

TRANSPORTATION FOR THE 21ST CENTURY



WISCONSIN BICYCLE TRANSPORTATION PLAN 2020





Wisconsin Department of Transportation

Division of Investment Management

Bureau of Planning

Wisconsin Bicycle Transportation Plan Advisory Committee:

Kit Keller (Committee Chair)

Southeastern Wisconsin
Bicycle Federation

Nancy Anderson

Southeastern Wisconsin
Regional Planning Commission

Tom Boguszewski

Rock County
Highway Commissioner

Paul Braun

Manitowoc City Planning

Dan Fedderly

St. Croix County
Highway Commissioner

Jim Guthrie

Southeastern Wisconsin
Bicycle Federation

Bill Hauda

Great Annual Bicycle Adventure Along
the Wisconsin River (GRABAAR)

Craig Heywood

Governor's Bicycle
Coordinating Council

Jeanne Hoffman

Bicycle Federation of Wisconsin

Joseph King and Scott Rose

Bicycle Transportation
Alliance of Dane County

Bill Moorman

Wisconsin Department of Natural
Resources, Trails Coordinator

Carol Rittenhouse

American Youth Hostel

Fred Scharnke

East Central Regional
Planning Commission

Mariano A. Schifalacqua

(and Jeff Polenske)
City of Milwaukee, Engineering

Tom Walsh

City of Madison
Department of Transportation

Jacklyn Lawton

Federal Highway Administration

Mike Rewey

WisDOT District 1 Planning

Bob Pfeiffer

WisDOT District 2 Design

Rory Rhinesmith

WisDOT Central Office Design

Mary Forlenza and Rae Casale

WisDOT Bureau of Programming

JoAnne Pruitt Thunder

WisDOT Bicycle and
Pedestrian Safety Program

Doug Dalton

WisDOT Urban System Planning

Tom Huber

WisDOT Bicycle and
Pedestrian Coordinator



Wisconsin Department of Transportation

Tommy G. Thompson
Governor

Charles H. Thompson
Secretary

OFFICE OF THE SECRETARY
P. O. Box 7910
Madison, WI 53707-7910

Dear Wisconsin Bicycle Enthusiast,

I am pleased to present to you the Wisconsin Department of Transportation's first comprehensive bicycle plan -- the *Wisconsin Bicycle Transportation Plan*.

This plan is the result of two years of hard work and dedication. It was developed to keep Wisconsin among the leaders in providing its citizens a safe and efficient means to travel by bicycle. I am impressed by and appreciative of the assistance provided by the State Bicycle Plan Advisory Committee, as well as the comments and suggestions offered by citizens during the plan's development. Through the numerous meetings we held and comments we received, we learned about your concerns. I believe this plan addresses your concerns, making it the product we had all hoped for. Your involvement has been vital in the development of a plan that will guide policies, programs, investments and the future of bicycle transportation to the year 2020.

Progress has already been made in putting this plan into action. Our transportation district offices are using the plan in considering the needs of bicyclists on the state highway system. Department guidelines and procedures on bicycle planning and design will be updated this year to reflect the recommendations of the bicycle plan. Finally, training sessions for our staff and local government employees have been adapted to include a section on the *Wisconsin Bicycle Transportation Plan* and the new *Wisconsin State Bicycle Map*.

I encourage you to take a good look at this plan. It makes recommendations on the roles that different groups and government agencies have in making the plan successful and effective. This plan should be considered a work in progress. We have completed an important first step in developing our first *Wisconsin Bicycle Transportation Plan*. We will review and amend it over the years, integrating it with other plans as appropriate.

I close this letter by asking you to do what you can to help pursue the two main goals of the plan: more and safer bicycle trips.

Sincerely,

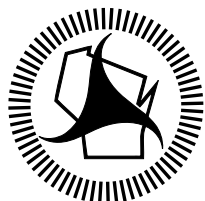
Charles H. Thompson
Secretary

This page intentionally left blank.



