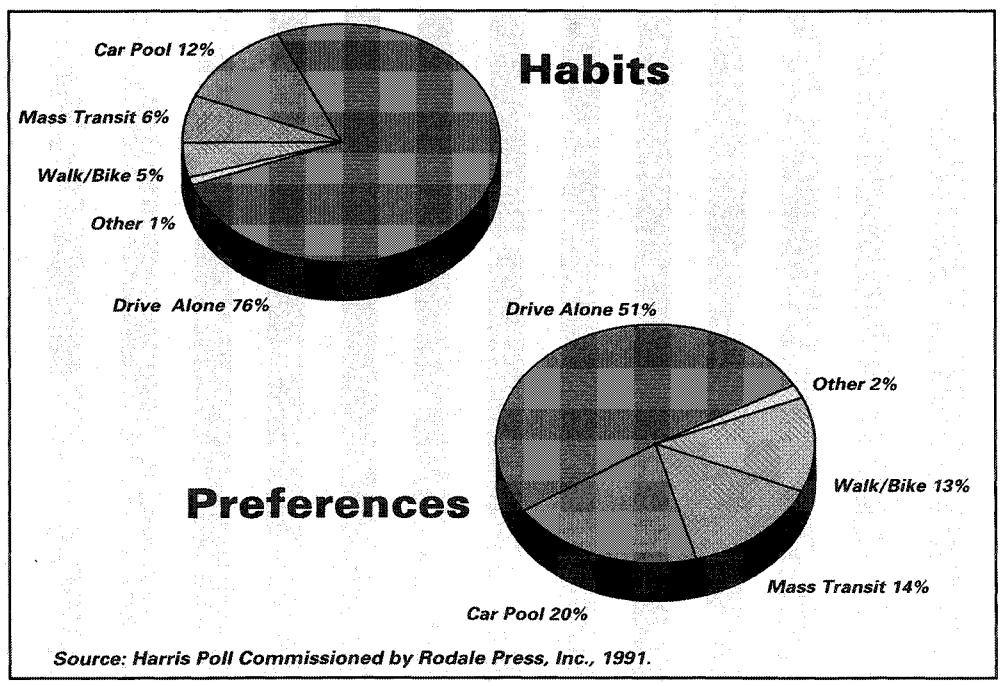
Regardless of the commitment of Federal, State and local governments to bicycling and walking transportation, and regardless of the "walkability" or "bicycleability" of our cities and towns, the full potential of bicycling and walking as transportation modes will not be realized if the public is unwilling to recognize and embrace them as viable transportation options. Both Government and the private sector can play key roles here by working to increase public awareness of bicycling and walking and actively promoting their use. Programs to increase employee use of non-motorized transportation, including innovative Transportation Demand Management plans, police-on-bikes, and U.S. Postal Service employees on bicycles, all can help to legitimize non-motorized transportation.

If recent survey results are any indication, the public already strongly supports increased travel options. The 1991 Harris Poll cited earlier showed that 46 percent of adults aged 18 and older — 82 million Americans — had ridden a bicycle in the previous year. Of these:

- 46% stated they would sometimes commute to work by bicycle if safe bicycle lanes were available;
- 53% would if they had safe, separate designated paths on which to ride;
- 45% would if their workplace had showers, lockers, and secure bicycle storage; and
- 47% would if their employer offered financial or other incentives. (Pathways for People, 1992)

Similarly, 59 percent of the respondents reported that they would walk, or walk more, if there were safe, secure designated paths or walkways, and 55 percent would if crime were not a factor. Overall, five percent of

Figure 5. Transportation Habits & Preferences If Facilities Existed



Source: Harris Poll Commissioned by Rodale Press, Inc., 1991.

respondents reported that either walking or bicycling was their primary means of transportation; but given adequate facilities, 13 percent would prefer to meet their transportation needs by walking or bicycling (see Figure 5). Respondents also indicated that they want their government to enhance their opportunities to walk and bicycle (Pathways for People, 1992).

Another indication of the public's desire for increased opportunities to bicycle and walk can be found in the overwhelmingly positive responses to the Federal Register notice soliciting comments for the National Bicycling and Walking Study. Most of the respondents clearly indicated a desire to walk and bicycle more if appropriate facilities were provided.

Other Considerations

Other factors can also significantly impact on the potential for bicycling and walking in the United States. Of particular relevance are (1) the linkage of bicycle and pedestrian travel to transit, (2) the expansion of recreational bicycling and walking to more utilitarian uses, and (3) the potential impact of bicycle design technology.

The transit connection. An important outgrowth of the ISTEA legislation is the creation of an Office of Intermodalism within the U.S. Department of Transportation. This office has primary responsibility for coordination between the different modes of transportation. In the past, intermodal research, planning, and programs attracted relatively little attention in the United States, in part because transportation agencies are organized along modal lines. The recent legislation offers new opportunities and strong encouragement for transportation agencies to work together to improve pedestrian and bicyclist access to public transportation (FHWA Publication No. FHWA-PD-93-016, The National Bicycling and Walking Study Case Study No. 9:

Secure bicycle parking such as lockers at transit stops is essential for bicycle access, and the ability to transport the bicycle on transit greatly expands the area serviced.

Bicycle and Pedestrian Policies and Programs in Asia, Australia, and New Zealand, 1992).

The potential for bicyclist and pedestrian integration with transit is enormous. According to 1990 NPTS data, 53 percent of all people nationwide live less than two miles from the closest public transportation route. The median length of an automobile trip to access a park-and-ride lot for public transit is 2.3 - 2.5 miles; and for a kiss-and-ride trip in which a passenger is dropped off, median trip length ranges from 1.3 - 1.6 miles (Case Study No. 9).

Since these short-distance "cold-start" motor vehicle trips generate significant pollution, improved bicyclist and pedestrian access to transit can also reap environmental benefits. A 1980 Chicago area transportation study found bike-and-ride to be by far the most cost-effective means of reducing hydrocarbon emissions. Results of recent studies indicate that if only 0.5 percent — one out of every 200 workers — living less than two miles from a transit route and currently commuting by auto could be attracted to bike-and-ride travel, nationwide gasoline savings of 20 to 50 million gallons would be realized annually. The conversion of only 10 percent of park-and-ride commuters to bike-and-ride could result in gasoline savings of more than 2.2 million gallons annually (Case Study No. 9).

"Transportation is now viewed primarily as the movement of people by cars, buses or other motorized vehicles. Yet growing numbers are walking and bicycling to work, school and other destinations and use sidewalks, paths, and roadways for local transportation. Trail systems provide an alternative transportation system at the local and metropolitan level. Trails can connect homes with schools, offices, and shopping areas. They can be designed as much for transportation as for recreation and allow people to appreciate the outdoors while reducing air and noise pollution and energy consumption."
(Trails for All Americans, 1990)

While much potential remains unrealized, the bicycle-transit link is gaining momentum:

- In Phoenix, Arizona, the first major city to use bus bicycle racks systemwide, there are an estimated 13,000 bicyclist boardings per month.
- In the first three months of Portland, Oregon's Tri-Met program, more than 700 bicyclists bought permits to allow bicycles on bus and light rail.
- Pierce Transit in Washington allows bicycles to travel inside transit vehicles.
- In California, surveys show that one-third to two-thirds of bicycle locker users at park-and-ride lots drove alone to their final destination before switching to bike-and-ride. In San Diego, the average bicyclist rides 3.6 miles to access a locker prior to traveling another 11 miles by transit.

Recreational bicycling and walking. The popularity of bicycling and walking as recreational activities as well as healthy forms of outdoor exercise is well documented. Over the past decade, both activities have enjoyed widespread and growing

participation by the American public. The distinction between recreational bicycling and walking and utilitarian bicycling and walking is not always clearcut. One approach is to classify a bicycle or walking trip as "utilitarian" only if it would otherwise have been made by an alternative mode of transport, such as a car or bus (the "mode substitution" test). By this definition, the age of the person and the nature of the facility on which the travel takes place do not enter into consideration. If a child rides a bicycle, even on the sidewalk, down the street to a friend's house, this is a legitimate transportation trip.

The blending of recreational and transportation trip purposes and facilities is perhaps best evidenced by the Rails-to-Trails movement. The idea behind the movement beginning in the mid-1960's, was simple: to convert abandoned or unused rail corridors into public trails (Nevel and Harnik, 1990). The first trails were little more than unpaved and ungraded stretches of "scrap land" used primarily by hikers and casual walkers, but over time they evolved into more finely-tuned facilities, often paved, and immensely popular with the new breed of mountain-bike riders and joggers. Today there are nearly 3,000 miles of such linear greenways, with an estimated 27 million users a year.

Trails serve a variety of purposes — environmental conservation, habitats for wildlife, educational resources, as well as preservation of the rail corridors themselves. But beyond these uses, they also serve as a valuable system of urban corridors for bicycling, walking, and other forms of non-motorized transportation.

Despite the tremendous growth in the Rails-to-Trails program over the past two decades, the market remains virtually untapped. Only about two percent of the total mileage of track abandoned in this century has been converted to trails. Nearly 150,000

A key to increased usage is to convert recreational bicyclists and walkers into using these modes for everyday trips such as going to the store.

miles of abandoned track remain available for development, and much of this is located in urban areas. The Rails-to-Trails movement thus holds tremendous potential for recreational as well as utilitarian bicycling and walking.

The kinds of grassroots efforts that make rails-to-trails conversions a reality are typical of the actions of bicyclists across the country, who over the past two decades have been organizing in a variety of ways to improve their acceptance and safety on the roadway. From national groups such as the 23,000-member League of American Wheelmen (LAW) and 25,000-member Bikecentennial, to State-level bicycle advisory boards and local bicycle clubs, there is already in place an extensive network of resources to support current efforts to increase levels of utilitarian bicycling. While pedestrians have not organized themselves to the same extent as bicyclists, the potential exists here as well, as evidenced by Prevention magazine's 70,000+ member Walking Club and local groups such as Walk Boston. Currently the Bicycle and Pedestrian Federations are organizing a national bicycle and pedestrian advocacy campaign.

According to the Bicycle Federation of America, there are already an estimated 131 million recreational bicyclists and walkers. These people have demonstrated their ability to travel under their own power. They have also experienced first-hand the fitness, health, psychological, and other benefits of bicycling and walking. This population will be instrumental in achieving the goal of doubling the percentage of utilitarian bicycling and walking.

The primary question that remains is how to convert more of these recreational bicyclists and walkers to persons using these modes for utilitarian travel. The 1991 Harris Poll suggests that at least part of the answer lies in improving existing facilities for bicycling and walking — building sidewalks and designated bicycle facilities, installing secure bicycle parking at destinations, etc. (Pathways for People, 1991). Other surveys support this conclusion (Robinson, 1980). However, it is uncertain to what extent a person's professed intention to bicycle or walk if certain facilities are made available will correspond to actual changes in their travel behavior should these improvements be realized. Nevertheless, recreational bicyclists and walkers represent a strong candidate pool of potential bicycle and walk commuters.

Indications that efforts to increase overall levels of bicycling and walking transportation will succeed come from analyses of successful efforts in this country and abroad. Much of the remainder of this report is devoted to documenting these successes and showing how the results can be expanded to other areas.

Bicycle design technology.
Another factor that may affect the potential of bicycling is the continued development of the bicycle itself, along with the many accessories that accompany it. The resurgence of bicycling in the 1980's may be partially credited to the development of mountain bikes. Technological innovations and highly functional design have made this type of bicycle "user friendly" and versatile for a wide range of people and uses. New bicycle designs — some of which are just now appearing — that are appropriate for facilitating transit interface, short-distance cargo carrying, and easy use by all segments of society, may further broaden ridership. Perhaps an even more "intelli-

gent" bicycle design can contribute to a significant increase in utilitarian bicycle trips.

Program Objectives - A Framework for Action

What is the potential for bicycling and walking in the United States? What is a reasonable goal for the National Bicycling and Walking Study?

Millions of Americans already enjoy bicycling and walking. However, these activities are just beginning to realize their potential as utilitarian modes of transportation. A number of surveys offer strong evidence that Americans want to bicycle and walk more, but that they are constrained by factors such as a perceived lack of safe places for bicycling and walking, long trip distances, and/or the absence of workplace or other destination amenities such as parking facilities and showers.

The time is right for addressing these issues. The Federal Government, — through its policy, legislation, and funding ,— has demonstrated an increasing commitment to promoting bicycling and walking as viable and safe modes of transportation. The goal is to create a more balanced transportation system that will better serve the travel needs of all Americans and at the same time contribute to a healthier, more environmentally responsible, and more appealing environment in which to live and work.

As stated in the Introduction, the overall goals of the present study are:

- To double the percentage of all trips made by bicycling and walking, and
- To reduce by ten percent the number of bicyclist and pedestrian injuries and fatalities.

Data from the Nationwide Personal Transportation Survey for 1990 indicate that eight percent of trips for all purposes are currently made by

"When I see an adult on a bicycle, I do not despair for the future of the human race." H.G. Wells

bicycling and walking. Doubling this percentage represents a challenging yet attainable goal.

According to the NPTS, the average individual makes 20 trips per week. Eight percent of these 20 trips is 1.6 trips per week on the average currently being made by bicycling and walking. The U.S. Department of Transportation would like to double this to an individual average of three trips per week. In keeping with the flexibility of ISTEA, specifically how each person will contribute toward this goal will be determined by the individual, with some able to contribute more than others. The additional trips should replace existing trips made by automobile, and may be for commuting, personal business, or social purposes. The use of bicycles or walking for parts of multimodal trips (e.g., walking or bicycling to a transit stop instead of driving an automobile) will also help to achieve this goal.

As previously stated, some individuals will be more likely to increase their bicycling and walking trips than will others. In areas of extreme temperatures or very hilly terrain, smaller increases will be offset by larger increases in other areas. Personal business trips in urban and some suburban areas offer real potential for increases. Intermodal connections where bicycling and walking are used with transit also offer promise for longer trips. In general, small to medium sized communities have and will continue to attract bicycle and walking trips. Larger communities do offer opportunities as well. Shorter trips seem especially attractive for non-motorized travel opportunities. Local areas can determine which trips could be made by bicycling and walking, and provided encouragement for these trips.

In regards to the safety of bicyclists and pedestrians, 1991 data from the Fatal Accident Reporting System (FARS) indicate that 6,595 pedestrians and 841 bicyclists were killed in crashes involving motor vehicles (U.S. DOT, 1992). In addition, an estimated 109,000 pedestrians and 77,000 bicyclists were injured in motor- vehicle -related crashes, based on 1990 General Estimates System (GES) data (U.S. DOT, 1991). As a group, pedestrians and bicyclists comprise more than fourteen percent of all highway fatalities each year. Thus, a second goal of this study is to reduce bicyclist and pedestrian fatalities and injuries by ten percent.

Pedestrian fatalities often occur on Fridays, Saturdays, and Sundays. They often happen in time of darkness, and in about half of the cases, alcohol is involved for either the pedestrian or the motor vehicle operator.

Bicyclist fatalities occur in larger numbers in early evening hours—especially during the summer months. Alcohol involvement by the bicyclist or the motor vehicle operator is present in about one third of the fatal accidents.

Addressing the use of alcohol involvement and the overrepresentation of the very young and the elderly in these accidents, offer the most promise.

The remainder of this report documents an agenda for accomplishing these goals, beginning with a plan of action for the Federal Government, followed by State and local government action plans. All are based on the premise that bicycling and walking should comprise a larger part of our overall transportation system, and should be viable mode choices for all Americans.

References

American Trails. **Trails for All Americans**, U.S. Department of the Interior, National Parks Service, Summer 1990.

Bicycle Insitute of America. **Bicycling Reference Book**, 1990-91 Edition. Washington, D.C., 1991.

Brown, R.E., Elixhauser, A., Corea, J., Luce, B. R., and Sheingold, S. **National Expenditures for Health Promotion and Disease Prevention Activities in the United States**. Washington, D.C.: The Medical Technology Assessment and Policy Research Center, Battelle. Report prepared for the Centers for Disease Control, Office of Program Planning and Evaluation, June 1991.

Brundell-Freij, K., and Ekman, L. Flow and Safety—**Some Aspects on the Relationship with Special Respect to Unprotected Road Users**. Paper presented at the annual meeting of the Transportation Research Board, Washington, D.C., January 1991. (Paper No. 910006)

Burden, D. Personal communication, February 1992.

FHWA Publication No. FHWA-PD-93-025, The National Bicycling and Walking Study Case Study No. 14: **Benefits of Bicycling and Walking on Health**, Burke, Edmund R., 1992.

FHWA Publication No. FHWA-PD-92-040, The National Bicycling and Walking Study Case Study No. 7: **Transportation Potential and Other Benefits of Off-Road Bicycle and Pedestrian Facilities**, Flink, C. A., 1992.

FHWA Publication No. FHWA-PD-93-041, The National Bicycling and Walking Study Case Study No. 1: **Reasons Why Bicycling and Walking Are and Are Not Being Used More Extensively as Travel Modes**, Goldsmith, S., 1992.

Hillman, M. **Cycling Towards Health and Safety**. A publication of the British Medical Association. Oxford: Oxford University Press, 1992.

Klinger, D., and Kuzmyak, J.R. **Personal Travel in the United States**, Vol. II. 1983-1984 Nationwide Personal Transportation Study. Washington, D.C.: FHWA, September 1986.

FHWA Publication No. FHWA-PD-93-015, The National Bicycling and Walking Study Case Study No. 15: **The Environmental Benefits of Bicycling and Walking**, Komanoff, C., Roelofs, C., Orcutt, J., and Ketcham, B., 1992.

Miller, P., Allen, K., Rivara, F.P., and Soderberg R. **Pedestrian and Bicycle Collisions with Motor Vehicles in King County**. Seattle, WA: King County RoadShare Program, Department of Public Works, and Harborview Injury Prevention and Research Center, 1992.

National Center for Health Statistics. **Current Estimates from the National Health Interview Survey**, United States, 1985. Washington, D.C.: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, 1990. (Publication No. GPO 017-022-00979-0).

National Sporting Goods Association. **Sports Participation in 1990**. Mt. Prospect, IL: NSGA, 1991.

Nevel, B., and Harnik, P. **Railroads Recycled**. Washington, D.C.: Rails-to-Trails Conservancy, 1990.

FHWA Publication No. FHWA-PD-93-016, The National Bicycling and Walking Study Case Study No. 17: **Bicycle and Pedestrian Policies and Programs in Asia, Australia, and New Zealand**, Replogle M., 1992.

References

Replogle, M. (Director of the Environmental Defense Fund). Personal communication.

FHWA Publication No. FHWA-PD-93-012, The National Bicycling and Walking Study Case Study No. 9: **Linking Bicycle/Pedestrian Facilities with Transit**, Replogle, M., and Parcells H., 1992.

Research Triangle Institute. 1990 **Nationwide Personal Transportation Survey, User's Guide to the Public Use Tapes**. Research Triangle Park, NC: RTI, 1991. [FHWA Report No. FHWA-PL-92-007]

Robinson, F. O. **Feasibility of Demand Incentives for Non-Motorized Travel**. Washington, D.C.: U.S. DOT, Federal Highway Administration, April 1981. [Report No. FHWA/RD-80/048]

Robinson F., Edwards, J., and Ohrn, C. **Strategies for Increasing Levels of Walking and Bicycling for Utilitarian Purposes**. Transportation Research Record 743. Washington, D.C.: Transportation Research Board, 1980.

Rodale Press Inc. **Pathways for People**. Emmaus, PA: Rodale Press, Inc., June 1992. (Survey tabulations made available by Chuck McCullagh of Bicycling Magazine).

U.S. Centers for Disease Control. **Promoting Physical Activity Among Adults** (pamphlet). Washington, D.C.: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control.

U.S. Department of Health and Human Services. **Healthy People 2000**. Washington, D.C.: US DHHS, Public Health Service (Publication No. PHS 91-50213).

U.S. Department of the Interior. **Trails for All Americans: The Report of the National Trails Agenda Project**. Washington, D.C.: US DOI, National Park Service, and American Trails, 1990.

U.S. Department of the Interior. **1982-1983 Nationwide Recreation Survey**. Washington, D.C.: National Park Service, April 1986.

U.S. Department of Transportation. **Fatal Accident Reporting System 1991**. Washington, D.C.: U.S. DOT, National Highway Traffic Safety Administration, 1992.

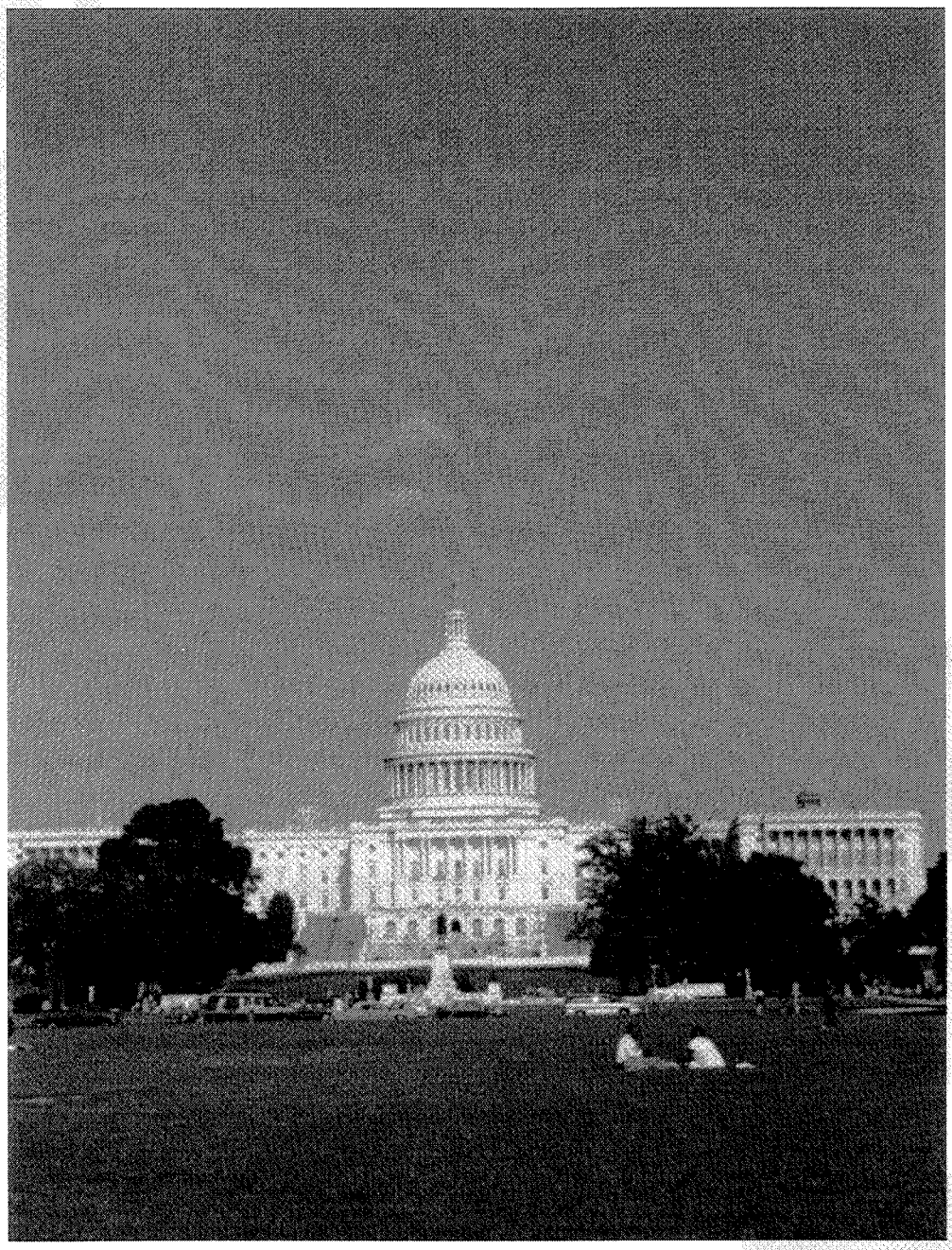
U.S. Department of Transportation. **General Estimates System 1990**. Washington, D.C.: U.S. DOT, National Highway Traffic Safety Administration, 1991.

U.S. Department of Transportation. **Moving America -- New Directions, New Opportunities. A Statement of National Transportation Policy and Strategies for Action**. Washington, D.C.: U.S. DOT, February 1990.

FHWA Publication No. FHWA-PD-92-037, The National Bicycling and Walking Study Case Study No. 16: **Study of Bicycle and Pedestrian Programs in European Countries**, Wynne, G., 1992.

Zegeer, C.V., and Council, F.M. **Safety Effects of Cross-Section Design**. In: Compendium of Safety Effectiveness of Highway Design Features. McLean, VA: Federal Highway Administration, 1991.

FHWA Publication No. FHWA-PD-93-031, The National Bicycling and Walking Study Case Study No. 4: **Measures to Overcome Impediments to Bicycling and Walking**, Zehnpfennig, Gary, 1992.



Chapter Three

Federal Action Plan

Federal Action Plan

To help meet the goals of doubling the percentage of bicycling and walking trips and reducing by ten percent the number of bicyclist and pedestrian injuries and fatalities, the Federal Government must undertake new roles and responsibilities not previously performed. For example, promotion of these modes will require new initiatives for intermodal projects by the Federal Government. These actions are in keeping with current U.S. Department of Transportation (U.S. DOT) policy.

As previously indicated in *Moving America, New Directions, New Opportunities: A Statement of National Transportation Policy* which was issued in February of 1990, it is Federal transportation policy to:

- Increase pedestrian safety through public information, and improved crosswalk design, signaling, school crossings, and sidewalks; and
- Promote increased use of bicycling, and encourage planners and engineers to accommodate bicycle and pedestrian needs in designing transportation facilities for urban and suburban areas.

The U.S. DOT should continue to enhance supportive programs and policies addressing the needs for bicycling and walking. Consideration of these two travel modes must be part of day-to-day planning, design, and operational activities throughout DOT.

ISTEA has offered new mechanisms for Federal, State, metropolitan planning organization (MPO), and local initiatives to promote safer bicycling and walking. This Chapter will demonstrate how the U.S. DOT has been and will be carrying out this policy after ISTEA. By way of background to this chapter on Federal policies and actions, Appendix B shows some of the activities that have been undertaken by some foreign nations to promote bicycling and walking.

Facilities for pedestrians can enhance their safety and mobility.

Past Activities

The Federal Government, primarily through the agencies of the U.S. Department of Transportation (U.S. DOT), has conducted research and special studies, developed and implemented programs, and provided technical and financial assistance in the areas of bicyclist and pedestrian accommodations. Most of this work has been directed towards increasing the safety of these two travel modes.

The various agencies of the U.S. DOT have differing responsibilities in carrying out departmental policy. The Federal Highway Administration (FHWA) has responsibility for planning, design, and operations of the engineering or physical environment provided for bicyclists and pedestrians. The National Highway Traffic Safety Administration (NHTSA) has responsibility for educational, training, and law-enforcement programs to increase their safety. NHTSA and FHWA share administrative responsibility for the Section 402 Highway Safety Program for bicycle and pedestrian projects. It has been increasingly recognized by both agencies that the synergistic results of joint efforts by FHWA and NHTSA seem to offer the most promise. In addition, the Federal Transit Administration (FTA) (formerly the Urban Mass Transportation Administration) has responsibility for pedestrians and bicyclists as transit patrons. The Office of the Secretary of Transportation (OST) has oversight and coordination responsibilities both within the DOT and with other Federal agencies.

Research and Special Studies

Research efforts to increase bicyclist and pedestrian safety were initiated by the U.S. DOT in the early 1970's. Crashes/accidents involving motor vehicles colliding with bicyclists or pedestrians were analyzed and classified into recurring "types" or

Aesthetic and functional pedestrian facilities require careful planning and design.

categories. Solutions or "countermeasures" for these types of accidents were developed and tested by either NHTSA or FHWA depending on the nature of the countermeasure. These countermeasures were then packaged and distributed through FHWA and NHTSA field offices throughout the country, presented at State and national conferences, and otherwise disseminated.

Previous special studies have been conducted. Two are of particular relevance for this study. The first, "Bicycle Transportation for Energy Conservation," was published in April 1980. This report, which was required by the U.S. Congress, identified a series of obstacles to increased bicycle use, and developed a comprehensive transportation program to increase bicycle use. Many of the findings from that study are still relevant and were used in the present work. A second study, "Actions Needed to Increase Bicycle/Moped Use in the Federal Community," was published by the U.S. General Accounting Office in January 1981. This report summarized what needed to be done to encourage greater use of bicycles and other two-wheeled vehicles by employees of the Federal Government. Policy shifts at the Federal level resulted in limited applications of the findings of these studies.

Operational Programs

The U.S. DOT has sponsored numerous programs for bicyclists and pedestrians, including conferences; demonstration projects; development of technical materials such as brochures, user guides, and training course materials; and the production of general safety-related materials such as slide shows, videotapes, and posters. Some of the materials have been turned over to other distribution channels with vastly different records of success in reaching the target groups. Some materials were widely disseminated, while others were not.

Wearing bicycle helmets is one safety measure that has been promoted by the Federal Government.

Technical and Financial Assistance

One of the strengths of the Federal Government is the ability to share information at the national level. The U.S. DOT provides technical guidance on the interpretation of national transportation legislation (such as ISTEA's requirements for State and MPO planning for bicyclists and pedestrians, and for a State DOT level bicycle and pedestrian coordinator position). The U.S. DOT also informs localities of successful programs from other areas.

Staff time devoted to bicycling and walking has varied over the years. At the present time, OST has a bicycle and pedestrian program manager. FHWA has four staff members with responsibility for bicyclist and pedestrian issues. NHTSA has three individuals with responsibility in this area. Both FHWA and NHTSA have personnel in their field offices who spend part of their time on bicycle and pedestrian issues.

In addition, the U.S. DOT provides funding assistance to States and other localities for bicyclist and pedestrian programs. In the past there have been demonstration funding programs, grants to localities to set up pedestrian safety programs, as well as funding through the 402 Highway Safety Program, and regular Federal-aid transportation funding programs for construction and nonconstruction (e.g., maps, brochures, etc.) efforts. More recently, the Department has been able to actively encourage funding of bicycle and pedestrian projects as a result of ISTEA.

The U.S. DOT informs localities of successful programs from other areas.

Future Action Items for the U.S. Department of Transportation

In order to achieve the goals of increased bicycling and walking and safer use of these travel modes, the U.S. DOT must carry out a series of actions.

It should be emphasized that the following are action items for the U.S. DOT. Other Federal agencies, such as the Environmental Protection Agency, Health and Human Services, the Centers for Disease Control, the Consumer Product Safety Commission, and agencies of the Department of the Interior also will be conducting activities for this effort. In addition, the items delineated below provide a framework for action, but many of the activities will be carried out at the State, MPO, and local levels. Those activities will be discussed in Chapters 4 and 5.

Discussion of the Action Items

For each action item, the specific activities required are delineated. These activities would be carried out within existing program funding, although some items may require a reallocation of resources within the DOT budget. Within the U.S. DOT, there are several agencies with responsibility for bicyclists and pedestrians: The Office of the Secretary (OST), the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), and the Federal Transit Administration (FTA). The specific agency or agencies responsible for carrying out the activity is/are identified in parentheses.

Federal Action Items

Action Item 1 Provide **technical guidance in the interpretation of national transportation legislation and distribute other technical information.**

Action Item 2 Fully **integrate consideration of bicyclist and pedestrian needs into planning; design; operational policies and procedures; and suggested usage, accident rate, and evaluation methodologies.**

Action Item 3 Provide **funding** for a bicycle- and pedestrian-friendly infrastructure that includes:

- new facilities and infrastructure retrofitting
- education for all road users
- enforcement programs for all road users.

Action Item 4 Provide **initial and continuing education and training for planning and engineering professionals** which encourages routine consideration of the needs of bicyclists and pedestrians.

Action Item 5 Conduct **promotion and awareness activities** both to increase the level of bicycling and walking for all trip purposes, and to legitimize these travel modes within the transportation system.

Action Item 6 Carry out activities that increase the **safety** of bicycling and walking.

Action Item 7 Provide **outreach** to other government agencies and to develop new public/private partnerships to safely increase bicycling and walking usage levels.

Action Item 8 Conduct **research** and develop effective methods of **technology transfer.**

Action Item 9 Serve as a **positive national presence and role model.**

Action Item 1: Provide technical guidance in the interpretation of national transportation legislation and distribute other technical information.

1. Develop guidance and regulations as required to implement the bicycle and pedestrian provisions of ISTEA, including information on funding sources, State and MPO planning requirements, and the State DOT bicycle and pedestrian coordinator positions. (FHWA)

2. Develop guidance as needed on the use of bicycle and pedestrian programs to meet the goals of the Clean Air Act Amendments. (OST, FHWA)

3. Distribute the findings of the National Bicycling and Walking Study and develop an implementation plan for carrying out the Federal action items. (OST, FHWA, NHTSA, FTA)

4. Develop and distribute a brochure describing and promoting opportunities in the FTA program for bicycle and pedestrian projects. (FTA)

5. Assimilate other technical information and distribute it as appropriate. (OST, FHWA, NHTSA, FTA)

6. Conduct briefings for field, State, and local offices on bicycle and pedestrian program issues. (FHWA, NHTSA, FTA)

7. Provide materials on bicycle and pedestrian issues to national organizations. (OST, FHWA, NHTSA, FTA)

Action Item 2: Fully integrate consideration of bicyclist and pedestrian needs into planning; design; operational policies and procedures; and suggested usage, accident rate, and evaluation methodologies.

1. As appropriate, include consideration of bicyclist and pedestrian needs into revisions of DOT policies and procedures. (OST, FHWA, NHTSA, FTA)

2. Distribute the revised policies and procedures to field offices. (FHWA, NHTSA, FTA)

3. Coordinate bicycle and pedestrian efforts with the Office of Intermodalism and with the Bureau of Transportation Statistics. (OST, FHWA, NHTSA, FTA)

4. Encourage AASHTO to incorporate appropriate criteria for accommodation of bicyclists and pedestrians into their design and construction policies, standards and guides. (FHWA)

5. Recommend revisions to the "Manual on Uniform Traffic Control Devices" and "The Highway Capacity Manual" to ensure appropriate consideration of bicyclists and pedestrians. (FHWA)

6. Encourage the revision of State and local planning and design policies and procedures to include consideration of bicyclists and pedestrians as appropriate. (FHWA)

7. Encourage and publicize intermodal projects which include bicycle and/or pedestrian components. (OST, FHWA, NHTSA, FTA)

Action Item 3

8. Encourage State safety offices to include consideration of bicyclists and pedestrians into their policies and procedures. (FHWA, NHTSA)

9. Investigate the collection of use, crash/accident rate, and evaluation data. Develop and test model usage, crash/accident rate, and evaluation methodologies and encourage their use by State and local officials. Assimilate and distribute this information. (OST, FHWA, NHTSA, FTA)

10. Develop prototype seating configurations and hardware to accommodate bicycles on commuter and intercity rail and bus lines. (FTA)

11. Encourage liberalized policies by AMTRAK for bicycle carriage on rail. (FTA)

Action Item 3: **Provide funding for a bicycle and pedestrian friendly infrastructure that includes new facilities and infrastructure retrofitting and education for all road users, and enforcement programs for all road users.**

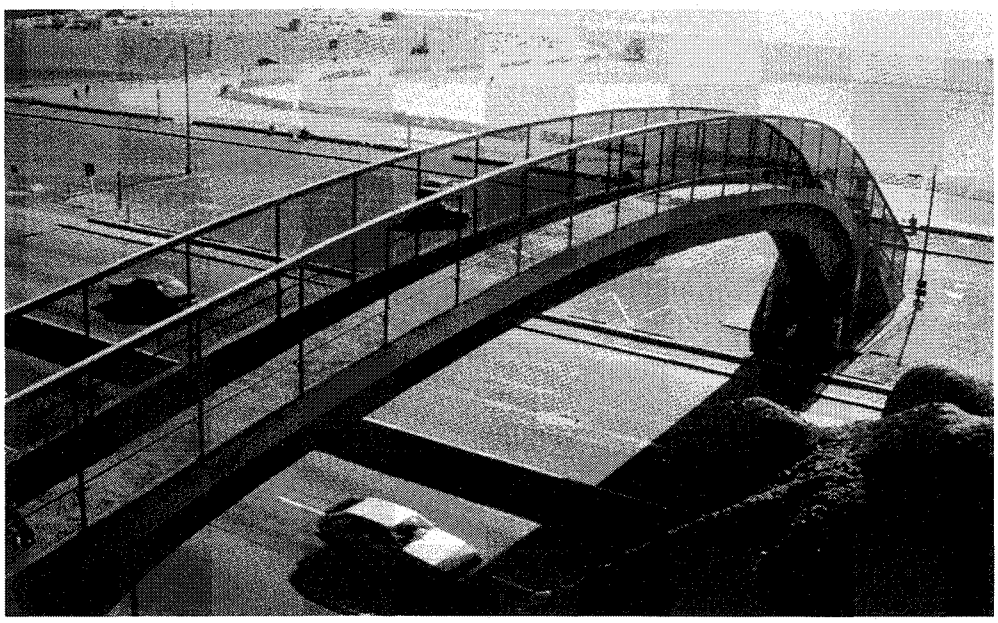
1. Actively promote the use of Federal-aid transportation funds for bicycle and pedestrian projects. Followup to determine the amount of money spent in each State. Publicize the expenditures and funding sources. (FHWA, NHTSA)

2. Actively encourage Section 402 funding to be used on bicycle and pedestrian safety programs. (FHWA, NHTSA)

3. Encourage the use of Title III Section 25 funds for facilities and programs enhancing multimodal transit trips which include bicycle and pedestrian components. (FTA)

4. Refine and promote educational and enforcement programs for all road users relating to bicyclists and pedestrians. (NHTSA, FHWA, FTA)

A variety of Federal funding sources can be used to provide a bicycle-and pedestrian-friendly infrastructure.



Action Item 4: **Provide initial and continuing education and training for planning and engineering professionals which encourages routine consideration of the needs of bicyclists and pedestrians.**

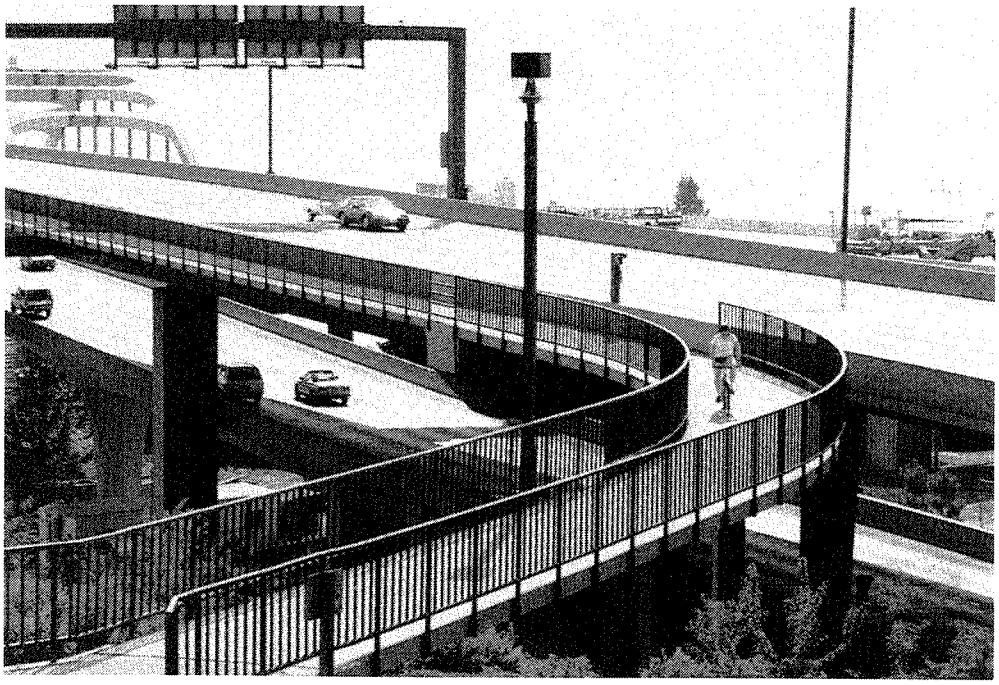
1. Refine and continue providing training for transportation officials in field, State, MPO, and local offices on bicycle and pedestrian accommodations and safety. (FHWA, NHTSA)

2. Provide training opportunities and technical assistance to State Department of Transportation bicycle and pedestrian coordinators. (FHWA, NHTSA)

3. Investigate the development of a core bicycle and pedestrian curriculum for inclusion in transportation engineering courses at the undergraduate, graduate, and continuing-education levels. (FHWA)

4. Investigate development of a training course on bicyclist and pedestrian facility planning and design. (FHWA)

5. Provide training for local transit officials on designing bicyclist-friendly parking facilities, on vehicle carriage programs, interfaces for bicyclists and pedestrians with transit, and access features approaching and at transit centers. (FTA, FHWA)



The needs of bicyclists and pedestrians shall be routinely considered by transportation officials at all levels of government.

Action Item 5

Action Item 5: Conduct promotion and awareness activities, both to increase the level of bicycling and walking for all trip purposes and to legitimize these travel modes within the transportation system.

1. Coordinate activities of the U.S. DOT with other Federal agencies. Convene regular meetings of representatives of the Federal agencies involved in bicycling and pedestrian issues to develop new programs and to exchange information. (OST with assistance of FHWA, NHTSA, and FTA)

2. Include specific promotional references to bicycling and walking in speeches, policy documents and regulations, press releases, news articles, and other information released to the public. Actively promote and sponsor events such as National Bicycle Month and bicycle and pedestrian conferences. (OST, FHWA, NHTSA, FTA)

3. Conduct briefings for field, State, MPO, and local offices on bicycle and pedestrian program issues. Conduct site visits of exemplary programs and pass on information found to other localities. (OST, FHWA, NHTSA, FTA)

4. Encourage and coordinate activities to measure the amount of bicycling and walking in the United States, and ensure this data is compatible with crash/accident data. (OST, FHWA, NHTSA)

5. Develop and provide information to transit providers and to potential and actual transit users on multimodal trips including bicycling and walking. (FTA)

6. Implement a national campaign to promote increased and safer use of bicycling and walking. (OST, FHWA, NHTSA)

The U.S. DOT can join with States and local agencies to promote bicycling and walking transportation and safety.

Action Item 6: **Carry out activities that increase the safety of bicycling and walking.**

1. Encourage the collection of data for evaluating the effectiveness of bicycle and pedestrian safety programs. (OST, FHWA, NHTSA, FTA)

2. Promote and disseminate the results of Section 402 bicycle and pedestrian safety programs. (FHWA, NHTSA)

3. Develop a data collection methodology for bicyclist and pedestrian use estimates and for exposure measures in crash/accident rate calculations. (FHWA, NHTSA)

4. Encourage and actively promote helmet use among bicyclists of all ages. (OST, NHTSA, FHWA, FTA)

5. Investigate bicyclist and pedestrian crashes/accidents which do not involve motor vehicles and those which occur off the roadway. (OST, FHWA, NHTSA)

6. Widely promote the use of the "Walk Alert" and other pedestrian safety program materials. (FHWA, NHTSA)

7. Cooperate with other agencies and organizations to develop and promote a Bicycle Safety Program for use at the local level. (FHWA, NHTSA)

8. Collect crash/accident data involving bicyclists, pedestrians, and transit vehicles, develop countermeasures for these crashes/accidents, and test these countermeasures. (FTA)

Action Item 7: **Provide outreach to other government agencies and develop new public/private partnerships to safely increase bicycling and walking usage levels.**

1. Initiate contact with other Federal agencies to learn of their efforts relating to bicycling and walking both from programmatic and from administrative aspects. Work with these agencies to use their resources to promote bicycling and walking, and to integrate consideration of bicycling and walking into their policies and programs where appropriate. (OST, FHWA, NHTSA, FTA)

2. Initiate contact, respond to inquiries, and work cooperatively with public and private organizations committed to promoting bicycling and walking and their safety. (OST, FHWA, NHTSA, FTA)

3. Provide technical information, present briefings, or conduct workshops and conferences as appropriate. (OST, FHWA, NHTSA, FTA)

4. Conduct a workshop to investigate the role of the transit industry in bicycle systems and services. (FTA)

5. Monitor and publicize ongoing projects to show the role of local transit agencies, metropolitan planning organizations, and other local organizations in developing and managing a comprehensive bicycle commuting system. (FTA)

Action Item 8

Action Item 8: **Conduct research and develop effective methods of technology transfer.**

1. Coordinate Federal research activities both within and outside of the U.S. DOT and make recommendations for studies as appropriate. (OST, FHWA, NHTSA, FTA)

2. Continue research activities relating to the safety of bicycling and walking. (FHWA, NHTSA, FTA)

3. Conduct research into promoting the use of bicycling and walking, and measuring the effectiveness of such programs (FHWA, NHTSA, FTA)

4. Actively investigate existing technology transfer activities (such as the FHWA Local Technical Assistance Program, FHWA National Highway Institute, the FHWA Office of Technology Applications, and the NHTSA Regional Operations Program) and utilize them as appropriate. Where needed, develop new technology transfer activities. (OST, FHWA, NHTSA)

5. Conduct a workshop to investigate the shortcomings of traditional technology transfer activities relating to bicyclists and pedestrians. Develop solutions and recommend their implementation in the DOT agencies. (OST, FHWA, NHTSA, FTA)

6. Identify means and provide resources to translate appropriate research and other bicyclist/pedestrian literature from foreign language sources. (OST, FHWA, NHTSA, FTA)

7. Investigate the quantification of the projected reductions in emissions as a result of provisions for bicyclists and pedestrians in air quality nonattainment areas. (OST, FHWA)

8. Establish a national nonmotorized transportation center and clearinghouse. (OST, FHWA, NHTSA, FTA)

9. Conduct research on patronage estimation and mode split modeling for bicycle and pedestrian services and facilities. (FTA)

Action Item 9: **Serve as a positive national presence and role model.**

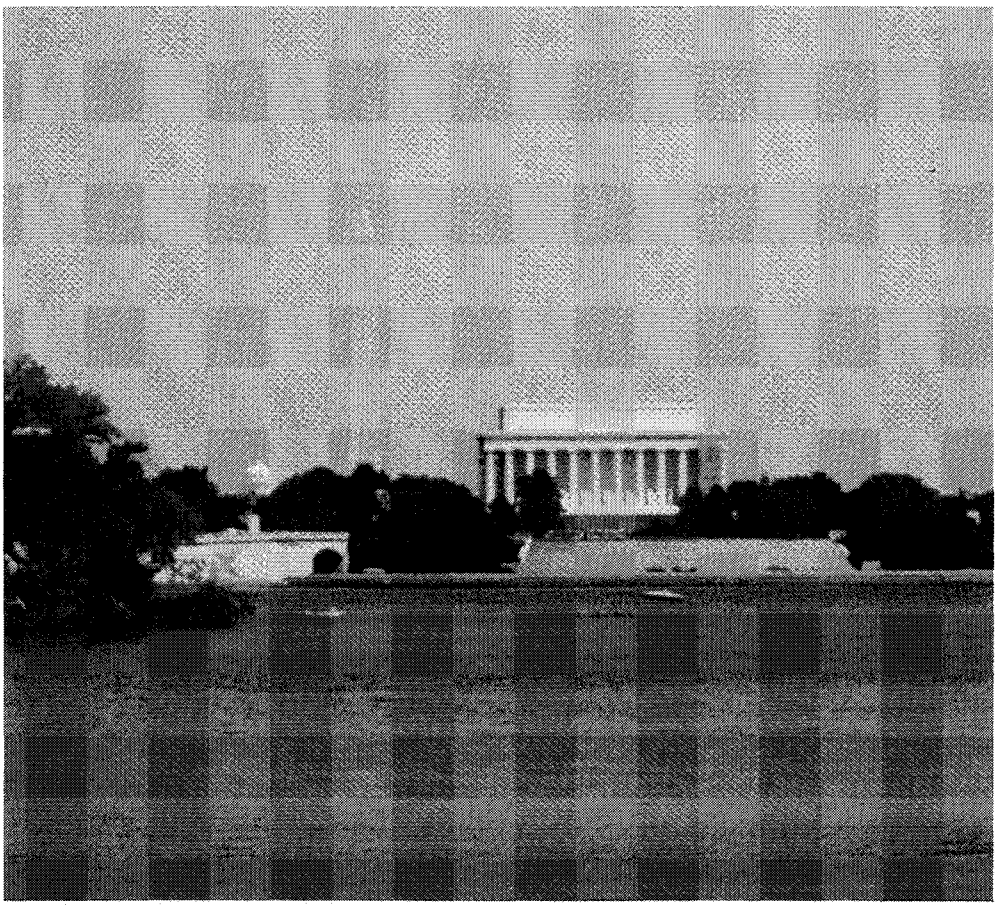
1. Offer and provide technical information within the agencies of the U.S. DOT, their field offices, and outside the agency as appropriate. (OST, FHWA, NHTSA, FTA)

2. Encourage the use of bicycling and walking as agency policy. (OST, FHWA, NHTSA, FTA)

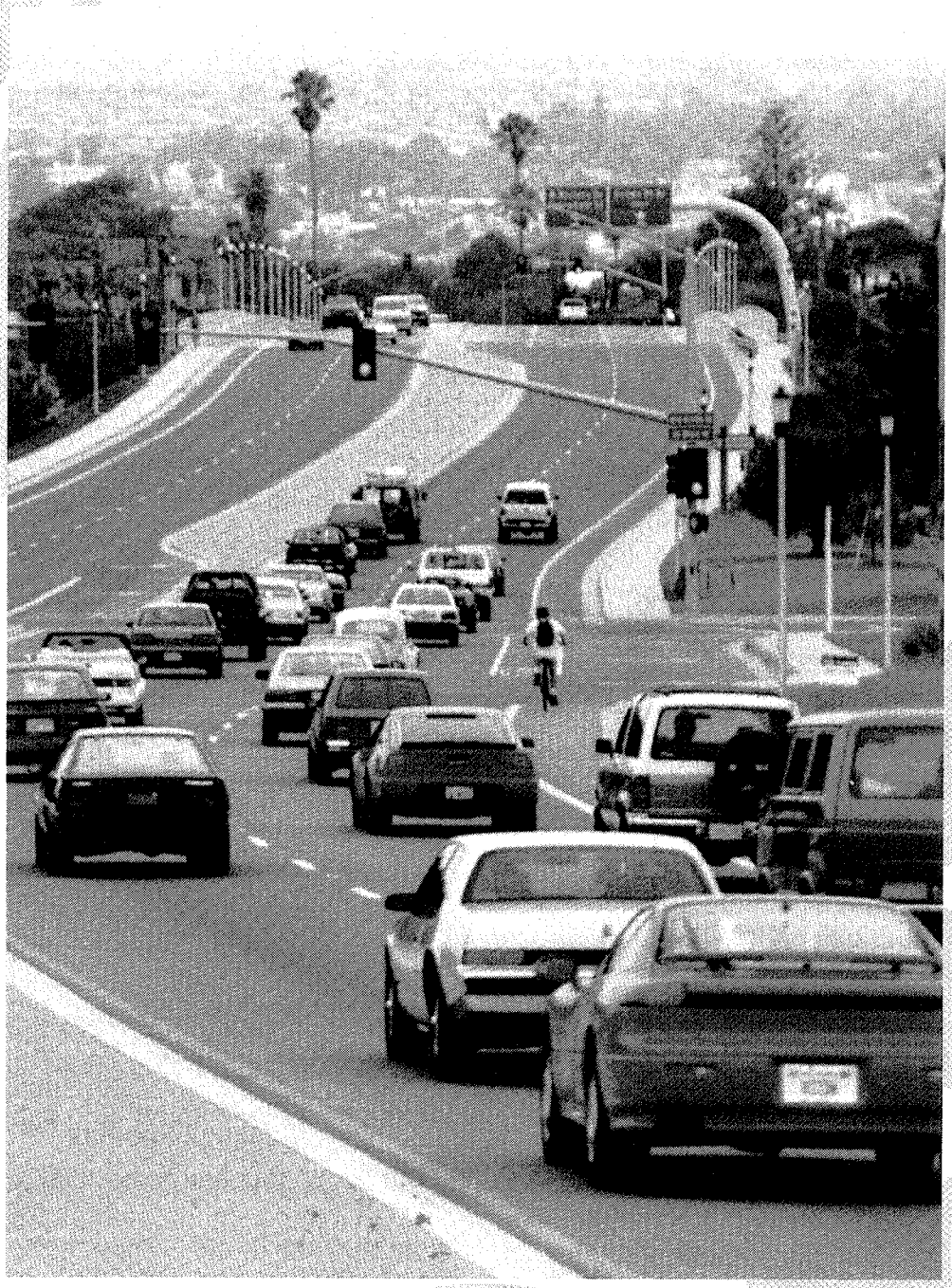
3. Present bicycling and walking as legitimate transportation options in speeches and other public communications. (OST, FHWA, NHTSA, FTA)

4. Participate in national and regional conferences to promote bicycling and walking. (OST, FHWA, NHTSA, FTA)

5. Assimilate examples of successful projects and promotion programs for distribution. (OST, FHWA, NHTSA, FTA)



The U.S. DOT can serve as a positive national presence and role model for promoting bicycling and walking transportation and safety.



Chapter Four

Action Plans And Programs At The State Level

Action Plans And Programs At The State Level

The preceding chapters have offered a goal of doubling the percentage of trips made by bicycling and walking in the United States, along with reducing the number of bicyclist and pedestrian fatalities and injuries by 10 percent. Major actions at the Federal level were identified in chapter III as being necessary to reach these objectives. This chapter focuses on the State level and builds on the actions and programs recommended for the Federal level. Examples of successful State programs are discussed, followed by a recommended action plan. It is recognized that some States are much further advanced than others in promoting bicycling and walking. However, actions are needed by all if the goal is to be realized.

The Concept of Institutionalization

In the past few years the process of integrating bicycle and pedestrian considerations into national, regional, State, and local planning, design, construction, and operations activities has become known as "institutionalization." In particular, the bicycling community believes this is the most effective way to foster advances.

> Over the last five years the concept of "institutionalization" has become very popular within the bicycling community, and is equally valid and important with regard to pedestrian issues. Bicycle program staff and advocates have realized there is only so much one staff person — or even a program with five or six people — can do to change a city, county, or State for the benefit of bicyclists and pedestrians. There is simply too much to do.
>
> Thus, bicycle programs have become more focused on ensuring that the routine work of government agencies, particularly transportation agencies, includes appropriate consideration of the nonmotorized modes. This has involved changes to State and local legal codes and ordinances, regulatory changes, project review, policy and plan development, and the training of agency personnel. (Case Study No. 21)

Thus, the more successful programs have integrated thinking about bicycle and pedestrian needs throughout various policies, programs, and procedures of State agencies.

In the successful programs (both State and local), the following key elements are common:

- Full-time coordinator,
- Sufficient staff,
- Supportive professionals within government agencies,
- Active and organized citizens,
- Stable and adequate levels of funding,
- User-friendly facilities, and
- Education and public information

More detail about each appears in the description of the State Action Plan (as well as in the Local Action Plan in Chapter Five). Some State programs are now presented as examples of what has been achieved.

Indicators of Institutionalization

"Institutionalization" refers to the ongoing integration of bicycling and walking considerations into the routine working of all levels of government agencies or, in certain cases, the private sector. Institutionalization is brought about through the support of elected officials or agency heads and other professionals who make policy decisions and can positively influence others. This support is typically garnered through citizen activism and program staff influence.