WISCONSIN BICYCLE TRANSPORTATION PLAN 2020

December 1998



Wisconsin Department of Transportation
Division of Investment Management
Bureau of Planning

Acknowledgments:

This report was prepared by the Wisconsin Department of Transportation, Division of Investment Management, Bureau of Planning. The report was directed by Tom Huber, the Bicycle and Pedestrian Coordinator in the Bureau of Planning. Written and technical assistance were provided by JoAnne Pruitt Thunder and Mary McFarland of the Bureau of Transportation Safety. Sincere appreciation is extended to members of the Bicycle Advisory Committee (listed below), and its chairperson, Kit Keller, for their expert guidance. Beneficial comments were provided by many WisDOT staff members, the Governor's Bicycle Advisory Council, and the WisDOT district offices. Special thanks goes to Joanne Lazarz and Sharon Jones of the Bureau of Planning. Joanne painstakingly made the final edits, checked the report for accuracy, and prepared the document for publication; Sharon greatly assisted in many facets of the plan's preparation. Thanks also goes to Mary Nowakowski for designing the plan's cover and to Karen Graeber for assistance in preparing the plan for publication.

Photo Credits:

WisDOT wishes to acknowledge the photographers contributing to this plan:

Arthur Ross: Photos on pages 12, 23, 24, 55, 61.

Dan Burden with Walkable Communities: Photos on cover and pages 21, 28 (bottom), 30 (bottom), 33, 45, 50, 53 (top).

Wisconsin Department of Natural Resources: Photo on cover and on page 1.

Tom Huber, WisDOT: Photos on cover and pages 10, 28 (middle photo), 31, 44, 51, 53 (bottom), 60, 63 (middle and bottom).

Michael Rewey, WisDOT: Photos on cover and page 28 (top photo).

Donna Brown, WisDOT: Photo on page 47

Lisa Binkley, WisDOT: Photo on page 69.

Table of Contents

I. Introduction and Background	1
II. Plan Vision, Goals and Objectives	5
Vision	5
Translinks 21 Goals	5
The Role of this Plan	6
State Bicycle Plan Goals	7
State Bicycle Plan Objectives	7
Engineering and Planning Objectives	7
Education Objective	8
Enforcement Objective	8
Encouragement Objective	8
III. Current Bicycling Conditions	9
Bicycle Usage in Wisconsin	9
Road Conditions	10
Bicycle Crashes	13
Wisconsin Crashes - Overview and Bicyclist/Driver Characteristics	14
Characteristics of Bicycle Crashes	15
Crash Location (Urban vs. Rural)	16
Crash Types	17
Crash Summary	19
IV. Benefits and Impacts of Bicycling	21
Benefits	21
Health, Exercise & Fitness	21
Transportation Benefits	22
Safety Benefits	23
Environmental Benefits	23
Transportation Choice Benefits	23
Efficiency Benefits	24
Economic Benefits	25
Quality of Life Benefits	26
Multiple Benefits	26
Bicycling Costs	26
Improvement Costs	26
Metropolitan Bikeway Costs	29
State Trunk Highway Costs	29
Personal Transportation Costs	31
Other Costs	31

V. Public Involvement	33
VI. Intercity Element	35
Introduction	35
Related Federal Regulations and AASHTO Guidelines	35
Intercity Strategy	36
Recommended Intercity Improvement Actions	38
Intercity Trail Improvements	39
VII. Urban/Suburban Element	43
Introduction	43
Urban/Suburban Overview	43
Urban Bicycle Usage Target	44
Metropolitan Planning Organization Bicycle Plans	44
Multi-modal Integration	45
Urban Bicycle Crashes	45
The Two-Tiered Approach: Highway Design and Bikeway Planning	46
Related Federal Regulations and AASHTO Guidelines	46
Recommended Urban/Suburban Improvement Actions	47
VIII. Bicycle Safety	49
Overview	49
Bicycle Safety Action Strategies	51
Crash Prevention: Engineering	51
Crash Prevention: Education	52
Crash Prevention: Enforcement	55
Crash Intervention: Helmet Ownership and Use	55
Medical Services Response	56
Safety Conclusions	57
IX. Implementation	59
Introduction	59
Roles and Responsibilities	59
WisDOT	59
Metropolitan Planning Organizations	61
Regional Planning Commissions	62
Counties	62
Communities	62
School Districts	62
Department of Natural Resources	63
Tourism Interest Groups	63
Shopping Centers	63
Developers	63
Employers	63
Bicycle Groups/Clubs/Trail User Groups	64