Where bicycling and walking are more fully institutionalized, some indicators are:

1. **Program Staff** – The presence of a program manager (usually referred to as "coordinator") and sufficient number of staff typically defines the very existence of a formalized bicyclist/pedestrian "program." Many of the activities by which the institutionalization process takes place are best handled by a coordinator. Ideally, this person is a non-motorized transportation expert and advocate, an integral part of the government "team," and devotes 100 percent of effort to bicycling and walking issues.

2. **Citizen Involvement** – Citizens often play a vital role in helping to initiate, develop, sustain, and, in a sense, operate bicyclist and pedestrian programs. The input and efforts of volunteers are an acknowledged valuable resource for all aspects of non-motorized transportation and its institutionalization. Citizen involvement in the institutionalization process can take the form of a bicyclist-pedestrian advisory board created by ordinance or resolution, and advocacy groups.

3. **Supportive Elected Officials and Government Professionals** – The individuals who make policy and other decisions routinely consider the needs of non-motorized transportation.

4. **Funding** – Inclusion of bicyclist and pedestrian considerations in annual budget and capital improvements projects documents is necessary to ensure stable funding for the construction and maintenance of facilities, promotions, education, and enforcement initiatives, and, if applicable, the day-to-day operations of bicyclist and pedestrian program staff.

5. **Planning and Policy Documents** – State, regional, and local level documents which govern transportation, land use, growth management, urban design, the environment, recreation, and other topics that impact on bicycling and walking routinely provide for these modes. The ISTEA legislation establishes bicyclist and pedestrian planning requirements for both MPOs and States requesting Federal funding for non-motorized projects. This underscores the importance of careful planning at the local level where the projects are actually implemented.

6. **Legislative Authority** – Regulations, codes, and ordinances mandating bicyclist and pedestrian provisions, such as those requiring minimum levels of bicycle parking, sidewalks, or showers, help to ensure compliance with plans and policies.

7. **Roadway Design Manuals and Traffic Control Policies** – Bicycling and walking facility standards and user needs are incorporated into the documents that govern the process by which transportation facilities are designed and built, thus ensuring that provisions for these modes are included as routine features of new and reconstructed roads.

8. **Project Review Process/Boards and Commissions** – The concerns of bicyclists and pedestrians are routinely addressed during the project review process. Governments typically rely on a host of boards or commissions to provide policy direction and project review. Bicyclists and pedestrians are represented on these bodies.

9. **Training** – Courses, conferences, publications, and in-house training are regularly scheduled to educate transportation, urban design, land use, and other planning professionals who may never have had any formal training in bicyclist and pedestrian planning. Training is also offered for continuing education purposes.

10. **Transportation Demand Management** – Bicycling and walking considerations are routinely incorporated into overall TDM strategies.

11. **Maintenance** – Maintenance budgets, schedules, and standards routinely reflect the consideration of bicyclists and pedestrians in the transportation system. This includes routine maintenance such as debris sweeping, as well as the repair, resurfacing, or reconstruction of roads, at which time non-motorized needs are reassessed and possibly improved.

12. **Environmental Impact Statements** – Bicyclist and pedestrian improvements are frequently included in the EIS document as mitigation for environmental damage resulting from a project or as restorative requirements when a project involves the digging of linear trenches along public rights-of way.

13. **Requests for Proposal** – RFPs issued by government routinely include the requirement that experts in bicyclist and pedestrian planning be consulted.

14. **Interdepartment/Interagency Coordination** – Decisionmaking at this level of government routinely reflects non-motorized considerations.

Adapted from Lagerwey, P. 1992 and Wilkinson, B. 1992a; Bicycle Federation of America, 1992.

Over the last five years the concept of "institutionalization" has become very popular within the bicycling community, and is equally valid and important with regard to pedestrian issues.

Examples of Successful State Programs

Many States have programs to promote bicycling and walking. States with well established and effective programs include Minnesota, North Carolina, Florida, and Oregon. Generally, the focus has been on bicycling with a recent addition of interest in walking and pedestrian programs. The more successful programs are characterized by comprehensiveness, stable funding, development of facilities, and other components. These have evolved in response to a variety of circumstances.

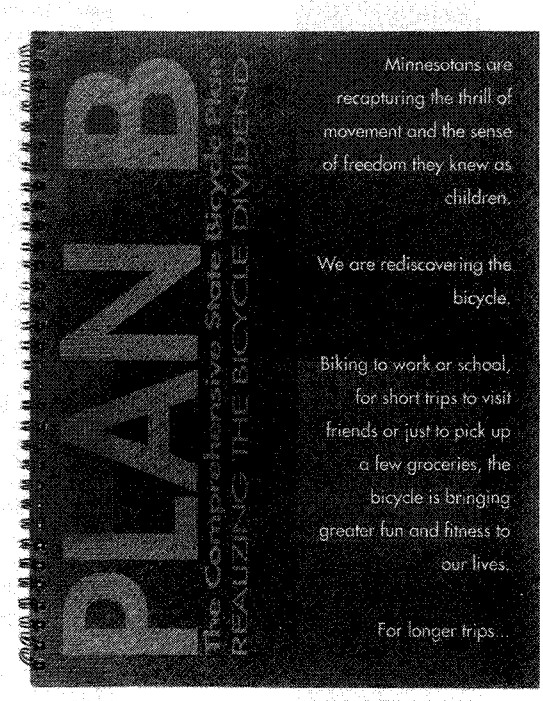
> Each of the indicators of success is valid depending on the circumstances of the State, province, or locality engaged in a program. In some communities, such as in Florida, accident statistics have been the spur to action. In Minnesota, the economics of encouraging bicycle use have appealed to advocates, politicians, and agency staff alike.
>
> In the years ahead, State and local plans and programs are likely to be based on performance targets to a greater and greater extent (Case Study No. 18)

Both Oregon and Washington passed laws in 1991 requiring large reductions in motor vehicle miles traveled in the years ahead (Bicycle Federation of America, *ProBike News*, January 1993). Bicycling and walking figure prominently in achieving these reductions, as well as helping States with non-attainment areas comply with Clean Air Act requirements.

Minnesota

This is a State with a long history of bicycling promotion, with formal involvement starting in 1976 with legislation recognizing the benefits bicycling would bring to Minnesota as well as legitimizing State support for bicycling. This was followed by

This plan outlines a rationale for elevating the position of bicycling on the public agenda.



creation of the State Bicycle Safety Commission. The first statewide bicycle conference was held in 1981, with the focus on safety.

"Plan B - The Comprehensive State Bicycle Plan —Realizing the Bicycle Dividend" is one of the most progressive in the United States (Minnesota Department of Transportation, 1992). The plan states that:

- Two-thirds of all Minnesotans ride at least once a year;
- Almost half of the estimated 300 million bicycle miles traveled in the State are for transportation purposes; and
- Ten percent of adults bicycle to work at least once every year.

Minnesota has a full-time bicycle coordinator who works with other State agencies and support staff who concentrate on bikeway design and implementation. The 1987 bicycle system plan identified almost 4,500 miles of major bicycle corridors on the trunk highway system, of which about 2,800 miles had adequate shoulder widths "suitable" for bicycling. The DOT is attempting to ensure that all highway projects include consideration of bicyclists through completion of a bicycle evaluation worksheet early in the design stage.

Stable funding for bicycling projects is an important part of the program. In 1990, an estimated $4.3 million was allocated to the bicycle program, comprised of $2.2 million from the DOT, $1.8 million from the Department of Natural Resources, and the remaining $300,000 from a variety of education, academic, and safety budgets. The funds have been used for on-street and trail facility development, education and safety programs, commuter encouragement programs, staff costs, a voluntary bicycle registration scheme, and specific programs for University of Minnesota campus and students. The new State plan calls for an increase in expenses to as much as $10 million annually over the next seven years. (Case Studies No. 5 and No. 18)

Florida

Perhaps as much as any other State, Florida has been an active proponent of both bicycling and walking. The Florida Bicycle Program was created in 1979 by an Executive Order of the Governor. In the early years of the program, important events included adoption of a state-of-the-art bicycle facility design guide (Florida Department of Transportation, 1982) and the formation of the Florida Bicycle Advisory Council.

In recent years the State program has focused on creating bicycle and pedestrian programs in every metropolitan area, giving pedestrian issues and activities much more visibility, and developing education and safety programs for bicyclists, pedestrians, and motorists. Training has been provided for the more than 20 local bicycle and pedestrian coordinators. The "Let Kids Live" conference was coordinated to develop efforts in bicycle, pedestrian, and school bus safety. In 1992, staff offered pedestrian facility workshops around the State for local traffic engineers and planners.

Another resource developed by the State program is the Florida Bicycle Commuter Center, located in the Florida Institute for Marketing Alternative Transportation at Florida State University. The mission of the

Center is to assist employers, transportation management associations, transit directors and other government agencies in developing and promoting bicycle and pedestrian commuter programs.

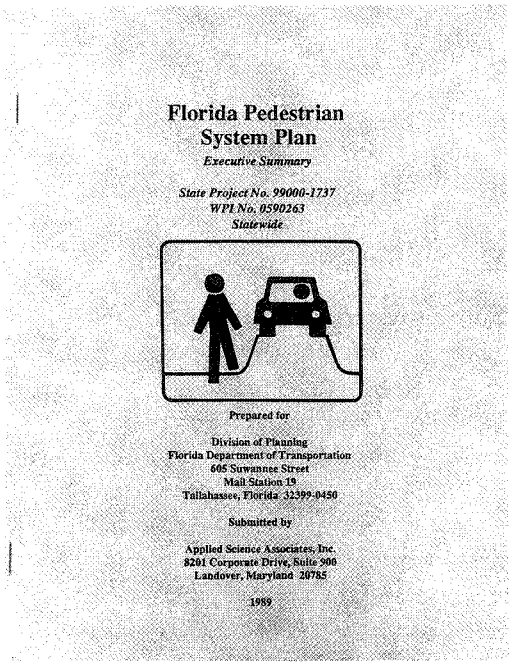
Nearly $100 million has been invested since 1979 to make the State's highway system more accommodating to bicyclists and pedestrians. Urban area highways now routinely incorporate paved shoulders, wide curb lanes, bike lanes, sidewalks, and other facilities. Another $10 million has been invested in education and safety programs and staff positions at the local level. (Case Study No. 18)

North Carolina

The North Carolina Office of Bicycle and Pedestrian Transportation began in 1974 and is recognized for its longevity and comprehensiveness. The current coordinator was appointed that year and now oversees seven full-time staff and annual outlays of more than $2 million. Pedestrian activities have moved to the forefront with passage of the ISTEA, and a Statewide pedestrian coordinator position has been established.

A major step was the development of the North Carolina Department of Transportation (NCDOT) Bicycle Policy in 1978, pursuant to the Bicycle and Bikeways Act of 1974. The policy legitimized the inclusion of bicycle provisions in highway projects. The policy document was updated and improved in 1991 and clarifies responsibilities regarding the provision of bicycle facilities along or upon the State-maintained highway system. These policies detail guidelines for planning, design, construction, and maintenance. An in-house task force (chaired by the bicycle and pedestrian program and made up of relevant highway staff appointed by the Highway Administrator) was created to review bicycle-related work, to study bicycle issues within the DOT, and to ensure the most efficient,

Florida has taken a leading role in Statewide planning for pedestrians.


Florida Pedestrian System Plan

Executive Summary

State Project No. 99000-1737
WPI No. 0590263
Statewide

Prepared for

Division of Planning
Florida Department of Transportation
605 Suwannee Street
Mail Station 19
Tallahassee, Florida 32399-0450

Submitted by

Applied Science Associates, Inc.
8201 Corporate Drive, Suite 900
Landover, Maryland 20785

1989

technically sound response to local and State bicycle needs. Thus, the Office serves as the focal point within the NCDOT for non-motorized transportation planning, programming, and technical assistance.

The Bicycle Policies formalize the structure within which bicycle projects are included in NCDOT's Transportation Improvement Program (TIP). Improvements for bicycling may be included as a part of the construction of a highway or, where no highway construction is programmed, as an independent bicycle project. Current requests from localities throughout the State amount to several million dollars.

The types of projects which are funded through the TIP include: bikeways, greenways, paved shoulders, bike routes, widened traffic lanes, signed routes, route mapping and safety brochures, spot improvements, parking, and training/education for bicyclists. Facility improvements are designed according to guidelines and standards from AASHTO, State and Federal policy, and recently developed North Carolina DOT guidelines.

A new level in NCDOT's bicycle programming activities beyond previous planning efforts is the scheduling of a regional bicycle improvement project for several counties which comprise the location of the Research Triangle Park. Components of this project will include encouraging greater bicycle/transit use, on-road and off-road construction, bicycle route signing and mapping, and intersection safety improvements.

A major responsibility of the Office is to provide for and maintain a program of information exchange, materials development, and training opportunities. This program is an ongoing outreach effort to all local agencies which have responsibilities for the safety and training of bicycle riders and motorists as they relate to

In North Carolina "Share the Road" reflects the basic concept that is part of all program responsibilities.

bicyclists. This Office works with local governments, teachers, police, and civic organizations to promote bicycle helmet wearing, basic bicycling skills, and motorist awareness.

Mapping of routes and facilities has been, and continues to be, an important product of the Office. More than 10,000 Bicycling Highways maps are requested each year. Besides offering maps and guides of popular places to ride in the State, computer-generated, state-of-the-art maps for the cities of Durham and Winston-Salem have recently been completed. (Case Study No. 18)

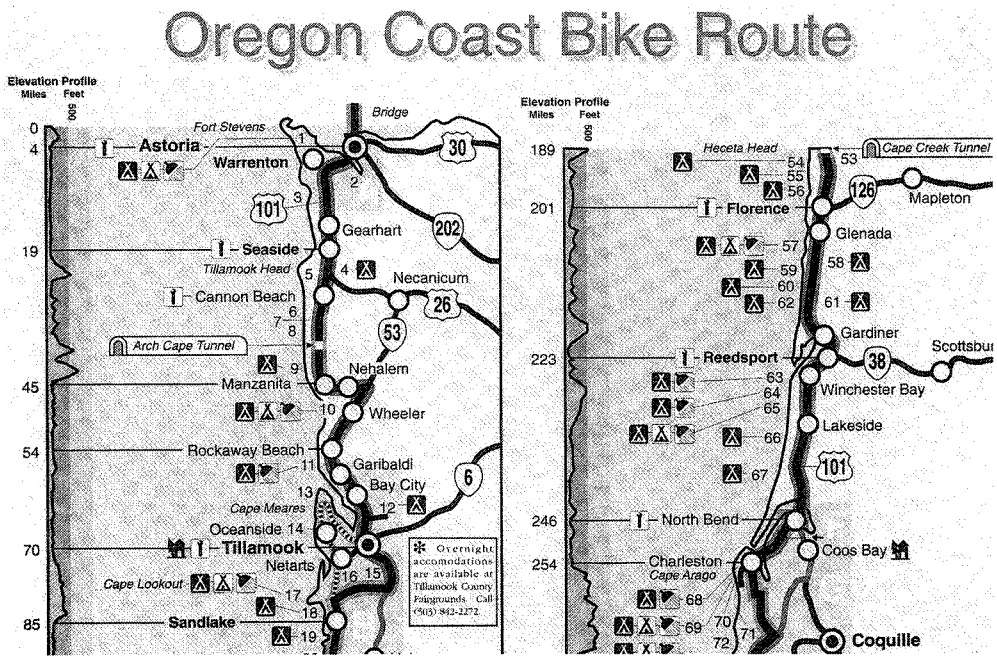
Oregon

Oregon has a long-standing bicycle program, and larger cities such as Portland and Eugene are examples of localities with increasing pedestrian-friendly activities. In 1971 the State legislature required that one percent of the State Highway Fund be spent on bicycle and pedestrian facilities to be built in conjunction with most roadway projects. By 1992, the annual budget amounted to $2.8 million at the State level and $1.75 million at the city and county levels. The Oregon DOT administers the funds; handles bicycle and pedestrian planning, design, engineering, and construction; and provides technical assistance to local government agencies.

The Bikeway Program Office currently has a full-time Bikeway/Pedestrian Program Manager and a full-time bikeway specialist. They identify and prioritize bikeway projects and develop policies, programs, and materials (such as maps and brochures) to improve the bicycle and pedestrian environment.

An eight-member advisory committee appointed by the Governor assists the Highway Division. Interestingly, members must include an employee of a unit of government involved in land use planning, a representative of a recognized environmental group, a

Oregon coast map showing bicycling routes.



person engaged in the business of selling or repairing bicycles, and a member designated by the Oregon Recreational Trails Advisory Council. At least one of the members must be under the age of 21 at the time of the appointment. Members serve four years, and the committee meets quarterly.

The Advisory Committee was responsible for guiding the development of both the 1988 State Bicycle Master Plan (Oregon Department of Transportation, 1988) and the recently updated 1992 version (Oregon Department of Transportation, 1992), the priorities of which include construction, maintenance, and assistance to local projects.

Bicycle safety education comes under the purview of the Traffic Safety Commission which offers a variety of services. Mapping is done by the Oregon DOT, with the foremost example being the Oregon Coast Bike Route along the Pacific coast. A unique feature of the route is that two tunnels allow bicyclists to activate lights warning motorists of their presence in the tunnel. (Case Study No. 18)

Other State Programs

Some risk results from offering only the States mentioned above as examples, because many others also have active bicycle and pedestrian programs. California and New Jersey are prime examples, as both had active bicycle programs with full-time coordinators during the 1970's and early 1980's. Both developed policies and guidelines that enabled provisions for bicycles to become a routine part of highway designs, such that virtually all roadways built in California and New Jersey had wide curb lanes, shoulders, or striped bicycle lanes.

Multi-use trail in Carmel, California.

Action Item 1

Action Plan For States

This section will focus on recommended policy and programmatic steps for State agencies to take to create bicycle- and pedestrian-friendly conditions. These action items embody the traditional "four E's" of pedestrian and bicycle programs — engineering, education, enforcement, and encouragement.

The inclusion of both public and private agencies and groups will help focus efforts and funding to maximize the planning and construction of improvements and promotion of their use, as well as to help ensure that walking and bicycling are treated as viable modes of travel.

Action Item 1: Organize a State Bicycle/Pedestrian Program

Establish a Full-Time Coordinator within the State DOT -
The statewide coordinator is often the ingredient that holds the process of building a bicycle- and pedestrian-friendly atmosphere together, especially for programs in the formative stage. Coordinators have been instrumental in programs with longevity.

In some States (e.g., NC, VA), the Department of Transportation (DOT) is the agency that ultimately develops and constructs most roadway facilities. In other States (e.g., NJ, MD) the State is responsible for small numbers of roadways. Establishing the coordinator's role, with sufficient staff, within the DOT can provide for ready access to planners and engineers who can be made aware of ways to enhance bicycling and walking.

Recommended State Action Plan

Action Item 1:
Organize a bicyclist/pedestrian program

Action Item 2:
Plan and construct needed facilities

Action Item 3:
Promote bicycling and walking

Action Item 4:
Educate bicyclists, pedestrians, and the public

Action Item 5:
Enforce laws and regulations

Having a full-time coordinator position will facilitate progress. Understanding the comprehensiveness of the coordinator role should make it easier to create a full-time position. Besides facility review and engineering-related tasks, the coordinator has other duties, including promotion, safety, and public information and education.

Activities of a coordinator and staff include:

- Developing policies, regulations, and guidelines that integrate bicycling and walking considerations into all levels of the agency (e.g., planning, design, construction, and maintenance);
- Reviewing capital improvement projects, traffic plans, developmental proposals, and comprehensive plans affecting bicycle and walking access and safety to ensure that all projects routinely include consideration of bicyclists' and pedestrians' needs;
- Advising on the planning and design of specific facilities, including both highway department designs and local designs; and
- Building a comprehensive program that includes elements such as promotion, public information and education, and enforcement.

Many States will develop a single pedestrian and bicycle coordinator position as required by the ISTEA legislation, which will certainly facilitate progress. However, in some States, part of the staff will handle pedestrian concerns and others bicyclist concerns. This assumes a larger staff. Alternatively, the division of duties may be according to function, with an engineer handling both pedestrian and bicycle facilities, another person handling education and promotion, etc.

Obtain Sufficient Staff - Progress is more easily attained with sufficient staffing. North Carolina has prospered in this way, where seven full-time staff members of the Bicycle Program will be joined by a full-time pedestrian coordinator. Florida has three full-time staff at the State level and more than 20 local coordinators. Oregon has some similarities, with full-time bikeway and bike safety program staff complemented by contacts in every city and county in the State. The State DOTs in Texas and Illinois have both recently appointed bicycle coordinators and have asked each of their district offices — nine in Illinois and 24 in Texas — to appoint a bicycle contact person. (Case Study No. 18)

Generate Supportive Professionals Within State Government Agencies - Ideally policies and/or guidelines for

Each State receiving an apportionment under the Congestion Mitigation and Air Quality Improvement, and the Surface Transportation Programs shall use such amount of the apportionment as may be necessary to fund in the State department of transportation a position of bicycle and pedestrian coordinator for promoting and facilitating the increased use of nonmotorized modes of transportation, including developing facilities for the use of pedestrians and bicyclists and public education, promotional, and safety programs for using such facilities.

Source: ISTEA 1991

Action Item 1

reviewing and integrating consideration of bicyclists and pedestrians in construction or non-construction requests are in place within the DOT. These include basic operating policy, highway design guides, planning documents, and other ordinances and regulations. Otherwise, engineers and planners who review and then develop transportation project specifications should be trained to incorporate bicycle- and pedestrian-friendly design features into all of their projects. Sometimes these individuals are educated by serving on project review teams.

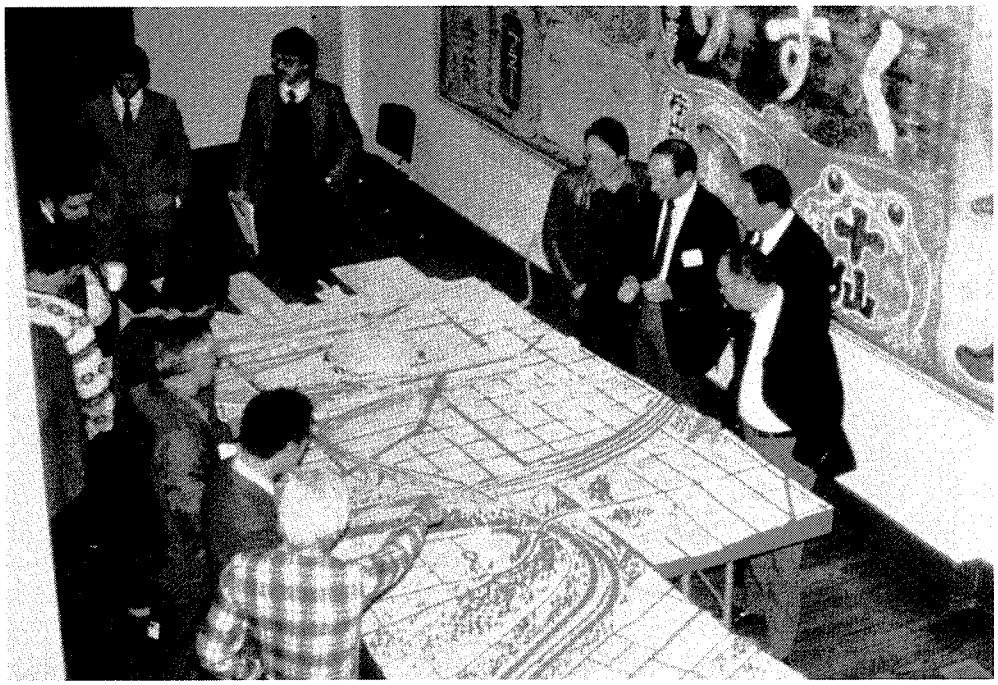
> One non-motorized program manager within a large highway department of many hundreds or thousands of employees can quickly get lost. One of the greatest challenges of program staff, therefore, is to generate support for their activities, and to persuade, train, and require their colleagues to work toward the same aim — creating more safe places to ride and walk.

> A survey of bicycle and pedestrian education courses in U.S. Universities in 1990 revealed that only one percent of University engineering courses offer a separate course in bicycle and pedestrian transportation (American Society of Civil Engineers, 1991). While 40 percent of respondents reported they offer some bicycle material within their courses, the average time given was just 1.5 hours. (Case Study No. 18)

Although most bicycle and pedestrian programs tend to reside within the State DOT, in some cases other State agencies provide budgetary and professional support. Examples are on-road improvements, off-road paths or trails, bicycle helmet promotion, the incorporation of an education program into a school curriculum, etc.

Program staff can help other agency engineers and planners feel more comfortable with the notion of providing for bicyclists and pedestrians through:

Involving the public in planning for facilities is an essential part of the process.



- Circulating magazines, newsletters, articles or technical papers related to bicycling and walking;
- Writing articles for internal agency magazines or newsletters on the work of the bicycle program or on bicycle and pedestrian planning and engineering in general;
- Giving presentations on different aspects of planning for the non-motorized at staff meetings or over a bag lunch;
- Organizing in-house training through the personnel department;
- Arranging training courses (from one-half to three days in length) to be run by outside organizations; and
- Encouraging attendance at major bicycle and pedestrian conferences. (Case Study No. 18)

Coordinate with Appropriate Federal and State Government Transportation Offices - Under the ISTEA legislation, States and local communities determine their own funding priorities. Given the increased opportunities for funding bicycle and pedestrian programs with ISTEA, States have a greater opportunity to develop more bicycling and walking projects.

One of the roles of an effective bicycle and pedestrian coordinator is to review project plans for non-motorized accommodation. This is often accomplished with a review team. Having an FHWA Division Office staff person on the team is an effective way to coordinate the agencies.

Another arm of the U.S. DOT with an interest in walking and bicycling activities is the National Highway Traffic Safety Administration (NHTSA). NHTSA has ten regional offices across the U.S. Within each is a recently appointed pedestrian and bicyclist specialist who can provide information about available materials, research projects, etc.

Within each State is a Governor's Highway Safety Program with the primary responsibility of distributing Section 402 funds to various agencies within the State. Pedestrians and bicyclists now constitute a "National Priority" area, and projects relating to these non-motorized users are eligible for 402 funds. Other State agencies such as departments of natural resources, parks, or recreation can also be helpful.

Thus, for every State various governmental offices are nearby. These can be important resources for State pedestrian and bicycle program staff and other advocates.

Coordinate with Metropolitan Planning Organizations (MPOs) - The ISTEA requires a cooperative planning process between States and MPOs. State and MPO transportation plans must be cooperatively developed and integrated. Transportation Improvement Programs (TIPs), which must reflect these plans, identify metropolitan and State program priorities. From these TIPs, projects are selected for implementation. In Transportation Management Areas (MPOs with an urbanized area of 200,000), MPOs select projects in consultation with the State and transit agencies (with the exception of National Highway System, bridge, and interstate maintenance projects). In all other metropolitan areas, project selection is done by the State and transit agency in cooperation with the MPO. Bicycle and pedestrian facilities are eligible projects for several

Citizen participation and advocacy has been, and will continue to be, an essential part of institutionalization.

Action Item 1

funding sources under the flexibility provisions established by the ISTEA. To ensure their adequate and full consideration in the planning, programming, and project selection processes, interested parties should become involved in these processes and the State and MPO should develop an effective partnership in considering them.

Incorporate Citizen Involvement - An active citizenry can be a powerful tool in fostering response to pedestrian and bicyclist needs, especially at the local level, but also at the State level. Typically a State Bicycle and/or Pedestrian Advisory Committee (BAC or PAC) is comprised of both State program staff and citizens having some special expertise in bicycling and walking. The role of any advisory committee should be continually analyzed and updated.

Citizen participation and advocacy has been, and will continue to be, an essential part of institutionalization. In addition to initiating and sustaining bicycle and pedestrian programs, advocates have a unique role to play in normalizing bicycling in the eyes of citizens and public agencies. This may be achieved through legislative efforts, event promotion, participation in citizen's advisory committees and the development of a constructive working relationship with public agencies.

The advocate's role has been significantly enhanced in the new planning process created by the ISTEA, where public involvement in the process has been mandated. This is an important step in the democratization of transportation policy-making and planning — and one where bicycle advocates in particular may be well-equipped to make an impact due to their prior involvement in the process. (Case Study No. 21)

In the last 15 to 20 years the bicycling

Bicycle lane striping and signing exert a strong channelizing effect on bicyclists and motorists.

community has made great strides through "grass roots" activities involving bicycle advisory committees or task forces. This has not been the case for pedestrian advocates, but the situation appears to be changing. Pedestrian advocacy groups are starting to form at the local level (e.g., Boston, MA.; Portland, OR; Philadelphia, PA; Asheville, NC; Madison, WI; New York, NY; and Toronto and Ottawa, Canada). An example of a national association is Prevention magazine's Walking Club, which has more than 70,000 members.

Normally, an important product of an advisory committee is a proposal for the multi-year bicycle and pedestrian improvement plan. In non-attainment areas under the Clean Air Act, these plans and related programs could be made part of the State Implementation Plan for air quality. Such a group should also offer suggestions concerning other types of projects, such as promotional activities, enforcement and regulations, etc. Review by an advisory committee will usually result in a better plan.

Under ISTEA, MPOs develop priority project listings for bicycle and pedestrian projects in their areas. Using the MPO priority project listings in concert with projects in other areas of the State, the State develops a prioritized listing of bicycle and pedestrian projects. The bicycle and pedestrian projects must compete for funding with other transportation projects.

Coordinate Roles of State Agencies - Bicycle and pedestrian programs in the State DOT focus mainly on facility development, because the program resides in the agency that may control the roadways and funding for improvements. Yet much can be accomplished working

"An advisory committee can provide continuity and permanence in the face of personnel changes."

Case Study No. 18

Some common activities of an advisory committee include:

- **Reviewing and commenting on planning documents and policies.**
- **Developing policies and guidelines on non-motorized transportation issues.**
- **Implementing community-based activities such as education programs, maps, publications and bicycling events.**
- **Identifying the needs and concerns of bicyclists and pedestrians, and the opportunities for bicycling and walking in the community.**
- **Recommending and implementing programs involving the private and non-profit sectors — such as bike-to-work promotions.**
- **Reviewing the annual work plan of the non-motorized program and developing its own list of priority projects. (Case Study No. 18)**

Benefits to be gained from advisory committees include:

- **The decisions and actions of the committee are more likely to reflect a balance between the enthusiasm and ideals of citizen members and the realism and attention to practical details of government employees.**
- **Working together educates all involved as to the views and constraints under which each must operate.**
- **The committee may be able to say, and ask for, things government employees cannot.**
- **An advisory committee can provide continuity and permanence in the face of personnel changes (more applicable at local level). (Case Study No.18)**

with other State agencies as well.

For example, interaction with environmental, health, and recreational agencies can lead to improvements in on-or off-road facilities, recreational opportunities, or bicycle helmet promotion initiatives. Coordinating with a State education department is probably the most efficient way to get an educational program into the school system. Working with a Governor's Highway Safety Program can lead to a mini-grant project for localities interested in an area such as bicycle law enforcement.

Numerous examples of coordinated State agencies abound. In Minnesota, the responsibility for bicycle planning is not positioned strictly within the DOT but is spread among the State Bicycle Advisory Board and the Departments of Public Safety, Public Service, Natural Resources, Education, Health, Trade and Economic Development, Administration, the Pollution Control Agency, and the State Planning Agency. The Minnesota Community Bicycle Safety Project is a broad-based youth education program operated by the 4-H Youth Development and funded by the Department of Public Safety. Services such as resources, information, and training are offered to local community safety programs. An important purpose of the State Bicycle Coordinator in the DOT and the State Bicycle Advisory Board is to better coordinate the diverse activities of the different State agencies into a more coherent planning effort.

In Ohio, a bicycle advisory council was established in 1983 and includes representatives from the Departments of Transportation, Education, Highway Safety, Natural Resources, and Development and Tourism, along with twelve citizen representatives. Although funded by the DOT, the safety and educational aspects of the State bicycling activities are focused in the Departments of Education and Highway Safety which provide information to schools and the public. In contrast, the educational efforts of the State of Florida have been contracted to a consultant at the University of Florida that manages all of the education activities.

In North Carolina, the DOT Bicycle Program; the Injury Control Section, Division of Epidemiology; and the Office of Prevention, Division of Maternal and Child Health (the latter two both within the Department of Environment, Health, and Natural Resources) are three State agencies which offer mini-grant programs for separate but interwoven bicyclist education and enforcement initiatives.

Develop, Review, and Modify Existing Policies - Putting a bicycle and pedestrian policy in place is an important step. Such a document forms the basis for interaction with other planners and engineers in the State DOT, as well as other State agencies.

Once policies are made, it is important to continue to evaluate their utility. The way a program operates can change over time, varying as departments or agencies learn how best to interact, or perhaps as program goals are achieved. Thus, policy updating may be necessary. The same would be true in other areas such as technical planning and design guidelines (an example being the AASHTO (1991) bicycle facility guide), legislation, and enforcement strategies.

Respond to Federal Mandates and Opportunities - Coordination with Federal agencies is a given, particularly where Federal funds are involved. The ISTEA legislation and the Clean Air Act Amendments will provide many new opportunities to incorporate bicyclist and pedestrian considerations, and there will be periodic interpretation of the legislation as States try different approaches. Pedestrian and bicycle coordinators should closely monitor these developments, as well as any other Federal mandates and opportunities that evolve.

The Federal Transit Administration allows funds to be used for pathways and trails that lead to transit stations, parking at the stations, design changes necessary to accommodate bicycles on buses, etc. In metropolitan areas, airport access is becoming a growing consideration, not only for travelers but also for employees.

Coordination with agencies like Amtrak and the Federal Aviation Administration can initiate useful dialogue. Contacts with the U.S. Department of the Interior and National Parks Service can provide better access to parks and other historic areas. And as mentioned earlier, bicycle and pedestrian projects are also now considered as a priority under Section 402 funding (i.e., where projects are developed under a State-level Governor's Highway Safety Program).

Provide Technical Assistance to Local Governments - This should be one of the most important missions of the program, because localities are the focus of many kinds of activities, from facility development to helmet campaigns to walking events. The North Carolina Bicycle Program was created from passage of the Bicycle and Bikeways Act of 1974, and its first duty was to "assist and cooperate

Providing convenient pedestrian access to rail transit can be funded through Federal Transit Administration programs.

Action Item 1

with local governments and other agencies in the development and construction of local and regional bikeway projects." The State program should hold training sessions for local government staff to learn about project eligibility, development, and funding. Providing technical assistance to a number of local governments can certainly exceed the capability of one person. Consequently, an appropriately-sized staff must be provided.

The State program should hold training sessions for local government staff to learn about project eligibility, development, and funding.

Some localities are of sufficient size that bicycle and pedestrian project activities can be budgeted and implemented internally with local funds. Periodic contacts with such communities will help ensure that standard practice is followed.

Provide Training - Most traffic engineers and planners receive little or no formal training in bicyclist and pedestrian issues (Case Study No. 2). Training can be provided "in house" by program staff, conducted under Federal government initiatives, or contracted to non-governmental groups such as the Bicycle Federation of America, Bikecentennial, or the League of American Wheelmen. Providing this for employees within a State DOT certainly fosters the institutionalization of non-motorized concerns. The States of Florida, Colorado, Washington, and Illinois, among others, have organized training courses for State agency and MPO employees. With the hiring of bicycle and pedestrian coordinators in more than 20 metropolitan areas, the Florida DOT contracted for three weeks of training over an 18-month period to cover the issues involved with being a coordinator. In the first half of 1992, the Florida DOT arranged 30 pedestrian facility design workshops that reached more than 1,500 traffic engineers.

Conferences also provide a training opportunity for State and local employees. Examples of such events include:

- ProBike - held every two years; covers program development, facility design, education, safety, and advocacy; organized by the Bicycle Federation of America.
- International Pedestrian Conference - hosted every year by the City of Boulder, Colorado; now in its 13th year; focuses on design issues.
- Rails-to-Trails Conference - held every two years; features trail design and program management techniques; organized by the Rails-to-Trails Conservancy.
- State Bicycle Conferences - cover a variety of topics; Minnesota and Arizona are examples.
- Regional ProBike Conferences - convened regionally around the United States every two years.
- Other national conferences hosted by the Transportation Research Board, Institute of Transportation Engineers, American Society of Civil Engineers, and Association for Commuter Transportation - held annually; feature bicycle and pedestrian sessions. (Case Study No. 5)

Other regional conferences have been organized to respond to passage of the ISTEA, the Clean Air Act Amendments, and the growing interest in walking and bicycling. One example is "Transportation Planning for Livable Communities," sponsored by

the Bicycle Federation of America; the Federal Highway Administration; the National Trust for Historic Preservation; the Rivers, Trails, and Conservation Programs of the National Park Service; Scenic America; the Surface Transportation Policy Project; and the U.S. Environmental Protection Agency. Besides providing specific information about the ISTEA and how it can benefit communities, an overall conference goal was to foster interaction between planners, engineers, and others and thus create a broader vision of transportation within a community.

Another example is a course offered through FHWA's National Highway Institute and NHTSA titled, "Pedestrian and Bicyclist Safety and Accommodation." The course is designed to provide training on safely integrating pedestrian and bicyclist considerations into normal highway planning, design, operations, education, and enforcement programs. The material is designed for FHWA and NHTSA field office personnel, State and local government representatives, traffic engineers, educators, and law enforcement personnel. Some 40 courses are planned.

Identify and Coordinate Funding Sources - There are a variety of Federal, State, local, and private funding sources for pedestrian and bicycling projects. This type of information needs to be disseminated widely. At the Federal level (as noted earlier), major sources of funding include:

- National Highway System (NHS) Funds,
- Surface Transportation Program (STP) funds,
- Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds,
- Federal Lands Highway funds,
- Scenic Byways Program funds,
- National Recreational Trails Fund, and
- Federal Transit funds.

Major sources of funding at the State level include:

- Set-aside programs. California, Oregon, Michigan and Illinois all have specific funds which can only be spent on bicycle and pedestrian facilities.
- Department of Transportation budget allocations. Minnesota, and North Carolina bicycle programs have developed multi-million-dollar line-item budgets for expenditure on bicycle program activities and facilities. Florida has no specific budget line-item, but still invests millions of dollars per year in bicycle- and pedestrian-safe highway designs.
- Voters in California have created a wide range of transportation funds for transit and congestion relief programs, and bicycle and pedestrian facilities are usually included as eligible expenditures.
- At least eight other types of State agencies have provided funds other than a transportation department, including health, energy, ecology, and tourism departments. (Case Study No. 5)

Both construction and non-construction projects have been routinely

There are a variety of Federal, State, local, and private funding sources for pedestrian and bicycling projects.

Action Item 1

funded from sources outside the State DOT. Examples include:

- Governor's Energy Office and disbursement of oil overcharge funds from the 1970's energy crisis. (The League of American Wheelmen has a detailed information packet explaining how to apply. The Governor's Energy Office in each State will also provide details about project eligibility.)

- Governor's Highway Safety Program and Section 402 funds.

- Bicycle registration charges (Minnesota is an example).

- Lottery receipts. (The Boulder Creek Bike Path was extended in 1988. The extension was jointly funded by the City of Boulder and a State trails fund grant using State lottery receipts.) (Case Study No. 5)

Corporations may offer assistance as well. Many examples exist of this type of funding being used for bicycle helmet campaigns and for the reprinting of various documents. Localities can contribute with "matching" aid, such as performing the engineering task for a greenway to enable the project to be accelerated into the State transportation improvement plan.

Today more adults than children ride bicycles for transportation and recreation.

Action Item 2: Plan and Construct Needed Facilities

Incorporate Bicycling and Walking into the Transportation Planning Process - Planning should precede construction of any kind of facility. Bicycling "grass-roots" advocacy has generally ensured that planning for this mode has been more frequent than planning for walking. The ISTEA legislation mandates that both modes be considered in planning. This opens a new window of opportunity.

Within ISTEA, bicycle transportation facilities are defined as "new or improved lanes, paths, or shoulders for use by bicyclists; traffic control devices; shelters; and parking facilities for bicyclists."

Newly required under ISTEA are a Statewide:

- Planning process,
- Transportation plan, and
- Transportation improvement program.

As required under ISTEA, States must develop long-range transportation plans. State plans shall consider "strategies for incorporating bicycle transportation facilities and pedestrian walkways in projects where appropriate throughout the State." (s.1025 (c)(3)). In addition, States "shall develop a long-range plan for bicycle transportation and pedestrian walkways for appropriate areas of the State, which shall be incorporated into the long range transportation plan." (s.1025 (e)).

A Statewide transportation plan must be approved by the Governor by January 1, 1995, including elements for all modes of travel and policies for implementing projects. The plan must be developed in cooperation with MPOs for metropolitan areas of the State. The opportunity for public comment must also be provided.

Statewide Transportation Improvement Programs (STIP) must include projects which are consistent with the long-range Statewide transportation plan, the metropolitan areas' transportation improvement plans (TIPs), and in ozone and carbon monoxide non-attainment areas, projects which conform with the applicable State air-quality Implementation Plan (SIP).

ISTEA requires long-range planning for bicyclists and pedestrians. The best bicycle and pedestrian plans will be comprehensive enough to encompass rural, urban, and suburban elements, such as:

- A park-and-ride lot in a rural area that connects to an urban or suburban area,
- A transit interface to provide for bikes on buses that allow bicyclists to make the work trip using the two modes,
- A program to retrofit sidewalks along roads in urban areas and to increase pedestrian safety at intersections.

Florida has already developed excellent plans for both bicycling and walking. Minnesota and Oregon have recently published updated State bicycle plans. These documents typically serve to heighten awareness of and further legitimize bicycling and walking among planning professionals, elected officials, and the public, as well as provide direction,

Action Item 2

focus, and continuity for a non-motorized program.

A number of States have specific bicycle planning and design guidelines, such as Arizona, California, Colorado, Delaware, Florida, Minnesota, New Jersey, North Carolina, Ohio, Oregon, Washington, and Wisconsin. California was an early pioneer with its 1978 publication titled, "Planning and Design Criteria for Bikeways in California" (since updated). States that have issued pedestrian planning guidelines include Delaware, Florida, Pennsylvania, and Washington. North Carolina and New Jersey are in the process of developing pedestrian plans, and other States will follow (Case Study No. 24).

Construct Facilities - States participate in construction of bicycling and walking facilities in various ways. Some projects are constructed entirely by State DOTs. Sometimes localities build their own facility to State standards and are then reimbursed by the State. The signing and mapping for the local project in such cases could be carried out by the State DOT. Using partial funding from a local capital improvement or maintenance budget to supplement State funds may allow for a larger or more comprehensive project. Programs to reduce traffic speeds ("traffic calming") in selected areas and the retrofitting of sidewalks for walking and intersections for pedestrians and bicyclists also should be considered.

User-friendly facilities refer not only to bikeways and other paths. Wide outside lanes (or simply wide lanes on two-lane roadways), though not a formal "bicycle facility," enable shared use of the roadway for bicyclists and motorists.

A user-friendly infrastructure means more than just miles of bikeways, trails and sidewalks. The provision of curb-cuts and ramps, bicycle parking, places to sit, adequate maintenance and special facilities at

Grade-separated crossings can benefit all users.

important (dangerous or key) locations throughout the community are also important. (Case Study No. 18)

Maintain and Improve Facilities - Most State program budgets have a maintenance schedule. Repair work, resurfacing, or reconstruction is usually programmed at least one year in advance. Maintenance standards should reflect consideration of bicyclists and pedestrians, allowing routine operations to be done as a part of the maintenance effort.

At the State level, opinion varies as to the value of having a special budget for bicycle facility maintenance or relying on State highway maintenance crews to routinely include maintenance work that ensures safe and convenient access to the highway system for bicyclists and pedestrians.

The Oregon Department of Transportation has a specific maintenance budget which it tries to use for every bicycle-specific maintenance work such as sweeping shoulders. Some bicycle facilities — especially trails — may require special maintenance equipment or practices, in which case a separate budget might be useful.

The Minnesota Department of Transportation takes the opposite view, preferring to incorporate bicycle-related maintenance work into the routine work of State crews. However, in Minnesota the State often tries to relinquish responsibility for trails and bikeway projects to city and county agencies once they are constructed. (Case Study No. 21)

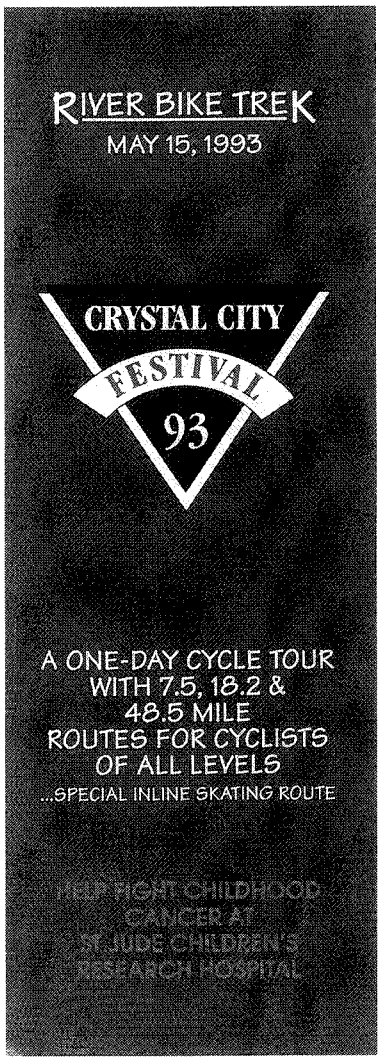
Provision of curb cuts at intersections is an important considerations for pedestrians of all ages and abilities.

Action Item 3

Action Item 3: Promote Bicycling and Walking

Develop Public Information and Awareness Programs - Bicycling and walking at the State level can be promoted or encouraged through many different kinds of public information and awareness programs. Special promotions of this type can be used to develop an interest in bicycling and walking, which then translates into wider use. Events to promote bicycling could be run by the private sector with assistance from the State coordinator.

Special promotions can be used to develop an interest in bicycling and walking which can be translated into wider use.



Examples of bicycling events include: general Bike Days (e.g., to promote any kind of riding), Bike Week, Bike Month, bike-to-work days, festival days, moonlight rides, bike tours, bike-a-thons, races (including road races, criterium, and time trials), weekend rallies, and bicycle fitness campaigns. Other public information items include bicycle helmet campaign information and maps of the State-level bicycle routes. State bicycle programs can publish a calendar of events as an awareness item. Other avenues are radio and television public service announcements and poster contests.

Although not as numerous as bicycling events, promotional pedestrian events include: walk-to-work days, Walk Week, Walk Month, trail walks, walks across States, charity-related walks, senior sports classics, consumer expositions, and others. A notable example is the annual convention hosted by *Prevention* magazine that typically includes a group walk. Again, the idea is to encourage walking trips that could lead to more frequent use of this travel mode. A coordinated approach involving various elements yields the best results.

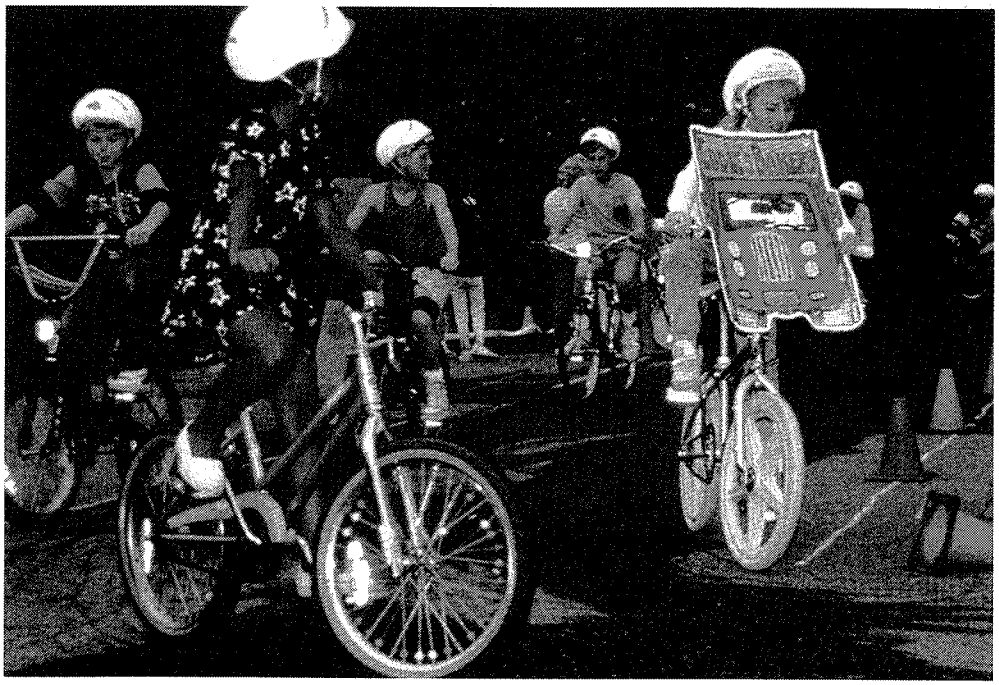
Provide Incentives - Incentives typically refer to benefits employers or businesses can offer to promote an activity. In terms of bicycling and walking, the States might offer incentives for their employees in the form of "flextime" (to avoid peak traffic and darkness); reimbursement for use of bicycles on official business; subsidized, or free, secure bike parking; purchase of company bike fleets; life and automobile insurance premium discounts for regular bicycling and walking commuters; and provision of shower and locker facilities.

Action Item 4: Educate Bicyclists, Pedestrians, and the Public

Provide Brochures, Pamphlets, and Other Resources - Successful bicycle and pedestrian programs include more than just miles of facilities. Education and public information components are examples of non-construction activities. On the education side, there is typically coordination with the State department of education, and often the bicycle and pedestrian program provides materials that may then be distributed through the schools. There are many such examples, and the actual educational message can be presented in a variety of ways. State bicycle/pedestrian programs routinely maintain a variety of pamphlets, videos, brochures, and other resources pertaining to safe practices for individuals or groups. Providing crash statistics is also a valuable service.

Initiate School Curriculum or Other Educational Programs - There are many examples of school curriculum programs. The Pennsylvania DOT is implementing a pedestrian public information and education campaign called "Walk Smart" to ensure that every child in Pennsylvania receives age-appropriate instruction in pedestrian safety education. Every elementary school in Ohio and Arizona received copies of the "Complete Bicycling Education Program" (Mountain Bicyclists Association, 1982). The successor to this program, "The Basics of Bicycling," (Bicycle Federation of America, 1991) is being distributed Statewide in Rhode Island, North Carolina, Wisconsin, and Colorado (Case Study No. 18).

Florida also deals with the education concept in a comprehensive manner. The goal of the "Florida Pedestrian Safety Plan" (Florida Department of Transportation, 1992) is to determine age-specific causes of pedestrian injury, and to create a comprehensive education program to teach pedestrians and drivers highway-sharing



Bicycle education programs can teach children about riding in traffic.

courtesy, predictability, and competency. Elements include:

1. School-based traffic education,

2. Campaign for the public awareness of the pedestrian safety problem,

3. Training of professional urban designers and roadway officials,

4. Study of pedestrian injuries and deaths by age groups,

5. Elderly pedestrian needs,

6. Enforcement and media campaigns regarding alcohol-related pedestrian problems,

7. Traffic safety education through health care professionals,

8. Driver education awareness of pedestrians,

9. Community education campaigns for intersection signals,

In like fashion, the Florida "Bicycle Sketch Plan" (Florida Department of Transportation, 1989) offers the following educational goals for bicyclists:

1. To offer adults and children a wide range of opportunities to improve their knowledge and skills related to bicycle use.

2. To create broad general awareness, understanding, and acceptance of bicycling, especially among motor vehicle operators.

3. To improve professionals' understanding of bicycling and to enhance their ability to effectively address bicycling matters.

4. To promote widespread, voluntary use of bicycle helmets by all ages and types of bicyclists.

Action Item 5: Enforce Laws and Regulations

Enforcement is important to the concept of having roadways that can be shared by pedestrians, bicyclists, and drivers of motor vehicles. Effective enforcement means the citing of pedestrians and bicyclists that are dangerous to themselves and others, as well as motor vehicle operators.

Examine State Vehicle Code - Much of what can be done in regard to enforcement and regulation of bicyclist and pedestrian actions occurs at the local level, and is described in Chapter 5. At the State level, however, there are various options for consideration. For example, some State vehicle codes may include regulations or provisions that actually discourage bicycling and walking. Thus, States should ascertain if their codes match the *Uniform Vehicle Code* (National Committee on Uniform Traffic Laws and Ordinances, 1987). The North Carolina and Florida programs routinely review proposed changes to State codes.

Consider New Laws - An area receiving considerable recent attention at both the State and local levels is that of mandatory bicycle helmet use laws. As of January 1992, California, Massachusetts, New York State, and Pennsylvania had passed laws requiring helmet use by children being carried as passengers on a bicycle. The content of the laws tends to vary by State, especially concerning age of the children. New Jersey also has a State-level law that includes bicycle operators as well as child passengers. The law applies to bicyclists under 14 years of age (Stutts, Hunter, Tracy and Wilkinson, 1992).

One possible negative effect of helmet legislation is a reduction in bicycle use, especially if the legislation is directed at older children or adult riders. Following implementation of a mandatory helmet use law in Victoria, Australia, head injuries in children were found to decline by 32 percent, but there was also indication of a 36 percent reduction in bicycle use (Cameron and Heiman, 1992). Public information and education campaigns are a key to the acceptance and effectiveness of any new legislation.

Certain bicyclist and pedestrian behaviors, in addition to behaviors of motor vehicle drivers, have come under scrutiny. Riding two or more bicycles abreast is an issue that has received recent review, in that the roadway may be blocked. This is often the case in mass bicycle rides. The means of signaling right-hand turns is another issue. On the pedestrian side, Washington State and Montana have recently changed the law so that vehicles must stop (not just yield) for pedestrians in designated crosswalks. Current regulation discussions also pertain to facilities, such as whether to require sidewalks, wide curb lanes, or bike lanes as a part of projects.

Promote Local Enforcement - A State program can also take steps to encourage bicyclist and pedestrian enforcement at the local level. Some States have offered workshops that cover the subject matter and then explain how to prepare a proposal for a mini-grant.

Measures of Successful Programs

Although there are many outcomes associated with bicycle and pedestrian programs, the ultimate measure of success is to safely increase the levels of bicycling and walking.

Increased Bicycling and Walking

Successful bicycle and pedestrian programs include more than just miles of facilities.

Although of prime importance, accurate measures of increases in bicycling and walking generated by program activities are difficult to obtain. Occasionally a State will distribute a questionnaire to learn about levels of bicycling and walking. For example, Tennessee and Arizona performed such surveys in the early 1970's. Minnesota has conducted a number of such surveys in recent years, and its latest comprehensive bicycle plan ("Plan B" report) (Minnesota Department of Transportation, 1992) states that:

- Sixty-six percent of all Minnesotans are bicyclists,
- The vast majority of Minnesota cyclists are adults, and
- Minnesota adults are bicyclists at nearly twice the national average.

It is estimated that Minnesotans traveled 138 million miles by bicycle for transportation-specific purposes in 1989.

In the 1987 New Jersey Bicycle Advisory Council Report (New Jersey Department of Transportation, 1987), national bicycle sales and use estimates were extrapolated to New Jersey's situation to estimate that more than three million people bicycle in the State, with 400,000

adults bicycling regularly (averaging once per week). Further, bicycling was projected to account for seven million commuting and 21 million non-commuting trips per year.

Most of the actual measurements of bicycling and walking are taken at the local level. Examples of these are provided in the next chapter. States can certainly undertake their own surveys, but cost may be a problem. If this is the case, a State program can perhaps assimilate whatever local data are available, as well as try to ensure that data from local surveys are comparable.

Reduction in Crashes

A study goal is to reduce bicycling and walking fatalities and injuries by 10 percent. This requires planning and implementing well-designed facilities, along with various forms of training and public information and education. One reason for the creation of Florida's bicycle and pedestrian program was the injury and fatality rate for these modes. Although crashes cannot be totally eliminated, more than 20 local coordinators across the State are implementing programs that point to individual community improvements.

At the State level, police-reported crash data for pedestrians and bicyclists are routinely processed through the traffic records system. These should be monitored on at least an annual basis. Any evaluator should be cautioned, however, that significant underreporting of crashes involving pedestrians and bicyclists is the norm. Studies using hospital emergency room and private practice records, as well as other available data sources, paint a more complete picture.

Safety results from well-designed facilities, effective education, and appropriate enforcement of traffic laws.

Summary

Much can be done at the State level to promote bicycling and walking. Once a coordinator and staff are in place, there are many resources that can be tapped. The State programs considered as successful are comprehensive in nature; have institutionalized bicycling and walking into the transportation planning process; and routinely embrace the elements of engineering, education, enforcement, and encouragement.

References

American Association of State Highway and Transportation Officials. **Guide for the Development of New Bicycle Facilities:** 1981 (revised 1991). Washington, DC: Author, 1991.

American Society of Civil Engineers, **Results of ASCE Human Powered Transportation College Education Questionnaire**. New York, NY: Author, May 1991.

Bicycle Federation of America, **The Basics of Bicycling**. Washington, D.C.: Author, 1991.

Bicycle Federation of America, **ProBike News**, January 1993, p. 5.

California Department of Transportation, **Planning and Design Criteria for Bikeways in California**. Sacramento, California: Author, June 1978.

Cameron, M., and Heiman, L. **Effects of the Mandatory Bicycle Helmet Wearing Law in Victoria.** In Proceedings of Conference *Velo Mondiale*, The Bicycle: Global Perspectives, Montreal, Quebec, Canada, September 1992.

FHWA Publication No. FHWA-PD-92-038, The National Bicycling and Walking Study Case Study No. 2: **What are the Training Needs for Transportation Professionals Relating to Bicyclists and Pedestrians?** Carter, E., 1992.

FHWA Publication No. FHWA-PD-93-008, The National Bicycling and Walking Study Case Study No. 5: **An Analysis of Current Funding Mechanisms for Bicycle and Pedestrian Programs at the Federal, State and Local Level**, Clarke, A., 1992.

FHWA Publication No. FHWA-PD-93-006, The National Bicycling and Walking Study Case Study No. 24: **Current Planning Guidelines and Design Standards Being Used by State and Local Agencies for Bicycle and Pedestrian Facilities**, Flink, C.A., July 1992.

Florida Department of Transportation, **Bicycle Facilities Planning and Design Manual**. Tallahassee, FL: Author, 1982.

Florida Department of Transportation, **Bicycle Sketch Plan**. Tallahassee, Florida: Author, 1989.

Florida Department of Transportation, **Florida Pedestrian Safety Plan**. Tallahassee, Florida: Author, February, 1992.

Lagerwey, P. **Institutionalizing Bicycling in the Transportation Planning Process.** In Proceedings of Conference *Velo Mondiale*, The Bicycle: Global Perspectives, Montreal, Quebec, Canada, September 1992.

Minnesota Department of Transportation, **Plan B: The Comprehensive State Bicycle Plan**. St. Paul, MN: Author, February 1992.

Mountain Bicyclists Association. **Complete Bicyclist Education Program**, Denver, Colorado: Author, 1982. Revised and published in 1986 by National Bicycle Education Consortium and in 1989 by Bicycle Federation of America.

National Committee on Uniform Traffic Laws and Ordinances, **Uniform Vehicle Code and Model Traffic Ordinance 1987**. Evanston, IL: Author, 1987.

New Jersey Bicycle Advisory Council. **New Jersey Bicycle Advisory Council Report on Bicycling in New Jersey:**

Findings and Recommendations. Trenton, N.J.: New Jersey Department of Transportation, July 1989.

Oregon Department of Transportation, **Bicycle Master Plan.** Salem, Oregon: Author, 1988.

Oregon Department of Transportation, **Oregon Bicycle Plan.** Salem, Oregon: Author, 1992.

Stutts, J.C., Hunter, W.W., Tracy, L., and Wilkinson, W.C. **Pedestrian and Bicyclist Safety: A Review of Key Program and Countermeasure Developments During the 1980's.** Chapel Hill, NC: University of North Carolina Highway Safety Research Center, March 1992.

FHWA Publication No. FHWA-PD-93-010, The National Bicycling and Walking Study Case Study No. 18: **Analyses of Successful Provincial, State and Local Bicycle and Pedestrian Programs in Canada and the United States**, Wilkinson, W.C., April 1992a.

FHWA Publication No. FHWA-PD-93-017, The National Bicycling and Walking Study Case Study No. 21: **Integrating Bicycle and Pedestrian Considerations into State and Local Transportation Planning, Design and Operations**, Wilkinson, W.C., July 1992.

Chapter Five

Action Plans And Programs At The Local Level

Action Plans And Programs At The Local Level

"Great walking cities are those with destinations within a 15- to 20-minute walk of each other . . . varied architecture. Diverse neighborhoods and a lively street life energized by sidewalk vendors, entertainers, and window-shoppers . . . filled with open spaces and parks . . . widened sidewalks, auto-restricted zones, and amenities such as benches, signs, and fountains."

(The Walking Magazine, August 1991)

To meet the goals of doubling the percentage of trips made by bicycling and walking and reducing bicyclist injuries and fatalities by 10%, programs must be developed and implemented at the local as well as the Federal and State levels. Measures of encouragement of non-motorized travel require the development of bicycle and pedestrian environments that are perceived as safe, scenic, convenient, attractive, and enjoyable. *The Walking Magazine* (August 1991) characterizes great walking cities as those with: "destinations within a 15- to 20-minute walk of each other . . . varied architecture. Diverse neighborhoods and a lively street life energized by sidewalk vendors, entertainers, and window-shoppers . . . filled with open spaces and parks . . . widened sidewalks, auto-restricted zones, and amenities such as benches, signs, and fountains." (*The Walking Magazine*, August 1991)

As with State programs, the development and implementation of successful local bicycling and walking programs involves a number of important factors. One of the most important of these is the institutionalization of bicycling and walking considerations in the routine planning, design, construction, and operations of government agencies.

This section provides an action plan for local governments including metropolitan planning organizations (MPOs). Examples of successful bicycle and pedestrian programs in the United States and abroad are examined, key components are identified, and indicative measures of successful programs are discussed. In short, this section presents methods to help ensure that bicycling and walking are treated as essential elements in the local transportation network.

Bicycling magazine asked readers in 1990 to nominate their "Best Cities for Bicycling in North America." The rankings of its survey (_Bicycling_, April 1990) in order were:

1990

Seattle, WA
Palo Alto, CA
San Diego, CA
Boulder, CO
Davis, CA
Gainesville, FL
Eugene, OR
Montreal, Quebec
Madison, WI
Missoula, MT

In 1991, _The Walking Magazine_ conducted a survey of U.S. cities based on their "walkability." One of the criteria cited by author Dan Zevin in selecting the cities was "An environment that makes it more compelling to stroll the sidewalks than to see it from behind a steering wheel" (_The Walking Magazine_, August 1991). The top ten cities (listed in no particular order) were:

San Francisco, CA
Savannah, GA
Washington, D.C.
Portland, OR
Boulder, CO
New York City
Boston, MA
Chicago, IL
Philadelphia, PA
New Orleans, LA

Examples of Successful Local Programs

Description of Programs in the United States

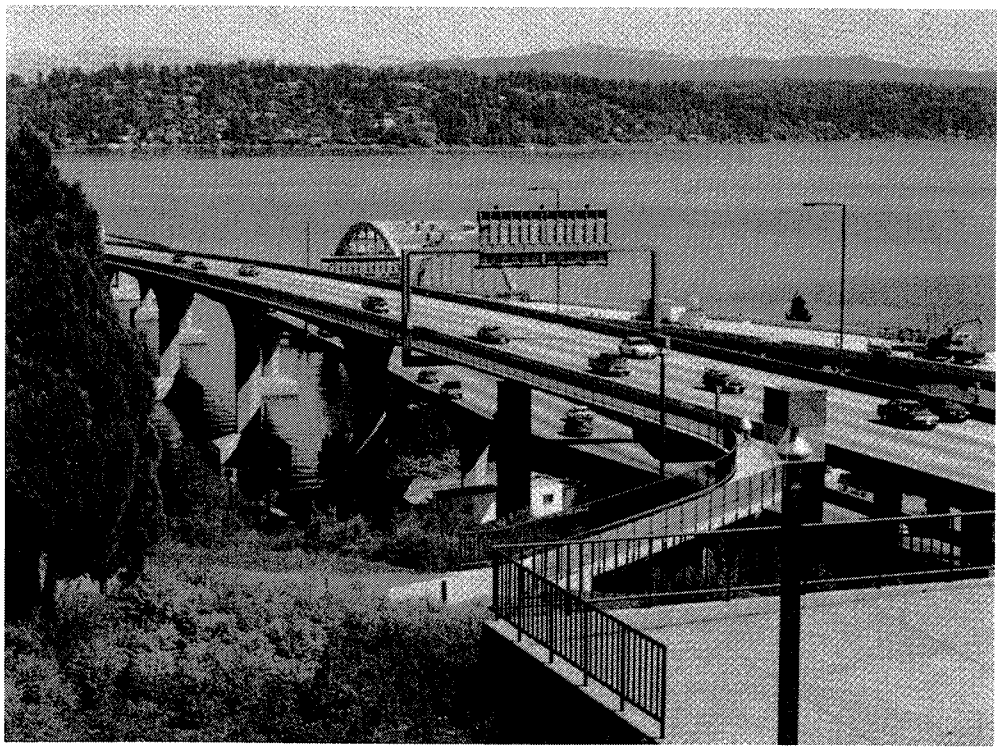
The following discussion highlights some successful local bicycling and walking programs in the United States.

Seattle, WA

Seattle has been described as having "great places to ride, a visionary cycling community, and a strong heritage of progressive city politics" (*Commuting by Bicycle*, 1991). Seattle has been named the "Best City for Bicycling in North America" (*Bicycling*, 1992). Not only does the City boast of pretty views and a livable atmosphere, it also has the commitment to make riding easy and safe, with the bicycle being an integral part of the transportation network (*Commuting by Bicycle*, 1991).

Seattle's bicycle and pedestrian program has six full-time employees and uses the input of a citizens' advisory board to help direct the program and determine priorities and policies (Case Study No. 5). A key part of the program's success has been the development of a 150-mile network of multi-use trails and on-street bikeways. Three trails providing access to the downtown area from the north, south, and east comprise the backbone of the network. The trails are connected to on-street bicycle lanes, wide curb lanes, and other facilities (Case Study No. 18).

Seattle annually spends about $4 million on bicycle and pedestrian improvements, largely due to expenditures on sidewalks and added street width or separate pathways for bicyclists along all new and improved highways in the City (Case Study No. 21). The City budgets $160,000 each year for its highly successful "Bike



The Seattle Bridge bikeway is part of an area-wide network of multi-use trails and on-street bikeways.

Spot Improvement Program," a special initiative devoted to low-cost and small-scale improvements such as pothole filling, sewer-grate replacement, sign replacement, and parking rack installation. Citizens recommend improvements through post-paid suggestion cards available at bike shops and City buildings (Case Study No. 5). Within a matter of days, City maintenance crews fix problems indicated on the "report cards" (Case Study No. 21). By involving Seattle residents, the program helps convince them that their City is responsive to their comments and requests. Seattle has a similar program for spot improvements to pedestrian areas (Case Study No. 18).

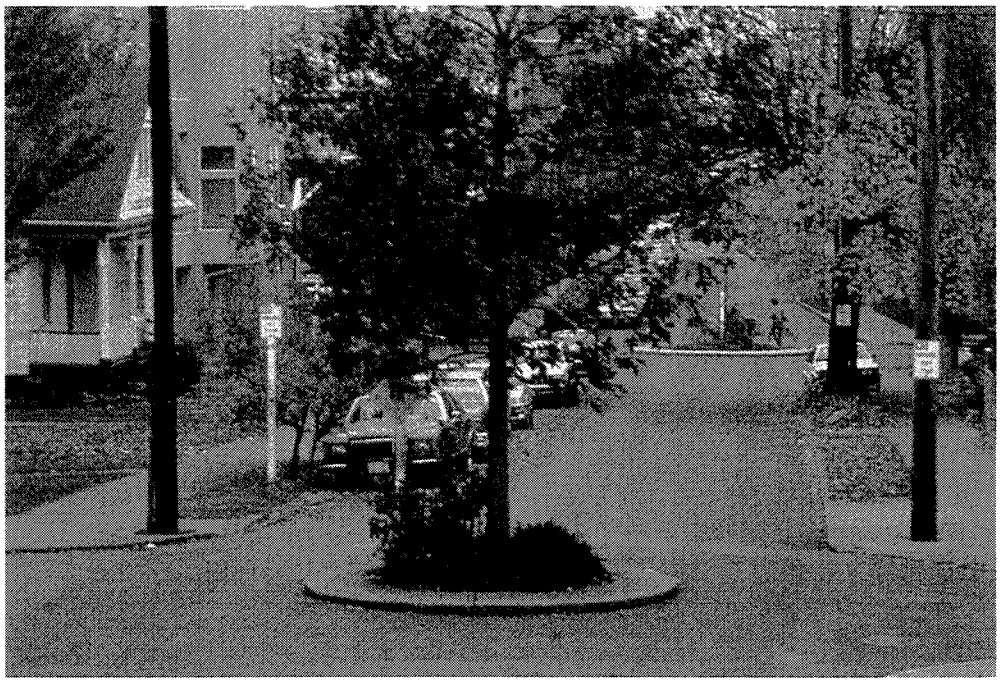
At the request of local residents, the City has implemented traffic calming measures by installing more than 200 traffic circles at four-way stop and uncontrolled intersections in residential neighborhoods. The traffic circles — islands in the middle of residential street intersections — have generally reduced traffic accidents and speeds (Case Study No. 18). In addition to well-planned facilities for bicyclists and pedestrians, Seattle has an enforcement program aimed at encouraging compliance to more than 31 pedestrian-related regulations.

Portland, OR

Portland started a bicycling program after Oregon passed a "Bicycle Bill" in 1971, which dedicated a share of State gasoline tax revenues to be earmarked for bicyclist and pedestrian facilities. Within two years, a Bicycle Master Plan was adopted, and in 1978 a permanent Citizen's Bicycle and Pedestrian Advisory Committee was formed (Case Study No. 3).

Initially, the bicycling program focused on local improvements to make bicycling easier and safer: improving bridge crossings, providing short street segments, and reducing other hazards or bottlenecks. The advisory committee later

In order to reduce traffic accidents and speeds, Seattle has installed more than 200 traffic circles, similar to this one, in residential neighborhoods.



developed a Corridor Program to allow area residents to assist in selecting local bicycle routes (totaling 65 miles) and in determining desirable treatments. More recently, the advisory committee has undertaken a bike signing and improvement program. This program focuses on minor improvements for bicycling, such as connecting existing bikeways, widening shoulders, and fine tuning traffic signals to detect bicycles (Case Study No. 3).

The City has produced maps and safety pamphlets and sponsored rides, races, and clinics. The program's mission is to "plan and implement bicycle programs and capital improvements necessary to increase bicycle ridership to five percent of total work trips by the year 2000." In general, Portland's bicyclist and pedestrian program has been successful in part because of the City's growth management initiative, transit development, and progressive efforts to link transit with bicycling and walking.

A full-time bikeway program manager has been on the staff for several years (Case Study No. 18), and in 1992, Portland announced that a full-time pedestrian coordinator had been added to its Alternative Transportation Program (*Pro Bike News*, July 1992). A number of park blocks designed in the 1800s have been preserved and a Loop Trail, which encircles the City and connects more than 30 parks, has grown from 40 miles to nearly 140 miles (*The Walking Magazine*, August 1991).

The program, also recognizing the needs of pedestrians with disabilities, calls for the installation of 100 to 120 curb cuts annually at locations requested by the public (*Pro Bike News*, July 1991).

Boulder, CO

Boulder has combined the activities of the bicyclist, pedestrian, and transit coordinators into one "Go Boulder" initiative (Case Study No. 21). A Citizen's Transportation Advisory Committee assists in decision making, along with the City's full-time bicycle and pedestrian coordinator, a bike-week coordinator, and a bicycle education specialist at the University of Colorado (Case Study No. 18).

The City's goal is to decrease single-occupant car trips by 15 percent by the year 2000, replacing them in many cases with trips by foot or bicycle. To achieve this goal, a City-appointed pedestrian coordinator is working to develop a walker-friendly downtown (*The Walking Magazine*, August 1991) by focusing on physical improvements to the pedestrian infrastructure, such as the completion of missing sidewalk links, the provision of pedestrian shelters at transit stops (about four per year), and the installation of benches (about 20 per year) (Case Study No. 11). In addition, a downtown pedestrian mall and a greenbelt were established to reduce sprawl development. The City has a policy to "improve the status of pedestrians by increasing the convenience, comfort and safety of pedestrians" (Case Study No. 18).

Boulder's bicycling program likewise reflects the needs and opportunities of bicyclists. The City's established bikeway network totals 50 miles, with more planned for the future. Capital improvements for 1991 included three miles of bikeway, two underpasses, 150 bicycle parking spaces and 40 bicycle lockers for Boulder employees. A full-time bicycle safety educator undertakes education and enforcement activities, including a hazard alert program (Case Study No. 11). A

two- to four-hour cycling course will soon be mandatory for all freshmen at the University of Colorado (*Commuting by Bicycle*, p. 12).

Boulder promotes bicycling by distributing a map of bikeways and stimulates media coverage through brochures and advertisements (Case Study No. 18). An annual Bike-to-Work Day, held since 1977, provides an effective forum to raise bicycle awareness, emphasize safety, and promote the bicycle as a viable method of transportation. The event was expanded in 1982 to a full week of activities involving low income residents, the physically challenged, and all age groups (*Pro Bike News*, October 1991). As part of the Bike-to-Work Day activities in 1991, more than 4,000 people bicycled to work (Case Study No. 11).

Palo Alto, CA

Palo Alto, recognized as one of the most bicycle-friendly cities in the United States, has neither a bicycle coordinator nor an identifiable bicycle facilities budget. Instead, bicycle provisions are built into the routine operation of the City traffic department, thereby relying on the implementation of various policies and standards to ensure that a bicycle-friendly infrastructure is created as the City grows (Case Study No. 5).

A prime example of bicycle-friendly infrastructure development is the creation of bicycle boulevards -- priority streets for bicycles (Case Study No. 19). Bicycle boulevards function as normal local city streets, but restrict motor vehicle through traffic. Palo Alto has one such boulevard on a two-mile stretch of a residential street that runs parallel to a busy collector arterial (Case Study No. 19). Six months after its construction, the amount of motor vehicle traffic had dropped while bicycle traffic had almost doubled (Case Study No. 19). The Palo Alto bicycle boulevard is the first of a

Boulder's bikeway network totals 50 miles of on and off road facilities with more planned for the future.

planned network of bicycle boulevards (*Commuting by Bike*, 1991).

To encourage optimum riding conditions, Palo Alto also requires that any streets torn up for construction must be repaired to meet stringent standards for smoothness. Special "detection loops" buried at intersections enable bicyclists to activate traffic lights (*Commuting by Bike*, 1991), with visible pavement markings showing cyclists where the most sensitive part of each loop detector is located (Case Study No. 21). To ensure that bicycles are linked to the transportation network, Palo Alto allows bicycles on buses and provides secure bicycle parking at those commuter train stations with connections into San Francisco (Case Study No. 11).

Tucson, AZ

In Tucson, several demonstration projects are being funded to increase Citywide bicycle and pedestrian facilities. The City's Alternative Modes Program began in 1988 to increase community awareness of bicycle and pedestrian alternatives and to direct public transit activities in the City. These include: participation in the Arizona DOT bicycle locker grant program, completion of a bikeway capital improvement program, the institution of a bicycle parking ordinance, and the implementation of a bike-on-buses campaign (Case Study No. 24).

The City has developed design criteria for "pedestrian circulation paths" serving public buildings and facilities, transportation access points, and housing areas. Developers are required to provide at least a four-foot sidewalk linking buildings with bicycle and automobile parking, recreation areas, and all common use areas (Case Study No. 21). Sidewalks are also constructed on all major streets and bridges. City guidelines identify major streets to be designed with 5-foot bicycle lanes adjacent to motor-vehicle travel lanes (Case Study No. 24).

Davis, CA

The U.S. city that lays claim to the highest level of bicycle ridership is Davis, with 25 percent of the total population commuting to work by bicycle. The most likely explanation for this unrivaled level is the combined effect of its many bicycle-friendly features (Case Study No. 1). The City actively promotes bicycling programs and has institutionalized bicycle planning and infrastructure systems to varying degrees (Case Study No. 15).

The amount of bicycling and walking in Davis is aided by: (1) a warm, dry climate; (2) flat terrain; (3) compact area; (4) extensive bicycling facilities; (5) short average commutes; and, (6) a young population. The high cycling level of Davis is sometimes attributed to its large university population, estimated at 26,000 — nearly half of the City's total population (Case Study No. 1). The presence of the university itself, however, does not account for Davis' high proportion of active non-student commuter cyclists (Case Study No. 1). Although more than 50 percent of students bicycle to classes, half of all bicyclists in Davis are non-student working citizens (Case Study No. 15) (Case Study No. 1).

The high rates of bicycling in Davis may be partly attributed to a set of proactive policies and programs, most of which were inspired by the university's decision in the 1960s to minimize the presence of cars on campus (Case Study No. 1). These include: construction of an extensive,

linked network of bike lanes; bicycle registration; active enforcement of bicycle and motor vehicle laws; very high parking fees at the UNC-Davis campus; and development to enhance access to bicycling facilities, making reliance on the automobile unnecessary. Such features have served to legitimize and institutionalize bicycling as a viable transportation option within the City (Case Study No. 1).

Other U.S. Local Experiences

A positive trend is emerging with some major cities promoting bicycling and walking. These cities tend to be "trend setters" and therefore serve as an important source of initiatives.

- In New York City, the transportation commissioner in June 1991 approved a policy on bicycling that included a goal to increase bicycle use by 25 percent by 1995.

- Los Angeles adopted an ordinance in November 1991 requiring showers and lockers in new developments, and the County Transportation Commission increased the budget for bicycle activities from $4 million to $10 million annually (*Pro Bike News*, September 1992).

- In May 1991 Boston's Mayor appointed a Task Force to develop a plan for reducing the City's pedestrian accidents (*Pro Bike News*, August 1992).

Successful Local Programs in Other Countries

Bicycling and walking are more prevalent in many foreign cities than in many U.S. cities. Thus, foreign experiences can provide ideas for programs in the United States. Several local foreign programs are discussed.

Groningen, The Netherlands was named the "World's Best City for Cycling" in the May 1992 issue of *Bicycling*. A city of about 200,000

The combined effect of many bicycle-friendly facilities, such as providing bike lanes as a part of existing roads, helps make Davis, CA the U.S. city with the highest level of bicycle ridership.

people, Groningen features a trend toward increased bicycle ridership (*Bicycling*, May 1992), with well over half of all trips in the City being made by bicycle (Case Study No. 19). Since the early 1970's, bicycling, walking, and public transit have been emphasized to the extent that car parking lots have been converted to parks and huge traffic circles to daily markets (*Pro Bike News*, February 1992).

A traffic circulation plan in Groningen divides the downtown area into four sectors. Automobile travel is prohibited between the sectors, and all sectors must be accessed from a peripheral roadway (*Bicycling*, May 1992). By eliminating automobile through traffic, the use of these traffic sectors known as "traffic cells," promotes walking and bicycling by giving pedestrians, bicyclists, and public transportation the freedom to cross the boundaries (Case Study No. 19).

Other roadway features have been altered to benefit bicyclists. At traffic lights, bicycle stop lines are placed in front of those for cars to protect riders from harmful exhaust fumes. Commuters are encouraged to combine bicycling with mass transit. Some transit lots hold up to 3,000 bikes, a capacity that needs to be doubled to meet heavy demand (*Bicycling*, May 1992).

Other Dutch cities are characterized by their innovative use of traffic calming measures. Traffic calming refers to roadway and intersection treatments installed to reduce the volume and speed of motor vehicle through traffic, thereby improving safety for pedestrians and bicyclists and enhancing the urban environment. One technique to benefit bicyclists and pedestrians is the "woonerf," or living yard concept, developed by the Dutch during the 1970s. In woonerven, pedestrians and bicyclists are not segregated from motor vehicles, but they do have priority over the motor vehicles.

In Washington, D.C. some roads are closed to motorized vehicles certain days of the week to encourage bicycling and other recreational uses.

Woonerven are characterized by street furniture, play areas, designated parking spots, different surface materials, and regular changes in the vertical and horizontal road alignment — all of which reinforce the notion that non-motorized users have priority. Vehicle speeds in the woonerven are reported to average 8 to 15 mph (13-25 km/hr), contributing to a 50 percent reduction in injury accidents (Case Study No. 19).

In **Japan**, planners have adapted the woonerf concept and developed their own "community streets." The community streets slow motor vehicles, but they also separate pedestrians from vehicle traffic by methods such as the strategic placement of shrubs and trees (Case Study No. 17). A successful project in Osaka in 1980 involved the conversion of a 10-meter wide street into a three-meter wide zig-zag space for vehicles. This move increased pedestrian traffic by five percent and bicycle traffic by 54 percent, while reducing automobile traffic by 40 percent. The success of the demonstration project resulted in similar projects across Japan. By the late 1980s, more than 140 community streets had been created primarily in areas surrounding schools and parks and in neighborhood shopping areas (Case Study No. 17).

In **Toronto, Canada,** a "City Cycling Committee" was founded in 1975 as an official body of the City Council. The committee lobbies all government levels to improve the local cycling environment. The committee has been involved in numerous promotional activities including publication of bicycle maps and a free newsletter with a circulation of 20,000, promotion of a highly successful Bike-to-Work-Week, and the installation of 1,000 bicycle racks throughout the City since 1983 (Case Study No. 18).

Since 1975, bicycle traffic in Toronto has increased by 270 percent. Bicycles accounted for nearly five percent of vehicles entering central Toronto in 1989, and it is estimated that one-fourth of all trips made by metropolitan residents during peak hours were by foot or bike (Case Study No. 18). The committee aims to shift 15 percent of automobile trips to bicycle trips and bicycle/transit rides in the metropolitan area in an effort "to make Toronto the best City for cycling in North America by the year 2000" (Toronto City Cycling Committee, 1990) (Case Study No. 18).

For the past 10 years, the Danish city of **Odense** has been developing a "Safe Routes to School" project, traffic calming efforts focusing on popular school routes. Seven major slow-speed areas have been developed and the results have been dramatic. Average vehicle speeds have fallen by.30 to 35 km/hr, truck traffic has almost disappeared, and accidents have declined by 85 percent (Nielsen, 1990) (Case Study No. 19).

In **Gothenburg, Sweden,** traffic entering the central area was reduced by 45 percent between 1970 and 1982 as a result of the installation of traffic cells, improved public transport, a reduction in the number of parking spaces, an increase in the price of parking, and the implementation of an extensive public information system. Injury accidents inside the ring road declined by 50 percent in the first five years of the program's existence (Case Study No. 19).

Together, these U.S. and foreign examples offer a guiding vision as well as a wealth of practical experi-

ence to draw upon in developing successful local U.S. programs. At the local level, counties, municipalities, and MPOs all have a role in providing for bicyclists and pedestrians. The following local action plan outlines how their ideas may be carried out.

Local Action Plan

The goal of establishing a successful pedestrian/bicycle program is best achieved through a comprehensive transportation plan in which pedestrian and bicycle concerns are fully integrated and not isolated. Such a program should ideally include consideration of all transportation modes in local planning, design, and construction of transportation facilities. This will help to ensure that the needs of pedestrians and bicyclists are more fully met and not merely treated as an afterthought. An action plan like the one below will help ensure that pedestrian and bicyclist needs are more fully integrated into a comprehensive transportation program and considered at the local level.

Recommended Local Action Plan

Action Item 1:
Organize a bicycle/pedestrian program

Action Item 2:
Plan and construct needed facilities

Action Item 3:
Promote bicycling and walking

Action Item 4:
Educate bicyclists, pedestrians, and motorists

Action Item 5:
Enforce laws and regulations

Action Item 1

"The presence of a regular committee with a body of wisdom shared by the continuing members provides a buffer against ... losses [of staff]. The program need not die and have to be restarted, and replacements are more quickly trained. Under the guidance of the committee three bicycle coordinators [in ten years] gained their stripes and two traffic engineers learned to think bicycles."

City of Eugene, OR

Action Item 1: Organize a Pedestrian/Bicycle Program

Establish Full-Time Coordinator and Staff as Needed - A full-time local pedestrian/bicycle coordinator carries out many of the same duties as a coordinator at the State level. Typical responsibilities include program planning, policy development, facility design, accident analysis, coordination among agencies and within government, public relations, educational support, and development of local legislation. Local coordinators also typically review capital improvement projects, plans, and designs related to pedestrian and bicycle facilities (Case Study No. 23).

Currently, almost half of all local program coordinators are positioned within planning departments and a quarter are located in engineering or public works departments. While coordinator titles vary, there has been a definite shift from the "engineer" to "planner" category during the 1980s (Case Study No. 23). Often, their most important task is coordination with other agencies and organizations to integrate bicycling and walking into the everyday work of the government and community. Eight of the top 10 cities for bicycling have bicycle program managers.

Movements to establish pedestrian coordinators have also achieved success in recent years. For example, citizen pressure for better pedestrian conditions was partly responsible for the hiring of a full-time pedestrian coordinator in Portland in June 1992 to be added to a bicycle program staff that had been active for many years. The Auto-free New York Coalition helped generate such interest that the City hired a pedestrian coordinator (Case Study No. 21). Citizen councils meet regularly with city officials on pedestrian issues in Boston and Philadelphia, and Seattle has a formal Pedestrian Advisory Committee.

While many successful programs have a high level of citizen involvement, such activity sometimes stands out as the major reason for the longevity and integration of the program into the local transportation agency. The Bicycle Advisory Committee in Eugene, OR has provided continuity to the City bicycle program that ranks among the best in the nation. According to the City of Eugene (Case Study No. 21): "The presence of a regular committee with a body of wisdom shared by the continuing members provides a buffer against ... losses [of staff]. The program need not die and have to be restarted, and replacements are more quickly trained. Under the guidance of the committee three bicycle coordinators [in ten years] gained their stripes and two traffic engineers learned to think bicycles."

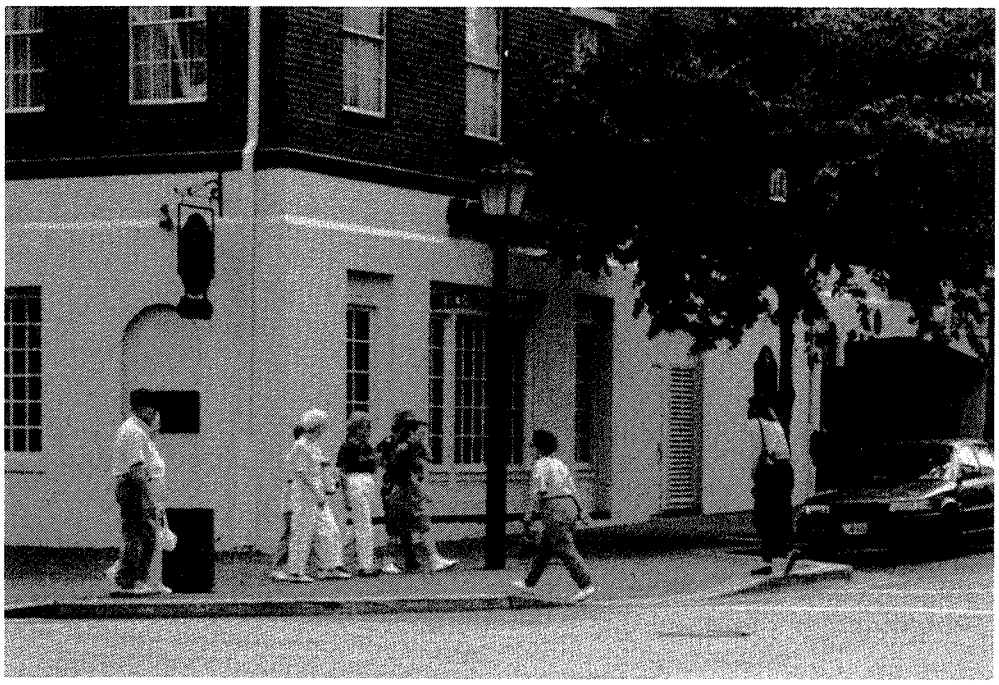
Although in many cases local government has the responsibility of creating and maintaining bicyclist and pedestrian programs, there are exceptions. Without access to local government staff and resources, some volunteer groups or citizen committees effectively substitute for a State or local bicycle/pedestrian program. For example, in the Dayton, OH region, the Miami Valley Regional Bicycle Club performs many of the same duties as a bicycle program. The club has helped to identify, design, and fund trails. It has also organized major recreational and transportation-based events and has developed materials to promote bicycle commuting (Case Study No. 21).

The Pedestrian Action League (PAL) in Asheville, NC has actively pursued better walking conditions for

the City. For example, the league took out full-page advertisements in the local newspaper discussing intersection problems. The organization publishes a Citywide newsletter titled "City Watch," which covers a range of issues including pedestrian safety and facility design. During its short life, PAL has had an important impact on the City's transportation department (Case Study No. 21).

Encourage "Grassroots" Initiatives - Citizen actions can encourage progressive transportation planning, and bicycling has benefited from many kinds of organizations and activities, some national in scope and some "grass-roots" in nature. To begin a grassroots movement, all that is needed is one person's ideas. That one person talks to another about his/her ideas, and the movement has begun. A successful grassroots movement can help produce facilities and continued local support for a safe and effective bicycle/pedestrian program. The enthusiasm, aesthetic touch, cultivation of leaders, and organization of community support are some additional outcomes of a grassroots movement (Case Study No. 6).

In Portland, two recently formed groups, the Bicycle Transportation Alliance (BTA) and the Willamette Pedestrian Coalition, serve as advocates for Portland's future. These grassroots organizations are comprised of local citizens working to improve bicycle and pedestrian conditions. From a one-person operation, the BTA grew quickly, expanding its influence in part through the publication of a monthly newsletter (Case Study No. 3).



A pedestrian-friendly street with expanded corners at crosswalks can reduce walking distance. Curb cuts can also be provided for ease of movement.

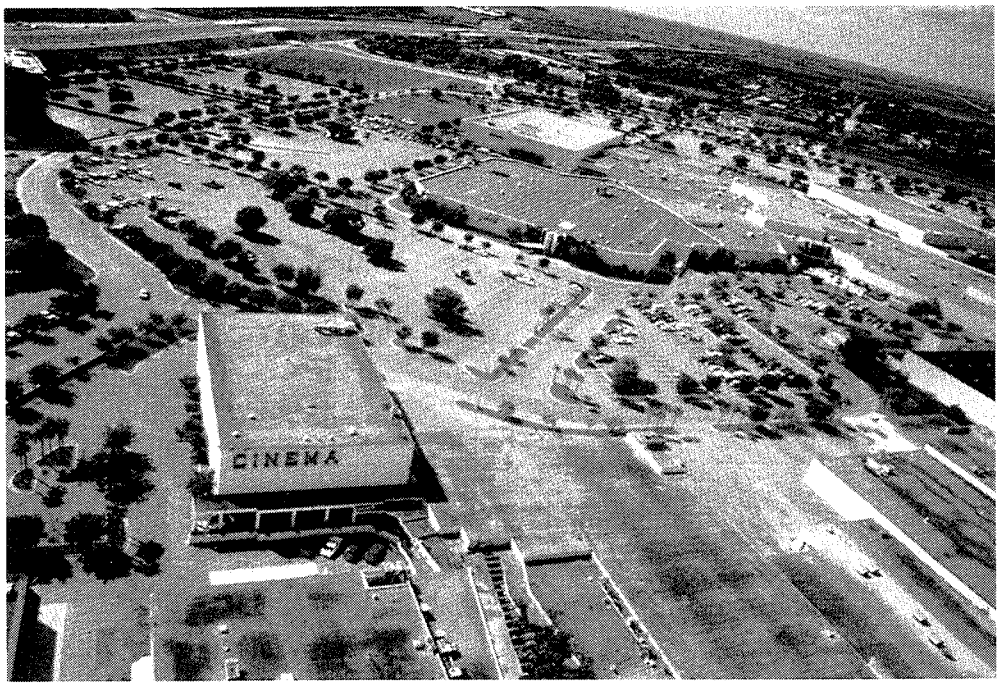
Action Item 1

Develop Coalitions with Local Groups - An important function of a local bicycle/pedestrian coordinator is to tap into local community resources through a coalition with pedestrian and bicycle organizations. Such bicycle organizations include: the Bicycle Federation of America, American Youth Hostels, Bicycle Institute of America, Bikecentennial, Canadian Cycling Association, League of American Wheelmen, United States Cycling Federation, and Women's Cycling Network. Other promotional organizations include local bicycle clubs. Walking-related organizations include the U.S. Walking Association, the Pedestrian Federation of America, and *The Prevention Magazine's* Walking Club (FHWA Interim Report, 1991).

Review, Modify, and Expand Existing Policies - Standards and guidelines for designing local streets and sidewalks to accommodate bicycle and pedestrian travel are critical to bicyclists and pedestrians. Designs and specifications for special bicycle facilities such as those outlined in the 1991 *Guide for the Development of Bicycle Facilities* by the American Association of State and Highway and Transportation Officials (AASHTO) should be followed.

Considerations of the non-motorized traveler in roadway design manuals are of major importance. For example, adopting a standard paved shoulder width of 4 to 6 feet on arterial and collector highways in rural areas having pedestrian or bicycle traffic would be a major step toward the creation of a bicycle-friendly infrastructure. In Seattle, pedestrian and bicycle considerations are routinely incorporated into policies, manuals, and standards (Case Study No. 23). Adequate traffic control policies are also important, as they guide signal timing, channel-ization, and signing practices. For example, the amount of "WALK time" given to pedestrians at a signalized intersection determines whether senior citizens can safely cross.

Sprawling land use may result in lengthy trips and increases dependence on motorized transportation.



Local governments typically depend upon various boards and commissions to provide policy direction and project review. Some mid-sized cities have as many as 50 boards and commissions. The local coordinator has the responsibility of determining which boards make recommendations critical to the interests of bicyclists and pedestrians. The coordinator should ensure that bicyclist and pedestrian advocates are appointed. Input should be gathered from these advocates on all relevant local projects and programs (Case Study No. 23).

Promote Adoption of Efficient Non-Motorized Compatible Land Use Patterns and Zoning Requirements - Local land use patterns are fundamental to the number of trips that can easily be made by walking or bicycling. Sprawling land use patterns produce lengthy trips and thus increased dependence on motorized transportation. On the other hand, clustered patterns tend to promote shorter trip lengths that more readily enable walking and bicycling (Case Study No. 17).

Local planning officials should review the assumptions of land use plans and zoning ordinances and compare them to non-motorized travel needs identified in user surveys. In particular, impacts on bicycling and walking trips should be considered when deciding whether to exclude small-scale commercial developments in residential areas. Changes to land use plans and zoning ordinances should then be proposed when necessary to allow for safe travel by bicycling or walking. Gainesville, FL has created higher housing density requirements for areas near the University of Florida campus to facilitate bicyclist and pedestrian transportation (Case Study No. 11).

Local zoning officials should be involved in the review of regulations on land development to ensure that they are bicycle- and pedestrian-friendly. Palo Alto, CA requires that plans for new commercial developments include showers, lockers, and secure bicycle parking. Bicycle parking requirements are also specified in the parking ordinances for such cities as Madison, WI; Gainesville, FL; and Boulder, CO (Case Study No. 11).

Develop/Adapt Bicyclist and Pedestrian Compatible Urban Design Guidelines - Street layout is important in the encouragement of safe bicycling and walking. Most U.S. cities are laid out in grids or modified grids. In comparison to less conventional designs, such as the radial system, a grid system maximizes direct access for bicycles. Perhaps no layout is as inherently hostile to bicycling as the "superblock," commonly found in suburbs. A large residential block ranging from one-half to one mile square, the superblock contains an arterial on its perimeter and lacks through streets within. Due to restricted movement on streets within the superblock, traffic on surrounding arterials is usually quite heavy. Bicyclists and pedestrians who prefer to travel through quiet residential streets may be forced onto the more heavily traveled arterials to gain access to other areas (Case Study No. 1).

Urban design guidelines can greatly improve the environment for safe and efficient bicycling and walking. In addition to State and national guidelines, many local agencies have adopted their own design standards.

A local bicycle/pedestrian coordinator needs adequate staff and support personnel for the program to be successful.

Action Item 1

For example, the Eugene, OR code includes several provisions for improved urban design for non-motorized travel. Among other provisions, the code: (Case Study No. 24)

- Requires that sidewalks and driveway approaches are constructed by those applying for building permits.
- Provides for public access when designing City blocks.
- Provides for public access along the Willamette River running through the City.
- Requires bicycle storage for all multiple dwelling units based on the number of units. In industrial and commercial districts, requirements are based on a percentage of the automobile parking requirements. The code also specifies the size and placement of parking facilities.

Educate Planners, Designers, and Other Officials - A local bicycle/pedestrian coordinator needs adequate staff and support personnel for the program to be successful. This includes not only the help of support staff to the coordinator, but also the support of professionals elsewhere within the appropriate agencies. Cooperation is also needed from local elected officials, bicycling and walking organizations, local educators (elementary through college), health organizations, and law enforcement agencies.

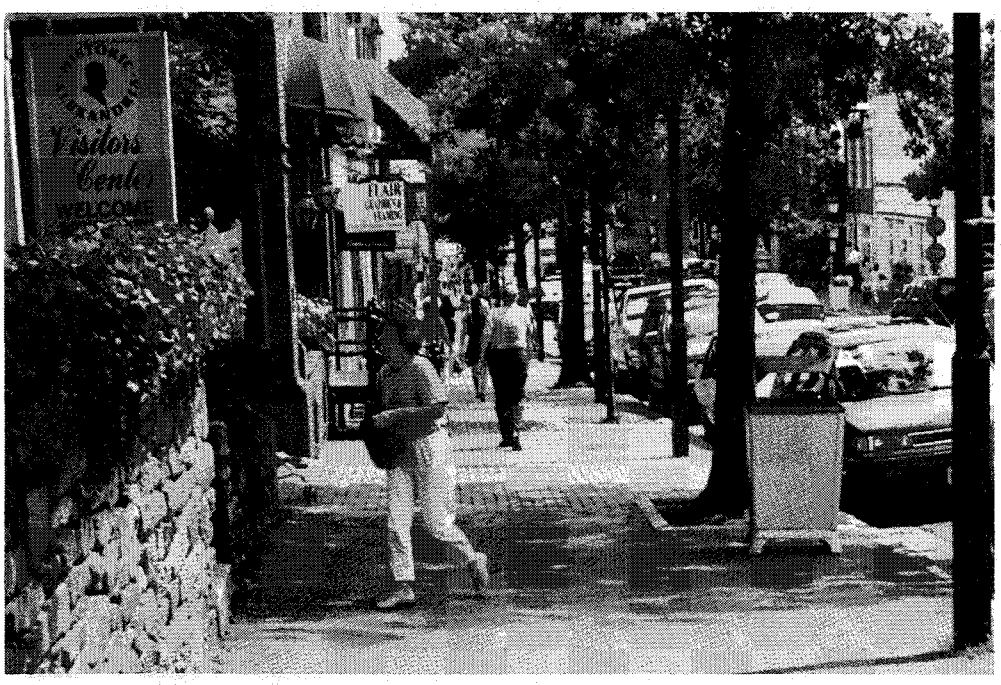
Many of the decisions that affect bicyclists and pedestrians are made by designers, planners, and engineers who have not received adequate training to provide for safe walking and bicycling. (Case Study No. 2). As a result, the needs of bicyclists and pedestrians are too often overlooked. A local coordinator should facilitate ongoing training through presentations, conferences, seminars, or written materials. Often, simply making presentations at agency staff meetings can be effective in alerting people to the particular needs (Case Study No. 23).

Action Item 2: Plan and Construct Needed Facilities

Integrate Bicycling and Walking Elements into Local Transportation Planning - Local governments are generally responsible for planning under the broad policies set by State and Federal government and those policies determined by their constituencies. Municipal and county officials play a key role in shaping our urban form. They have such regulatory powers as parking controls, zoning, public right-of-way dedicated to parks and streets, enforcement, and some control of housing patterns. Local governments can take a major step in fostering a more balanced transportation system by encouraging mixed-use zones, affordable housing near places of employment, and limiting motor-vehicle parking facilities.

Multi-modal transportation systems at the local level are scarce, in spite of many local plans which include pedestrian and bicycle trails and paths. These facilities have usually been developed as an addition to, rather than a integral part of, local community development plans. This is because the basic planning process has not included consideration of bicycle and pedestrian needs. Councils and planning and public works departments need to incorporate pedestrian and bicycle considerations into codes, ordinances, and specifications. Local governments have the tools and expertise to devise solid plans to guide development, but business interests control investment, and citizens determine demand (Case Study No. 3).

Prepare Plans, Goals, and Objectives - With a basic understanding of community problems, needs, and desires, a well-planned set of goals and measurable objectives should be created.



Urban design guidelines are an important tool for improving the pedestrian environment.

Action Item 2

Individual communities should establish goals and objectives that are specific and then monitor their progress. Some goals of a local bicycle and pedestrian program should be to (Case Study No. 11):

- Make the existing road network bicycle- and pedestrian-friendly;
- Provide additional non-motorized linkages to increase travel options;
- Provide a supportive environment for bicycling and walking;
- Encourage and enforce responsible behavior among bicyclists, pedestrians, and motorists, and;
- Eliminate disincentives and provide incentives for bicycling and walking.

"While considering a major improvement to a dilapidated bicycle/pedestrian bridge, the bicycle advisory committee conducted a 12-hour bicycle and pedestrian count. More than 2,000 crossings during that period helped justify the project."

(Case Study No. 11)

Conduct User Surveys and Collect Statistics - Bicycling and walking data are needed to develop measurable objectives, justify projects, track trends, and measure success. Several types of data are helpful (Case Study No. 22). For example, the public could be surveyed to determine usage rates, preferred places to ride or walk, trip purposes, concerns, and attitudes with respect to non-motorized and motorized travel (Case Study No. 11).

As part of its 1991 Transportation System Management Study, Davis, CA obtained figures for bicycle commuting and measured the potential for increased bicycling among employees of particular workplaces. Similar surveys have been conducted in Boulder, San Francisco, and Toronto (Case Study No. 11).

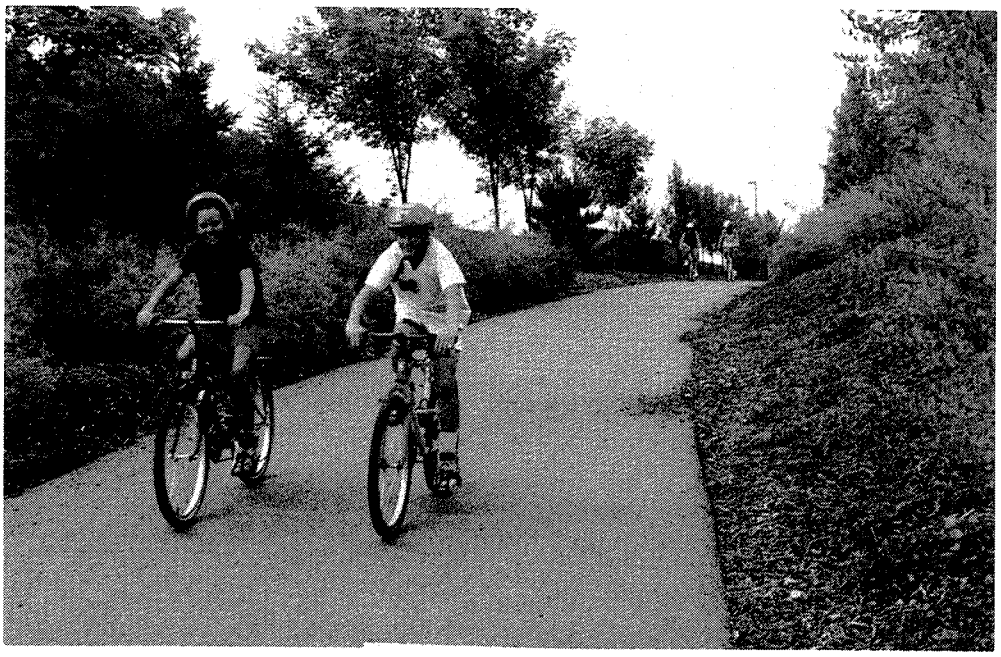
In addition to surveys, bike and pedestrian counts should be made on many of the streets and highways where routine traffic counts are taken. Counts can be made manually or by using video or stop action cameras. Bicycle traffic count data have been collected at the same locations for years in Madison, WI. As a result, the City has a good idea of usage

Eliminating barriers for those in wheelchairs also can benefit bicyclists and pedestrians in general.

changes at those sites. While considering a major improvement to a dilapidated bicycle/pedestrian bridge, the bicycle advisory committee conducted a 12-hour bicycle and pedestrian count. More than 2,000 crossings during that period helped justify the project (Case Study No. 11).

A list of barriers and potential hazards for bicyclists and pedestrians should be compiled to determine where improvements are needed. Missoula, MT used Federal transportation moneys to identify such hazards as narrow bridges and tunnels, and such barriers as railroad yards and interstate highways. Bicycle improvements for most of the identified problem locations were developed (Case Study No. 11). Geographic Information System (GIS) inventory systems offer real promise for identifying barriers, displaying missing network linkages, and tracking bicycling and walking improvements.

Data should also be gathered on crashes involving pedestrians and bicyclists. This type of information should include crashes involving pedestrians or bicyclists, bicyclists with other bicyclists or pedestrians, as well as the more common collisions of both modes with motor vehicles. This crash information can be used by local law enforcement agencies in setting priorities for selective enforcement. Also, educators can identify areas of emphasis, and media specialists can focus on important safety messages. Engineers can use crash data to identify and improve deficient roadway sites. Hospital emergency rooms should also be encouraged to collect information on pedestrian and bicyclist admissions and treatments, and such data should be analyzed to better understand crashes not reported to police (Case Study No. 11).



Among other uses, separate pathways for bicycling and walking can link homes to school and provide safe routes for children.

Action Item 2

Reserve Corridors and Incorporate Greenways - While most bicycle travel takes place on existing streets and highways, the construction of special facilities may also be desirable to encourage bicycling and walking. Sidewalks for walking and designated bicycle facilities (paths, lanes, routes) can be developed to link key trip generators (e.g., homes) and destination points (e.g., schools, shopping areas, places of employment, recreational facilities).

The network of paths and corridors can be further developed through public hearings and citizen input. Guidance, funding, and permits for such facilities may be obtained from local or State transportation departments, parks and recreation departments, natural resources agencies, and others. Of course, participation with adjacent land owners is a crucial step in this process.

Where opportunities permit, it may be possible to incorporate a "greenway" within a corridor. As described in Charles Little's book, *Greenways for America* (1990), a greenway is:

- "A linear open space established along either a natural corridor, such as a riverfront, stream valley, or ridgeline, or overland along a railroad right-of-way, converted to recreational use, a canal, a scenic road, or other route.
- Any natural or landscaped course for pedestrian or bicycle passage.
- An open-space connector linking parks, nature reserves, cultural facilities, or historic sites with each other and with populated areas.
- Locally, certain strips or linear parks designated as a parkway or greenbelt."

While most greenways include off-road trails, they also may include areas around rivers and streams and buffer areas between adjacent uses of land. Greenway corridors and related trails can help to promote efficient land use and development, control urban growth, create buffer zones, and ensure open space while also heightening public sensitivity to the natural environment (Case Study No. 7).

Identify/Coordinate Funding Sources - Most of the facilities and programs for bicyclists and pedestrians are implemented at the city and county level, instead of the State or Federal level. Roadway improvement projects are often funded from a mixture of Federal, State, and local funds, while maintenance is predominantly a State and local responsibility. Federal and State funding sources for bicycle and pedestrian projects usually require a certain proportion of local matching funds, along with the assumption of responsibility for routine maintenance. Thus, many of the funding sources at the Federal and State level discussed in chapters 3 and 4 are also used for local projects (Case Study No. 5).

Funding from multiple sources is often combined in a single project. (Case Study No. 8). For example, 17 different sources of funds were used for construction of the Duwamish Trail in Seattle. Many communities do not have separate line items in their transportation budgets for bicycle and pedestrian activities. The exceptions to this tend to be those local agencies with bicycle and/or pedestrian coordinators. Even in these places, however, the size of the line items may not reflect the total expenditure on these activities.

Sources of Local Funds

1. **Transportation department funds** - These are the predominant sources of local funds. The capital improvement program budget in Tucson for bikeways was $240,000 in 1990. The bicycle programs in Madison and Palo Alto are part of the overall DOT budget – there is no itemized budget for bicycle facilities.

2. **Sales tax** - Voters in San Diego and Los Angeles Counties, CA approved local sales tax increases to fund transportation improvements. San Diego's tax allocates $1 million over 20 years for improved bicycle paths.

3. **Open space bonds** - In 1989, voters in Seattle and surrounding King County approved a five-year bond issue of which $33 million was reserved for trail development.

4. **Mitigation measures** - Developers may be charged to pay for mitigating negative project impacts. In Los Angeles County, mitigation fees are taken from developers whose projects do not conform with Congestion Management Plan guidelines, and the funds may be used for such projects as bicycle facilities.

5. **Developer dedications** - These require the developer to construct bicycling and walking facilities as a condition for enabling the project to proceed. For example, a restaurant owner in Eugene, OR was required to make improvements to a river-front trail before developing a new location.

6. **Restorations** - Some local agencies require that developers restore rights-of-way for non-motorized users.

7. **Public agency land and funds** - The Port of Seattle donated land and funds for the Duwamish Trail.

8. **Motor vehicle taxes.**

9. **Street utility tax** - The City of Seattle has implemented such a tax on area employers and households. The money will be used to repave existing streets. Those streets that are important to bicyclists will receive priority treatment.

10. **Parks and recreation department funds** - In Arlington County, VA and Seattle, WA the Parks and Recreation Departments are responsible for trail maintenance.

11. **Donations (from the public and corporate sectors)** - In 1990, the Broward County, FL Bicycle Advisory Committee created a special fund to receive public and corporate donations for the county bicycle and pedestrian programs.

12. **Fund-raising rides and events** - The annual Thunder Road Bikeathon in the Dayton, OH area raises funds to pay the salary for the Miami Valley Regional Bicycle Committee's executive director and for small-scale projects.

Source: Case Study 5.

Action Item 2

"We've been trying to sell cyclists of all ages and abilities on very detailed and demanding education and training programs designed to make them more like motorists. Bicyclists have shown they don't want this. What cyclists repeatedly tell us they do want is more safe places to ride, and it is time we listened to that message."

Bill Wilkinson, Bicycle Federation of America Executive Director, 1991 (Case Study No. 3)

Local governments should work with the MPO and State DOT to discuss funding opportunities under ISTEA. Specifically, bicycling and walking projects or programs may be funded by National Highway System (NHS) funds, Surface Transportation Program (STP) funds including those set aside through Transportation Enhancement Activities (TEAs) allocations, Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds, Scenic Byways Program funds, Federal Lands Highway Funds, and the National Recreational Trails Fund. In addition, pedestrian and bicyclist safety are priority areas subject to expedited approval for Section 402 highway safety program funding. Federal Transit funding also continues to be available for improving the intermodal serviceability of bicycling and walking with transit. Bicyclist and pedestrian needs must compete with other highway/motorized projects for funding within these categories (ISTEA, 1991).

Other specific sources of local funds are identified on the previous page.

Construct and Improve Facilities - Usable facilities must be in place in order for bicycling and walking to become viable. Many types of bicycle and pedestrian facilities are routinely constructed by local jurisdictions. Common facilities for bicyclists include bicycle lanes, wide curb lanes and paved shoulders, bicycle paths separated from the roadway, bicycle-sensitive detectors at signalized intersections, bicycle parking, and bicycle-safe drainage grates. Pedestrian facilities include sidewalks and walkways, grade-separated crossings (e.g., overpasses or underpasses), pedestrian malls, and pedestrian signals (WALK/DON'T WALK).

Good facilities lead to a more convenient, more accessible, and safer travel route for bicyclists and pedestrians. As expressed by the Executive Director of the Bicycle Federation of America: "We've been trying to sell cyclists of all ages and abilities on very detailed and demanding education and training programs designed to make them more like motorists. Bicyclists have shown they don't want this. What cyclists repeatedly tell us they do want is more safe places to ride, and it is time we listened to that message." Bill Wilkinson, Bicycle Federation of America Executive Director, 1991 (Case Study No. 3).

An integrated network of usable road space is necessary, and in some cases, separate paths are appropriate. None of these facilities need to be unduly expensive, since usable road space can sometimes be attained for pedestrians and bicyclists by reallocating space through restriping or the removal of on-street automobile parking.

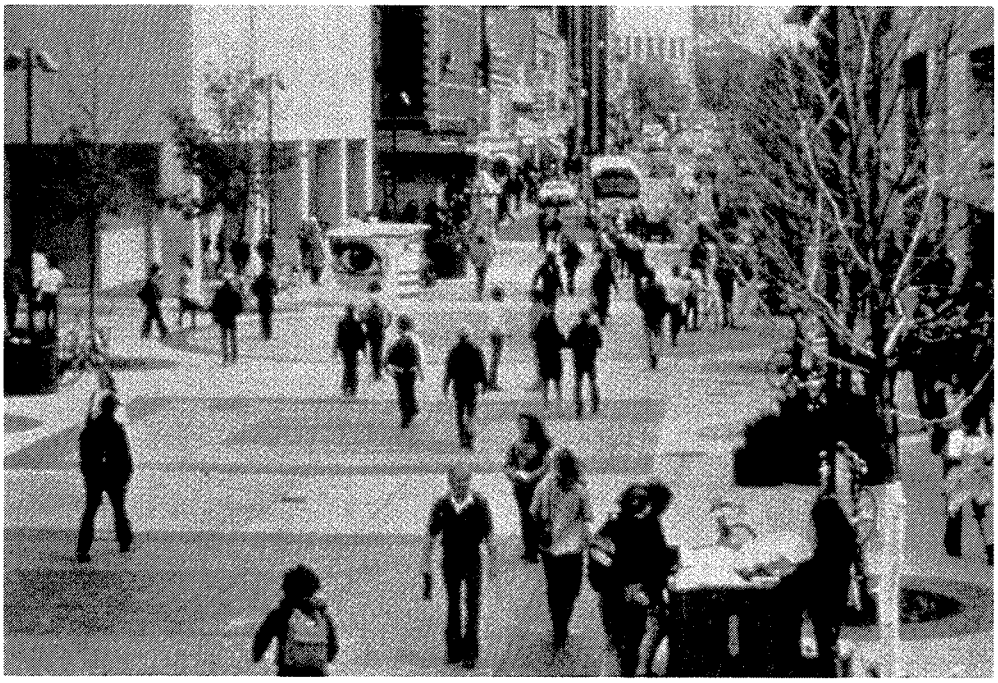
Both bicyclists and pedestrians benefit from streets, walkways, and multi-use paths that are well-lighted, and from various types of signs, signals, and markings. Traffic calming techniques are also beneficial to bicyclists and pedestrians and include the narrowing of streets in residential areas (to reduce vehicle speeds and create safer pedestrian crossings), the creation of cul-de-sacs, and the limitation of motor vehicle speeds or movements.

Examples of other facilities that may increase bicycling and walking include the following (Case Study No. 3):

• **Dedicated Areas** - These include streets on which automobiles are excluded or limited to local travel. Dedicated areas work well in city centers plagued with traffic congestion. Longer "Bicycle Boulevards" also may work well. These provide a dedicated, alternate route parallel to congested streets. Another option is to narrow the streets and widen the sidewalks to create a more balanced land use while still allowing automobile through traffic (e.g., downtown Portland). Many opportunities also exist for using plazas and non-motorized vehicle passages between buildings.

• **Trails and Multi-Use Paths** - Separated multi-use trails can provide desirable travel corridors if they are centrally located, have easy access, have few (if any) intersections with the existing street system, and are designed to connect origins with destinations. Bike paths can be valuable for commuters as well as recreational bicyclists. Although more expensive than on-roadway facilities such as bike lanes and shoulders, multi-use trails are very popular. The river paths in Eugene, OR are excellent examples of such facilities. As part of the Eugene paths, three bicycle and pedestrian bridges span the Willamette River and provide direct access along the paths to downtown streets.

• **Bicyclist Facilities and Sidewalks** - On-road bicyclist facilities and sidewalks for pedestrians form the bulk of the circulation system for bicyclists and pedestrians. They should be planned to connect with the separated trails and paths, with the major points of origins and destinations, with transit, and with park-and-ride lots. Bicyclist facilities (on and off road) and sidewalks should be designed to best suit the particular environment. A high priority should be given to creating improved bicyclist and pedestrian connections between high-density residential areas and local employers, businesses,



When feasible, pedestrian malls can provide a separate space for pedestrian activity away from motor vehicles and associated hazards.

Action Item 2

and transit stations. All roadways should be made bicyclist- and pedestrian- friendly whenever possible.

- **Parking** - In addition to safety concerns, lack of adequate parking is often cited as a common reason why people do not bicycle. Any bicycle trip requires some sort of parking at its destination. Secure parking is particularly important for commuters leaving their bicycles for long periods of time and for those destinations which lie in high-crime areas. An increasing number of cities now require bicycle parking facilities in new developments. Companies such as Xerox and Hewlett-Packard in Palo Alto provide covered parking and/or bike lockers.

- **Showers and Changing Rooms** - One of the common reasons given by people for not bicycling to work includes having to arrive at work sweaty from exertion and having nowhere to shower and change. Some communities such as Palo Alto, CA require that showers and changing areas be installed at new major commercial and public buildings. However, bicycling does not necessarily require these facilities. If the trip is short or if it is taken at a slower pace, showering and changing may not be needed.

- **Intersections and Crossings** - A majority of bicycle and pedestrian crashes with motor vehicles occur at intersections and other road crossing locations. Designs of intersections and crossings that minimize conflicts with traffic are needed in high-use areas. Redesigning crossing areas to give non-motorized traffic priority has been successful in some European cities. Various techniques include roundabouts, grade-separated crossings, recessed stop lines for cars, and narrowing of streets. Also of importance are bicycle-sensitive signal detectors in the roadway or a bike lane and pedestrian-actuated traffic signals.

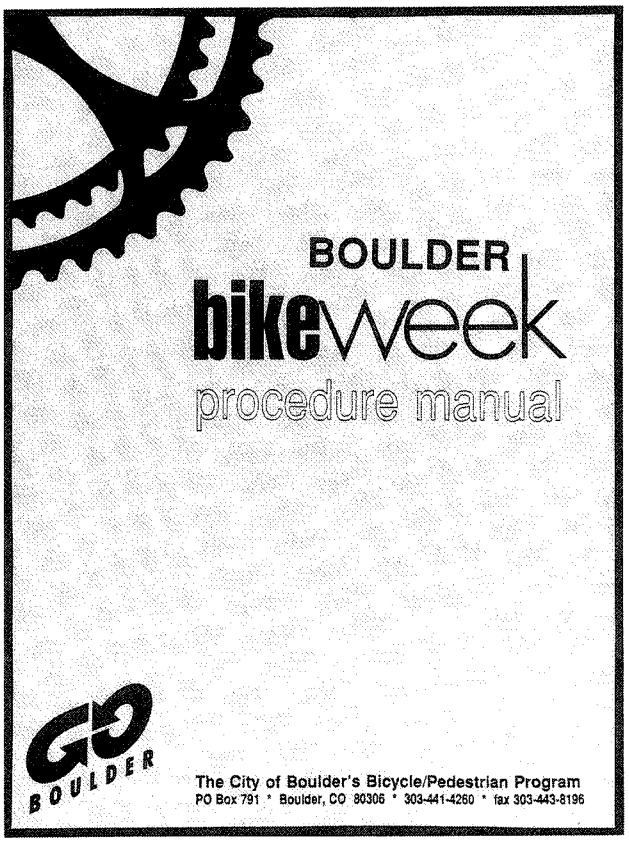
- **Signing and Markings** - Carefully signed and marked pathways can provide a great deal of valuable information to motorists, bicyclists, and pedestrians. For example, pavement markings delineate crosswalks and preferential lanes, and channelize traffic. Signs indicate special traffic regulations, provide directions to parking and entrances, give distances to destinations, and warn of potential dangers.

Action Item 3 : Promote Bicycling and Walking

Conduct Promotional Programs and Events - Although bicycling and walking can be promoted at the local level in many ways, a coordinated approach will yield the best results. Some of the elements used to promote bicycling and walking include: a pleasant environment with facilities and maps to highlight such features; employer incentives; special events; conferences; magazines and other publications; advertisements and the news media; and the involvement of trade organizations and other clubs (FHWA 1991).

A number of public information and awareness activities can be undertaken to inform the public about bicycling and walking options. Conferences are one way to bring together many elements of the bicycling and pedestrian community, including local administrators, local planners and engineers, proactive organizations, enforcement and educational specialists, riders and walkers, and others. Conferences are important not only for distributing information, but also for solving specific problems, for strengthening a group identity, and as a political mode of operation (FHWA 1991).

Provide Information - Local businesses can provide information by using materials such as posters and paycheck stuffers and by sponsoring week-long promotions. Other promotional techniques include workshops on commuting, bicycle tune-ups, and fitness (Case Study No. 3). Special events such as bike-to-work



Community events can lend high visibility to nonmotorized modes of travel.

Action Item 3

days and walks for hunger or other causes are also used in many local areas for promotion.

A popular method of informing riders and walkers of available routes is the publication of maps. Local maps can show the location of designated bicycle facilities and walking trails, or they can also show neighborhood routes good for non-motorized commuting (FHWA Interim Report, 1991). Maps might display such information as speed limit, roadway width, or traffic volume and should be designed to be compact, durable and useful to all classes of bicyclists and walkers.

"At Fleetwood Enterprises in Riverside, CA, a comprehensive program of incentives and promotions has resulted in 12 percent of the company's 600 employees bicycling to work regularly."

ProBike News, January, 1993

Communities have also used television and radio public service announcements, back-of-bus posters, billboards, brochures, and other types of media to get safety and education messages across to the general public. The City of Palo Alto regularly includes information on bicycling in utility bill mailings to every resident in the City (Case Study No. 18). Other methods of promoting bicycling and walking include newspaper and newsletter articles, television appearances, radio interviews, and award programs. Often, bicyclists and pedestrians themselves can serve as the best promoters of programs, since word of mouth is a very effective medium.

Provide Incentives - A number of activities can be undertaken by local businesses to make bicycling and walking easier and to reward those who are involved in such activities. The direct approach to encourage bicycling and walking is to pay employees to do it. Reimbursing employees for business travel on bicycles, as is done for usage of cars, is becoming increasingly popular. At Fleetwood Enterprises in Riverside, CA, a comprehensive program of incentives and promotions has resulted in 12 percent of the company's 600 employees bicycling to work regularly (*Pro Bike News*, January, 1993). Rather than give stipends, some employers have offered to pay for an employee's bicycle after a certain period of regular riding or to set up a credit program for its purchase (Case Study No. 3). The City of Glendale, AZ, gives unclaimed bicycles to its employees who bicycle to work at least three times per week (*Pro Bike News*, January, 1993).

In addition to the examples of employer incentives for bicycling mentioned in the previous State chapter ("flex time," reimbursement for use of bicycles for official business, and secure bicycle parking), another incentive that has been offered to regular bike commuters is life and automobile insurance premium discounts (FHWA, 1991).

Action Item 4: Educate Bicyclists, Pedestrians, and Motorists

Support Community-Based Programs - Pedestrian and bicyclist safety education is important in any successful local program. While Federal and State agencies often sponsor or develop pedestrian and bicyclist educational materials, such educational programs are often implemented at the local levels (Case Study No. 12). These programs may be run by city hospitals, school systems, or by other resources.

Most bicycle or pedestrian educational programs in the country produce literature aimed at bicyclists, pedestrians, motor vehicle drivers, or a combination of the three. The mere production of a brochure or safety literature, however, does not in itself constitute success. Success depends on the number of people who actually use and learn from the materials and translate this learning into action (Case Study No. 12).

A variety of resources at the local level can provide pedestrian and bicyclist education. These include: police, schools, medical facilities, 4-H clubs, scout and service organizations, and health and safety organizations (e.g., SAFE Kids and the American Academy of Pediatrics). Local bicycle/pedestrian coordinators can provide a centralized source for training materials and support activities such as helmet loaner programs, summer bicycle camps, and bicycle rodeos (Case Study No. 12).

Many good examples exist for pedestrian/bicyclist education program at the local level. One such program is the Allegheny County, PA "LOOK OUT" campaign, which is targeted to bicyclists, pedestrians, motorists, and bus riders in the city of Pittsburgh. A video and curriculum, available for elementary school children, covers safe practices for stopping and searching, crossing the street at midblock, crossing in front of a school bus, walking where there are cross-

The Willy Whistle program teaches children the critical behaviors needed to avoid the so-called "dart-out" accidents.

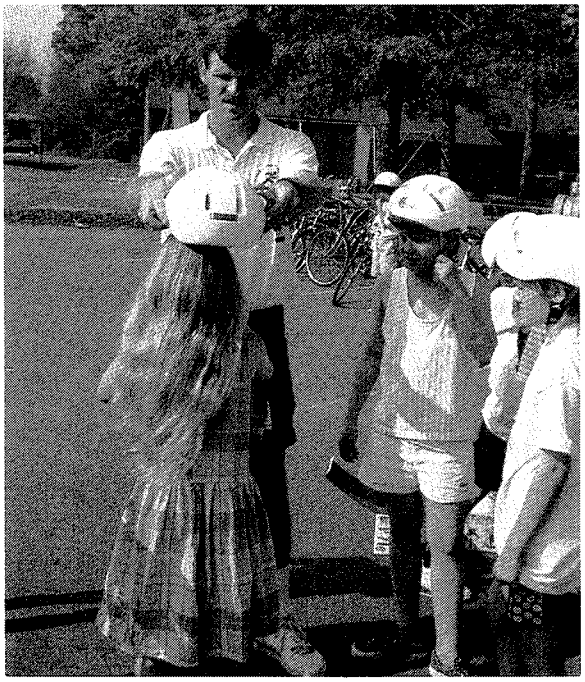
walks or no crosswalks, understanding traffic signals and signs, and being visible under dark conditions. Teachers use pedestrian fact sheets, activity lists, and posters as part of the program. The campaign also incorporates public service announcements and brochures oriented toward adults (Case Study No. 12).

Support School-Based Programs - The local school system should play a major role in pedestrian and bicyclist education. Nearly one million children in the Los Angeles area have been reached by the SAFE MOVES program, a school-based program teaching bicycle traffic safety to elementary age children. Milwaukee is known as a pedestrian-friendly City and has promoted pedestrian safety education for school-age children through a variety of programs. Each summer the Milwaukee Safety Commission sponsors a "Safety Fest" that regularly attracts 30,000 children (Case Study No. 18).

Much of the pedestrian and bicycle education material used in local school systems has been developed by the National Highway Traffic Safety Administration (NHTSA). Probably the most successful of these pedestrian programs is NHTSA's "Willy Whistle" film recently updated in 1991 as a video and renamed "Stop and Look with Willy Whistle." Oriented toward young children in kindergarten through third grade, the program teaches the critical behaviors needed to avoid the so-called "dart-out" accident (Case Study No. 12).

A companion video on pedestrian safety education called "Walking with Your Eyes" is a recent update of another successful NHTSA film called "And Keep on Looking." Oriented toward children in grades four through six, the video starts with a review of the critical stop-and-search procedure needed to avoid dart-out accidents. It then adds procedures to follow at intersections with traffic lights or pedestrian signals and

Bicycle safety education and skills instruction should begin at an early age.



where there are visual screens blocking the driver's and pedestrian's view of each other. Many other national educational programs, such as those created by the American Automobile Association, have also been developed (Case Study No. 12).

Bicycle safety education programs can reduce injuries and fatalities by teaching people to ride safely and competently in traffic and by encouraging the use of appropriate safety equipment, particularly helmets. "The Basics of Bicycling," a bicycle safety education curriculum targeted toward fourth graders (developed by representatives of The Bicycle Federation of America and the North Carolina DOT Bicycle Program) consists of lessons on using appropriate equipment, checking bike condition, obeying traffic laws and signs, dealing with high-risk situations, communicating and cooperating with other road users, and following proper bicycle handling skills. Field assessment of this program in North Carolina indicated that it was an effective tool for developing children's cycling skills and teaching them safe riding practices (Stutts and Hunter, 1990).

The League of American Wheelmen conducts adult education through its Effective Cycling program. Many communities have developed safety material targeted to adult cyclists.

Support Driver Education Programs - Driver education courses are commonly available to high school students of (or approaching) driving age. Beyond high school, driver education can be obtained from licensed driving schools which typically concentrate on behind-the-wheel instruction and preparation for the written driver's test. The courses should cover the following topics related to pedestrians and bicyclists: (Case Study No. 12)

- Legal rights and responsibilities of bicyclists and pedestrians,
- Traffic signs pertinent to bicyclists and pedestrians,
- Special roadway-surface and traffic flow problems that affect the bicyclist,
- Precautions that should be taken in areas with children, and
- The importance of searching for bicyclists and pedestrians, exercising caution near bicyclists and pedestrians, and communicating one's intentions to all users of the highway system.

Note: It should be ascertained whether local driver education programs do, in fact, cover these subjects. If not, the programs need to be revised.

For instance, the Texas driver education curriculum introduces new motorists to other roadway users in the first unit of instruction: "...the [...driver's education] instructor should never allow students to lose sight of the fact that often they are passengers and pedestrians. When attitudes, judgment, courtesy, habits, and any of the other human factors that might cause conflict between the driver and pedestrian are discussed, remind the students that 150 pounds of flesh are no match for 4,000 pounds of metal."

"When attitudes, judgment, courtesy, habits, and any of the other human factors that might cause conflict between the driver and pedestrian are discussed, remind the students that 150 pounds of flesh are no match for 4,000 pounds of metal."

Introduction to Texas Driver Education Program

Action Item 5

Action Item 5: Enforce Laws and Regulations

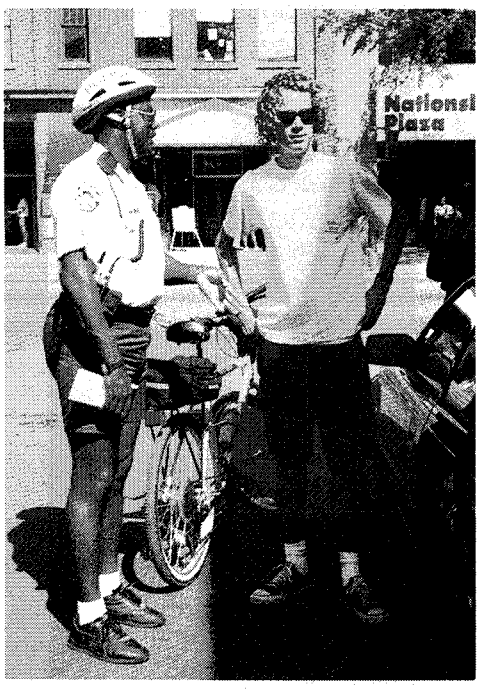
Enforce Laws and Regulations for Bicyclists, Pedestrians, and Drivers - A bicycling and pedestrian program can succeed only if engineering, education, encouragement, and enforcement are all present and working together. Laws and ordinances related to bicycling and walking should be reviewed for their utility and revised as applicable. Any new regulations imposed should be preceded by an education campaign, perhaps conducted by the local law enforcement agency (Case Study No. 13).

Pedestrian regulations include those that prohibit jaywalking and crossing against traffic signals. Bicycles as vehicles are subject to vehicular traffic regulations including obeying traffic controls, stopping at stop signs, and avoiding riding on sidewalks where prohibited. Unlawful motorist actions that endanger pedestrians and bicyclists include: exceeding the speed limit, failing to yield to pedestrians and bicyclists when turning, running stop signs and traffic signals, and failing to share the road with bicyclists (FHWA Interim Report, 1991). In addition, motorists sometimes exhibit aggressive behavior towards bicyclists and pedestrians.

Strong police enforcement programs are needed to reduce motorist and non-motorist violations and to increase driver awareness of pedestrians and bicyclists. In many cases, revisions of local traffic rules are needed to promote safer bicycling and walking. Certain traffic ordinances can help to reduce pedestrian accidents when implemented and followed by local jurisdictions. These can be reinforced by more pedestrian and bicyclist friendly street design and traffic calming strategies that enhance self-enforcement.

Several model ordinances to reduce certain types of pedestrian accidents have been developed for the National

Police on bicycles have proven very effective in congested urban areas and further legitimize the bicycle as a valuable transportation mode.



Highway Traffic Safety Administration (NHTSA). They include:

- A model ice cream truck ordinance to deal with the problem of children who walk or run into the street to or from ice cream vending trucks. The ordinance requires drivers to stop before overtaking a vending truck and restricts the locations where vending trucks are allowed. Related child pedestrian accidents in Detroit, MI in the mid 1970s were reduced by 77 percent as a result of implementing the model ice cream truck ordinance.

- A model bus stop ordinance, which requires that bus stops be relocated from the near side to the far side of an intersection, and

- A parking near intersections or crosswalks ordinance, which specifies a distance from a crosswalk from which vehicles are prohibited from parking. (Zegeer and Zegeer, 1991).

The effects of enforcement alone are difficult to properly quantify due to the many factors affecting bicycle and pedestrian accidents. Cities such as Milwaukee, Seattle, and San Diego have exemplary pedestrian and bicycle safety achievements, which include active enforcement of relevant laws and regulations in combination with other program elements (FHWA Interim Report, 1991).

Specific areas that should be targeted for enforcement include: areas within central business districts and around grade schools, universities, parks, and other locations where the likelihood is high for infractions or accidents involving bicycling or walking. In addition, locations with high concentrations of elderly or intoxicated pedestrians should be patrolled frequently because of the unique hazards that may be present in these locations (Case Study No. 13).

On-bike police patrols offer new possibilities for enforcement and for improved community relations.

Action Item 5

Implement a Police on Bicycles Program - The use of bicycle officers in law enforcement has many advantages for motorists, pedestrians, and bicyclists. The experience of being stopped and warned or cited by a police officer can be more of a traumatic experience than a learning experience. An officer on a bicycle is much less intimidating than one in a police car, and provides the opportunity for more direct personal contact. The concept of police on bicycles not only makes the execution of official duties easier, but it also can lead to enhanced community relations (Case Study No. 13).

An officer in a motor vehicle who attempts to stop an offender may be thwarted when violators take escape routes where an officer's car cannot travel. A police officer who is an experienced bicyclist can often engage in pursuit with success in such situations.

A major advantage of police on bicycles lies in the balance between speed and maneuverability offered by bicycles. An officer in a motor vehicle who attempts to stop an offender may be thwarted when violators take escape routes where an officer's car cannot travel. A police officer who is an experienced bicyclist can often engage in pursuit with success in such situations. Also, there are documented instances where, due to congestion in motor vehicle traffic, an officer on a bicycle has traveled substantial distances in response to a call, often arriving at the scene before officers in cars (Case Study No. 13). A police lieutenant with the Las Vegas Metropolitan Police quantified the success of that city's bike team: "Between May 23 and September 8, 1990, the Bike Team handled 850 calls for service, took 941 reports, issued 1,058 misdemeanor citations, wrote 943 traffic violations, stopped 1,440 vehicles, stopped and spoke to 1,396 people, field interviewed 327 folks, made 49 felony arrests, 308 misdemeanor/gross misdemeanor arrests, and recovered 16 stolen vehicles." (Lt. Charlie Davidatis of the Las Vegas Metropolitan Police in his article "Metro's Hard-Charging Bike Team," *Bicycle USA* magazine, Oct./Nov., 1991).

Another advantage of having police on bicycles is the education of the officer in the operational demands of bicycling.

Measures of Successful Programs

A number of characteristics are associated with successful pedestrian/bicycle programs at the local level. However, as with State programs, the ultimate success of local pedestrian and bicycling programs is an increase in levels of bicycling and walking and a reduction in crashes and injuries.

Increased Bicycling and Walking

Bicycling and walking at local levels are monitored through questionnaires and/or field counts at selected locations. For example, the City of Eugene, OR is an example of how the activities of a bicycle program can stimulate bicycle use. The bicycle program began in 1970, and a network of bikeways was developed during the 1970s. In 1973, 16 miles (25 km) of bikeway were constructed or committed for construction and by 1980 this had been increased to 70 miles (114 km). Between 1971 and 1978, bicycle volumes increased an average of 76 percent at locations where counts were taken. At one important connector in the network, which was completed in 1978, the number of cyclists increased from 1,000 a day in 1971 (on an unofficial dirt path) to as high as 3,600 by 1980 on the new link (Case Study No. 3).

Reduction in Crashes

Reductions in the number of motor vehicle crashes involving bicyclists and pedestrians is another important measure of the success of a bicycling/walking program at the local level. Enforcement programs, education programs, and physical improvements can improve safety and reduce crashes. Pedestrian accidents involving young children were reduced significantly in several cities as a result of implementation of the "Willy Whistle" education program. One article discussing an evaluation study of the program stated:

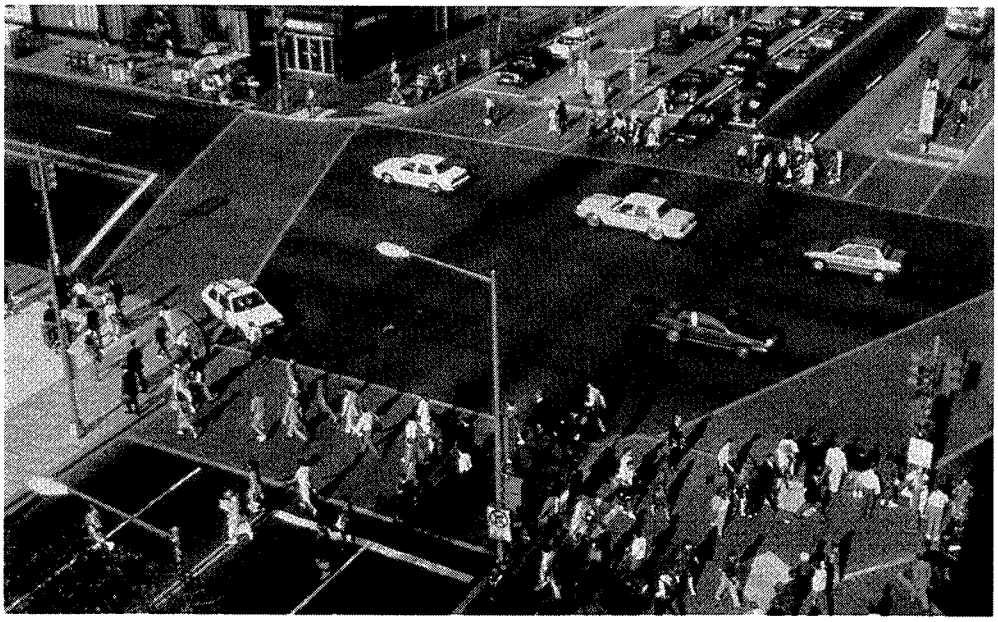
"The authors reported that pedestrian injuries involving mid-block dart-outs and dashes by children under age 14 dropped by 18 percent in Los Angeles and Milwaukee, and by 36 percent in Columbus (OH) after the introduction of the program. Other types of child pedestrian injuries decreased by three percent" (Case Study No. 20).

As previously mentioned, in the City of Palo Alto, a "bicycle boulevard" was installed which encouraged a shift of bicyclists from two parallel arterials (which had little space for bicyclists) onto the boulevard. As a result, motor vehicle traffic along the boulevard was cut in half. Despite an increase in bicycle use, there was no reported increase in bicycle accidents along the corridor (Case Study No. 18).

The same type of effect has also been reported in Eugene over a much wider area. An information sheet on Eugene's overall program detailed the installation of bike lanes and reported:

"Striping lowered accident rates in Eugene. Accident data gathered before and after five years of bikeway operation showed that streets with striped lanes had lower accident rates than before" (City of Eugene, 1991) (Case Study No. 18).

In one national U.S. study, the use of sidewalks was associated with reducing pedestrian accidents by about 50 percent along streets compared to having no sidewalks (Tobey



The future of mobility in our society depends on safe facilities for all types of road users.

et al., 1983). Sidewalks also provide a paved area for children who might otherwise play in the street. Grade-separated crossings that are properly located over high-speed roadways can provide access between neighborhoods and shopping areas or schools.

While the effects of pedestrian and bicycle facilities will often vary widely from site to site, specific roadway improvement must be carefully selected to tailor fit the site conditions and needs (Zegeer and Zegeer, 1991). Intersections seem to be a prevalent location for pedestrian/motor vehicle accidents where various countermeasures may be helpful in some cases (e.g., longer WALK intervals, pedestrian safety islands, curb cuts).

In addition to monitoring pedestrian and bicyclist accidents at individual sites, a local agency should monitor citywide or countywide crash experience to identify problem areas. Then, appropriate improvements should be made related to engineering, education, and/or enforcement to improve safety for pedestrians and bicyclists. Caution must be exercised, however, in interpreting a reduction in crashes as a measure of traffic safety. A reduction in crashes may well be the result of a decrease in bicycling and walking (i.e., reduced exposure) at a site.

Summary

Pedestrians and bicyclists are elements of a comprehensive transportation system. Activities at the local level are essential in encouraging an increase in safe bicycling and walking. Local officials should work closely with local organizations and citizens in developing and maintaining a successful program. Numerous local agencies in the United States and abroad have developed and maintained successful bicycling and pedestrian programs through an integrated plan of engineering improvements, education for the local citizens, enforcement of laws and regulations, and encouragement.

References

American Association of State Highways and Transportation Officials, **Guide for the Development of New Bicycle Facilities: 1981 (revised 1991)**. Washington, D.C.: Author, 1991.

Bicycle Federation of America, "Portland's Goal: 5% Bicycle Commuting," **Pro Bike News**, July 1991, p. 2.

Bicycle Federation of America, "Portland Hires Ped Coordinator," **Pro Bike News**, July 1992, p. 7.

Bicycle Federation of America, "Velo City '91 — Report from Milano," **Pro Bike News**, February 1992, p. 2.

Bicycle Federation of America, "Big Cities: There's Something in the Air," **Pro Bike News**, September 1992, p. 4.

Bicycling, Vol. 31 (3) April 1990.

Bicycling Magazine, Rodale Press, **A Trend on the Move: Commuting by Bicycle. An Overview of the Future of Cycling As Transportation,** 1991.

FHWA Publication No. FHWA-PD-93-018, The National Bicycling and Walking Study Case Study No. 13: **Synthesis of Existing Bicyclist and Pedestrian-Related Laws and Enforcement Programs**, Bowman, B., Vecellio, R.L., and Haynes, D.W.1992.

FHWA Publication No. FHWA-PD-93-007. The National Bicycling and Walking Study Case Study No. 8: **Analyze the Process In Creating Independent Facilities For Bicycle and Pedestrian. How Is Funding Initiated and Citizen Support Gathered?**, Burwell, D., 1992.

FHWA Publication No. FHWA-PD-93-041. The National Bicycling and Walking Study Case Study No. 2: **Reasons Why Bicycling and Walking Are and Are Not Used as Travel Modes**, Carter, E., 1992.

City of Eugene, **Bicycles in Cities: The Eugene Experience**, 1981, Vol. 12, p. 3.

City of Palo Alto, **Bicycle Boulevard Demonstration Study — Evaluation, Staff Report to Council**. Dec 9, 1982.

FHWA Publication No. FHWA-PD-92-036. The National Bicycling and Walking Study Case Study No. 12: **Incorporating Considerations of Bicyclists and Pedestrians Into Education Programs**, Cleven, A.M. and Blomberg, R.

FHWA Publication No. FHWA-PD-93-028. The National Bicycling and Walking Study Case Study No. 19: **Traffic Calming, Auto-Restricted Zones and Other Traffic Management Techniques — Their Effects on Bicyclists and Pedestrians**, Dornfeld, M.J. and Clarke, A., 1992.

FHWA Publication No. FHWA-PD-93-008. The National Bicycling and Walking Study Case Study No. 5: **An Analysis of Current Funding Mechanisms for Bicycle and Pedestrian Programs at the Federal, State and Local Levels**, Clark, A., 1992.

FHWA Publication No. FHWA-PD-93-039. The National Bicycling and Walking Study Case Study No. 3: **What Needs to be Done to Promote Bicycling and Walking?**, D. Evans, and Associates, 1992.

Davidatis, C. "Metro's Hard-Charging Bike Team," **Bicycle USA**, League of American Wheelmen, Oct./Nov., 1991.

References

FHWA Publication No. FHWA-PD-92-003. Federal Highway Administration, **National Bicycling and Walking Study — Interim Report**. Washington, D.C.: U.S. Department of Transportation, November 1991.

Fletcher, E. "Palo Alto Bicycle Facilities," **Bicycle Forum**, Vol. 24, Summer/Fall 1989.

FHWA Publication No. FHWA-PD-93-006. The National Bicycling and Walking Study Case Study No. 24: **Current Planning Guidelines and Design Standards Being Used by State and Local Agencies for Bicycle and Pedestrian Facilities**, Flink, C.A., July 1992.

FHWA Publication No. FHWA-PD-93-041. The National Bicycling and Walking Study Case Study No. 1: **Reasons Why Bicycling and Walking Are and Are Not Being Used More Extensively as Travel Modes**, Goldsmith, S.A., 1992.

FHWA Publication No. FHWA-PD-92-040. The National Bicycling and Walking Study Case Study No. 7: **Transportation Potential and Other Benefits of Off-Road Bicycle and Pedestrian Facilities**, Greenways Incorporated, 1992.

Harvey, S., Bicycle Federation of America, "Bike Week in Boulder, Colorado," **Pro Bike News**, October 1991, p. 4.

ISTEA, 1991.

FHWA Publication No. FHWA-PD-93-015. The National Bicycling and Walking Study Case Study No. 15: **The Environmental Benefits of Bicycling and Walking**, Komanoff, C., Roelofs, C., Orcutt, J., Ketcham, B. July 1992.

FHWA Publication No. FHWA-PD-93-014. The National Bicycling and Walking Study Case Study No. 23: **The Role of Local Bicycle/Pedestrian Coordinators**, Lagerwey, P.A. and Wilkinson, W.C., 1992.

Little, C.E. **Greenways for America**. Baltimore, MD: John Hopkins University Press, 1990, p. 1.

FHWA Publication No. FHWA-PD-93-024. The National Bicycling and Walking Study Case Study No. 6: **Analysis of Successful Grassroots Movements Relating to Pedestrians and Bicycles and a Guide on How to Initiate a Successful Program**, Lusk, A., 1992.

Martin, S. "The World's Best Cities for Cycling." **Bicycling**, May 1992, p. 58-64.

Nielsen, "Safe Routes to School in Odense." Chapter in **The Greening of Urban Transport**. Tolley, R., London: Belhaven Press, 1990.

Project for Public Spaces. **A Balancing Act: The Effects of Downtown Environmental Design on Pedestrian and Bicycle Use**. Case Study No. 20, 1992, p. 29.

FHWA Publication No. FHWA-PD-93-016. The National Bicycling and Walking Study Case Study No. 17: **Bicycle and Pedestrian Policies and Programs in Asia, Australia, and New Zealand**., Replogle, M.A., April 1992.

Stutts, J.C. and Hunter, W.W. **Evaluation of a Bicycle Safety Education Curriculum for Elementary School Age Children**. Chapel Hill, NC: Highway Safety Research Center, Report No. PR-170, December, 1990.

Tobey, H.N., Shunamen, E.M., Knoblauch, R.L. **Pedestrian Trip-Making Characteristics and Exposure Measures**. Federal Highway Administration, Report No. DTFH61-81-C-00020, 1983.

Toronto City Cycling Committee, **Toronto City Cycling Committee Profile**. 1990.

"Walking City Hikes — America's Ten Best." **The Walking Magazine**, 31 (3), April 1990.

FHWA Publication No. FHWA-PD-93-010. The National Bicycling and Walking Study Case Study No. 21: **Analysis of Successful Provincial, State and Local Bicycle and Pedestrian Programs in Canada and the United States**, Wilkinson, W.C., July 1992.

Williams, J. and McLaughlin, K. **The Role of State Bicycle/Pedestrian Coordinators**. Bikecentennial, Inc., Case Study No. 22, 1992.

FHWA Publication No. FHWA-PD-93-009. The National Bicycling and Walking Study Case Study No. 11: **Balancing Engineering, Education, Law Enforcement, and Encouragement**, Williams, J., McLaughlin, K., and Clarke, A., 1992.

Zegeer, C.V. and Zegeer, S.F. **Synthesis of Safety Reseach Pedestrians**. Federal Highway Administration, p. 89-90, 1991.

Zevin, D. "Walking City Hikes — America's Ten Best." **The Walking Magazine**. July/Aug. 1991.

Chapter Six

A Vision Of The Future

A Vision Of The Future

The vision of this program is a Nation of travelers with new opportunities to walk or ride a bicycle as part of their everyday life. They may walk or bike to a carpool or bus or train as part of a new intermodal trip pattern or they may find that they can walk or bike with safety and ease all the way to their destination. Many will find that they do not have to use a motor vehicle for trips to the store, to church, to work, or to school. They will like what they are doing for the community and for themselves. America will have a changed transportation system — better balanced to serve *all* travelers.

New and enhanced facilities and services along the way will make the trip safer, more pleasant, and more convenient. New pathways, overpasses and underpasses, well-marked lanes, signs, and signals will indicate clearly the nonmotorized traveler's right-of-way and his or her place on shared roadways. Interference between modes will be minimized.

Walking will be encouraged by eliminating obstacles and by furnishing continuous barrier-free sidewalks and walkways. Pedestrian areas will be established in downtowns and in suburban locations. Bicycling will be accommodated in street and highway design which meets the needs of bicyclists in mixed traffic and on separate facilities. The necessity for longer trips will be reduced by mixing residential, commercial, and employment centers. Laws protecting both pedestrians and bicyclists will be adopted and enforced.

At the end of the trip, facilities for the storage of bikes and belongings will be clean and reasonably priced. Showers and other amenities will be common and convenient. Merchants and employers will participate in these services as their contribution to the community's Transportation Control Measures (TCMs), for traffic congestion relief and air quality improvement.

Facilities encourage bicycle and pedestrian usage.

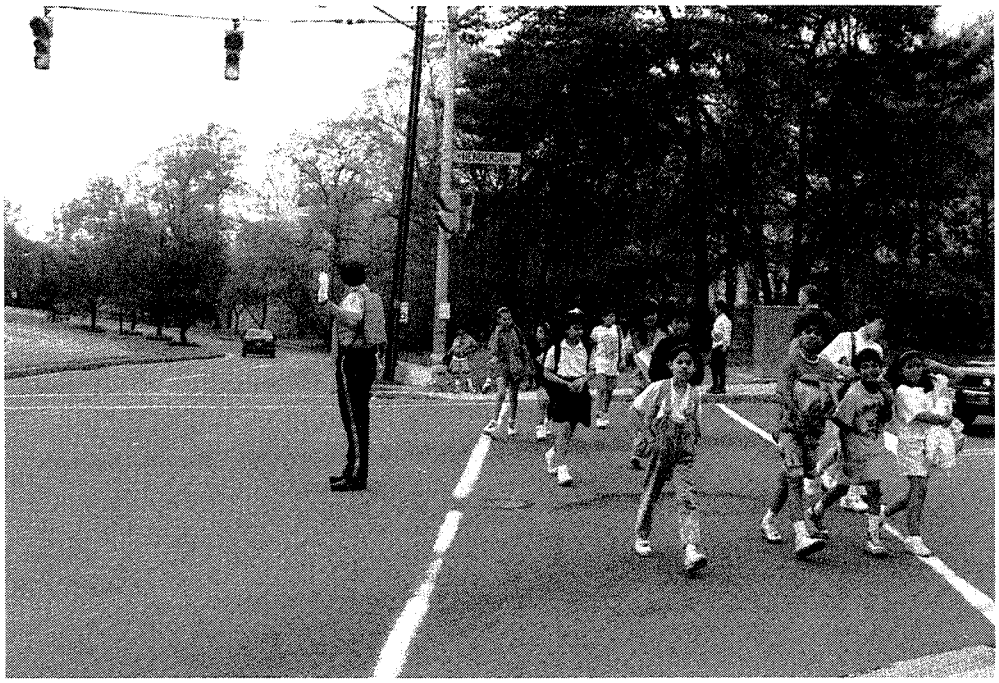
Travelers in cars and trucks will be better educated to the rights of the pedestrian and bicyclist and will benefit from the modal integration and separation that will result from a well-planned transportation network. The bicyclist will also better respect other road users as a result of good safety training. An entirely new culture of mutual respect will grow up between all users of the Nation's multimodal transportation system.

Individuals will realize the importance of their transportation decisions at the personal level and for the nation as a whole. Deciding to walk or bicycle will be recognized as contributing to personal health and to the health of our society.

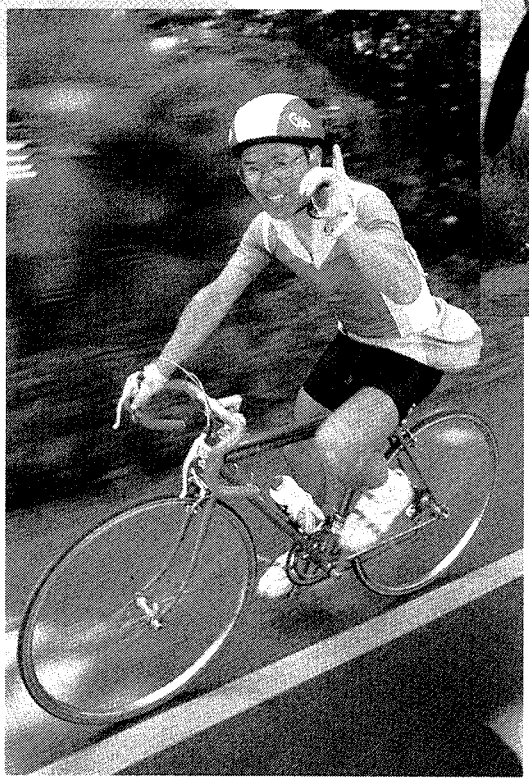
The vision of this program is a transportation system that provides new levels of personal mobility at modest cost while encouraging cleaner air and a healthier populace. America will feel good about the new intermodal opportunities and everybody will benefit. Individuals will choose to walk or bicycle and view these choices as personally and socially desirable. Walking and bicycling will become as socially acceptable as driving a motor vehicle.

This is the vision—to create a changed transportation system that offers not only choices among travel modes for specific trips, but more importantly presents these options in a way that they are *real* choices that meet the needs of individuals and society as a whole. Making this vision a reality must begin now.

The vision of this program is a transportation system that provides new levels of personal mobility at modest cost while encouraging cleaner air and a healthier populace.



Behaviors learned at an early age are continued throughout life.



Appendices A and B

The National Bicycling and Walking Study

24 Case Study Reports

Foreign Experience

Appendix A

The National Bicycling and Walking Study 24 Case Study Reports

Case Study No. 1, Reasons Why Bicycling and Walking are and are Not Being Used More Extensively as Travel Modes, Goldsmith, Stuart, FHWA-PD-93-041.

Case Study No. 2, The Training Needs of Transportation Professionals Regards the Pedestrian Bicyclist, Carter, Dr. Everett, FHWA-PD-93-038.

Case Study No. 3, What Needs to be Done to Promote Promote Bicycling and Walking, Garber, Sorbin, FHWA-PD-93-039.

Case Study No. 4, Measures to Overcome Impediments to Bicycling and Walking, Zehnpfennig, Gary, FHWA-PD-93-031.

Case Study No. 5, An Analysis of Current Funding Mechanisms for Bicycle and Pedestrian Programs at the Federal, State and Local Levels, Clarke, Andy, FHWA-PD-93-008.

Case Study No. 6, Analysis of Successful Grass-roots Movements Relating to Pedestrians and Bicyclists and a Guide on how to Initiate a Successful Program, Lusk, Anne, FHWA-PD-93-024.

Case Study No. 7, Transportation Potential and Other Benefits of Off-Road Bicycle and Pedestrian Facilities, Flink, Charles, A., FHWA-PD-92-040.

Case Study No. 8, Organizing Citizen Support an Acquiring Funding for Bicycle and Pedestrian Trails, Burwell, David, FHWA-PD-93-007.

Case Study No. 9, Linking Bicycle/Pedestrian Facilities with Transit, Replogle, Michael, FHWA-PD-93-012.

Case Study No. 10, Trading Off Among the Needs of Motor Vehicle Users, Pedestrians, and Bicyclists, Wilkinson, Bill, FHWA-PD-94-012.

Case Study No. 11, Balancing Engineering, Education, Law Enforcement, and Encouragement, Williams, John, FHWA-PD-93-009.

Case Study No. 12, Incorporating Consideration of Bicyclists an Pedestrians into Education Programs, Blomberg, Richard, FHWA-PD-92-036.

Case Study No. 13, A Syntheses of Existing Bicyclist an Pedestrian Related: Laws and Enforcement Programs, Bowman, Dr. Brian, FHWA-PD-93-009.

Case Study No. 14, Benefits of Bicycling and Walking to Health, Burke, Ph.D. Edmund, R., FHWA-PD-93-025.

Case Study No. 15, The Environmental Benefits of Bicycling and Walking, Komanoff, Charles, FHWA-PD-93-015.

Case Study No. 16, A Study of Bicycle and Pedestrian Programs in European Countries, Wynne, George, FHWA-PD-92-037.

Case Study No. 17, Bicycle and Pedestrian Policies and Programs in Asia, Australia, and New Zealand, Replogle, Michael, FHWA-PD-93-016.

Case Study No. 18, Analyses of Successful Provincial, State, and Local Bicycle and Pedestrian Programs in Canada and the United States, Wilkinson, Bill, FHWA-PD-93-010.

Case Study No. 19, Traffic Calming, Auto Restricted Zones, and Other Traffic Management Techniques: Their Effect on Bicyclists and Pedestrians, Clarke, Andy & Michael Dornfeld, FHWA-PD-93-028.

Case Study No. 20, The Effects of Environmental Design on the Amount and Type of Bicycling and Walking, Kent, Fred, FHWA-PD-93-037.

Case Study No. 21, Incorporating Bicycle and Pedestrian Considerations Into State and Local Transportation Planning, Design, and Operations, Wilkinson, Bill, FHWA-PD-93-017.

Case Study No. 22, The Role State Bicycle/Pedestrian Coordinators, Williams, John, FHWA-PD-93-019.

Case Study No. 23, The Role of Local Bicycle/Pedestrian Coordinators, Wilkinson, Bill & Peter Lagerwey, FHWA-PD-93-014.

Case Study No. 24, Current Planning guidelines and Design Standards Being Used by State and Local Agencies in the Design of Pedestrian/Bicycle Facilities, Flink, Charles, A., FHWA-PD-93-006.

Appendix B

Foreign Experience

There is a great deal of foreign experience and knowledge that should be considered relating to the accommodation and encouragement of bicyclists and pedestrians as part of the transportation system. Several "case studies" were conducted on this topic. The compact land use and substantial allocation of street space for bicyclist and pedestrian facilities and "traffic calming" measures in some areas (such as the Netherlands, Scandinavia, and many German and Japanese cities) have resulted in environments where bicyclists and pedestrians are the norm rather than the exception. In other parts of Europe, such as many French, Italian, and Eastern European cities, bicycling has been more marginalized as a transportation mode, although pedestrian transportation plays a major role.

One view is that any foreign country is a paradise for bicyclists and walkers when compared to the United States. That is not necessarily true. In some countries, such as China, the bicycle is the primary means of transportation due in part to low income levels that bar all but a few from owning motor vehicles, but also aided by strong government support for bicycle production, ownership, and use. Some low-income countries have adopted policies that suppress non-motorized vehicles, believing them to be "backward," thus forcing the poor to walk long distances or to use overburdened and inadequate public transportation. Although there is a great deal of difference among foreign national policies in this area, there is much to be learned by looking at the experience of other nations for examples and lessons in promoting safer bicycling and walking.

European Countries

Western Europe shares much in common with the United States in terms of culture and economic devel-

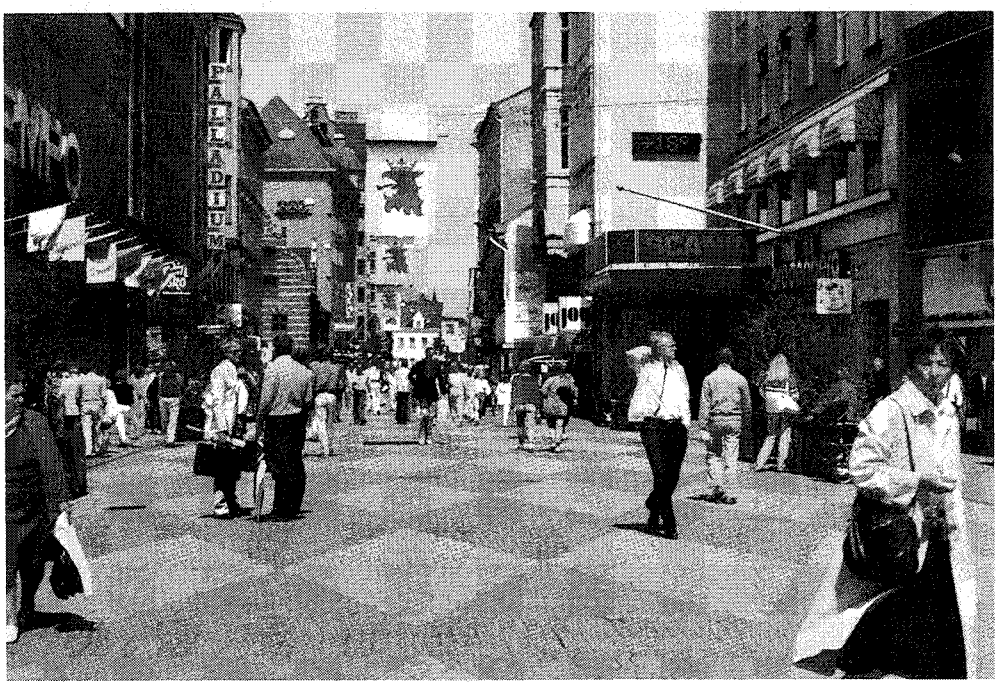
European facilities may be on or off road.

opment. Specific cities with successful bicycling and walking programs are discussed in Chapter 5. Two of the best examples of European countries with successful national programs are the Netherlands, and Denmark.

The Netherlands is perhaps the best-known example of a country where bicycling is a high priority. The country has a national policy on bicycles and allocates 10 percent of its roadway capital outlay for bicycle improvements. Bicycle programs have the cooperation of the railways and of local governments. In fact, 35 percent of all trips to the railroad are made on bicycles. The Netherlands is also a leader in traffic calming programs to reduce the speed of automobiles, making the streets safer for bicyclists and pedestrians. The "woonerf" concept, which originated there, treats the residential street as a multi-use facility to be shared by slow-moving automobiles, car parking, bicyclists, pedestrians, and for neighborhood play and recreation.

Denmark is another European country with a strong bicycling tradition and a national program to improve bicycle facilities and safety. As in the Netherlands bicycling is a significant means of commuter, shopping, and other types of trips. Half of the population makes regular use of bicycles for transportation. Among the innovations found in Denmark is a bike-on-taxi program.

Both the Netherlands and Denmark are small countries, and their national governments play a much larger policy role in transportation than that of the United States where State governments exercise their own authority. Other European countries have less successful national bicycling programs. In Great Britain, bicycling plays a minor but growing role in urban transportation. The national emphasis is on reducing accident rates with extensive investment in separate bicycle and pedestrian facilities. In Germany and France, there are many bicycle riders, but



In some European countries streets have been turned over to pedestrians.

most bicycle programs are local. In Eastern Europe there has been less government support for bicyclists. However, in the Baltic Region, Eastern Germany, Poland, the Czech Republic, Hungary, and Albania (among others), bicycling accounts for five to ten percent of all trips.

Europe provides outstanding examples of pedestrian programs. Germany and the Netherlands have large pedestrian-only zones in the center of many cities. The nationwide German Tempo 30 program reduces speed limits to 30 kph on many streets, making the streets safer for both pedestrians and bicyclists. France has local car-free zones and a national Safer Cities program. Traffic cells which inhibit through traffic in towns and cities while promoting walking, bicycling, and transit use are found in many European cities and towns, from old Gutenberg, Sweden, to the new town of Houten, the Netherlands, where 80 percent of internal trips are by walking and bicycling. Of course, the older central areas and narrow streets of European cities are by their nature more hostile to automobiles and better adapted to pedestrian and bicycle traffic than the wide, straight streets of some newer American cities. However, one finds the principles of traffic calming, woonerf streets, and pedestrian-friendly urban design embodied in many new suburban towns throughout Europe, which gives these areas a higher share of trips made by bicycling and walking.

Asian and Pacific Countries

Some Asian countries have very large numbers of bicyclists and walkers. China, for example, is known for its high levels of bicycle ridership. The greater density of many Chinese and other Asian cities would make automobile ownership impractical for most people.

Despite relatively high and growing automobile ownership, Japan is a highly affluent country where bicycling and walking play a major role in mobility. Bicycle ownership rates are similar in the United States and Japan, but the pattern of usage varies greatly. In the United States bicycles are used mostly for recreation, and less for commuting and shopping. In Japan the pattern is reversed, where the land-use policies and urban densities as well as the heavy taxes, parking limitations, parking charges, and user fees on automobiles discourage automobile use for most commuting trips. In the United States, women cycle less than men, while in Japan women use bicycles almost as much as men. The United States could also learn from Japan's systems of bicycle access to public transportation, the traffic calming "Community Streets" program, development of part-time pedestrian streets, enhancements to help the visually impaired navigate safely in cities, and many types of pricing-oriented strategies for transportation demand management. These programs all contribute to promoting bicycling and walking.

Australia and New Zealand are closer in culture to the United States than some of the countries mentioned above. These countries have lower population densities and newer cities which are more amenable to automobiles, and have pursued transportation policies similar to the United States. As a result, bicycle ridership levels are low in both Australia and New Zealand. However, traffic calming strategies are becoming quite widespread in both countries. The United States could learn from these experiences and from Australia's bicyclist education programs.

Publication No. FHWA-PD-94-023
HEP-50/3-94(25M)E