Implementation Strategies	64
Urban Strategy	64
Intercity Strategy	64
Facilities Design Strategy	65
Citizen Involvement and Local Support Strategy	67
Funding Strategy	68
Administrative Strategy	68
Enforcement and Education Strategy	69
Land Use and Development Strategies	69
X. Conclusion	71
List of Figures	
Figure 1. 1990 - 1998 Bicyclist Fatalities and Injuries	15
Figure 2. 1989 - 1998 Bicyclists in Crashes by Age	15
Figure 3. Shared Roadway	65
Figure 4. Wide Curb Lane	66
Figure 5. Bicycle Lane	66
Figure 6. Typical Bicycle Path	67
List of Tables	
Table 1. Biking and Walking to Work in March, 1990	11
Table 2. Injury Rates by Speed of Motor Vehicle	16
Maps	
Map 1. Bicycling Conditions Assessment with State Highway Priority Corridors and Key Linkages	41
Map Insert (back cover). Priority Corridors and Key Linkages	
Appendices	
Appendix A - History of Bicycling in Wisconsin	75
Appendix B - Terms and Definitions	79
Appendix C - Public Education Goals and Target Groups in Bicycle Safety	81
Appendix D - MPO and County Contacts	85
Appendix E - Order Form for County Plan Maps	89

This page intentionally left blank.

I. Introduction and Background

Bicycling plays an important role in moving people, many of whom rely on or choose the bicycle for their main or only mode of transportation. Bicycles can move considerable numbers of people, especially in urban areas. The Wisconsin Department of Transportation (WisDOT) recognizes the importance of the bicycle as a legitimate mode of transportation.

This plan anticipates the increased use of bicycling and supports measures to encourage bicycling. It presents a blueprint for improving conditions for bicycling, clarifies WisDOT's role in bicycle transportation, and establishes policies for further integrating bicycling into the current transportation system.

Because thousands of bicyclists use state and local roads for bicycle travel, bicycle safety has always been a high priority for WisDOT. WisDOT is committed to considering the needs of bicyclists as roadway improvements are made. This is consistent with Federal Highway Administration requirements and guidelines and is viewed as an integral part of the process leading to sound highway design.

In 1994, WisDOT prepared a bicycle and pedestrian element as part of its overall multimodal transportation plan (Translinks 21). In Translinks 21, WisDOT committed to developing a comprehensive bicycle plan. In addition, Metropolitan Planning Organizations (MPOs), representing the fourteen urban areas in Wisconsin with populations of at least 50,000, have each recently developed bicycle plans for their respective planning areas.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) required bicycle planning at the statewide and MPO levels so that bicycling would be fairly "considered" in the planning and development of street and highway projects.

In 1998, ISTEA was superseded by the Transportation Equity Act (TEA-21). Overall, this new act means the continuation and improvement of current programs, and provides Wisconsin with a significant increase in federal funding. It also supports and builds on the bicycle initiatives established in ISTEA, and reaffirms the need to consider bicyclists in the planning and design of roadway projects.

Although the major focus of this plan is on facilities and the

WisDOT recognizes the importance of bicycling as a legitimate mode of transportation. This plan anticipates the increased use of bicycling and supports measures to encourage bicycling.



physical environment, other elements—especially related to bicycle safety (education and enforcement)—are an integral part of the plan.

The plan establishes WisDOT goals, objectives, and policies ... that are realistic and can be implemented.

The plan establishes WisDOT goals, objectives, and policies regarding the provision of bicycle accommodations that are realistic and can be implemented. Although the plan emphasizes urban and community bicycling, intercity aspects are considered as well. The Intercity component presents a number of recommended improvements to State Trunk Highways that act as priority linkages between communities and other bicyclist destinations. Improvements to the local system are addressed through recommended policies and the incorporation of more detailed MPO, county, and regional bicycle plans into this statewide plan.

The plan consists of the following components:

Vision, Goals, and Objectives This component outlines a vision for bicycling in Wisconsin and states two broad goals that require the consideration of bicyclists in plans and projects. Goals and objectives address planning, design, construction, education, enforcement, and encouragement. This section helps establish direction for WisDOT's bicycle policy.

Current Bicycling Conditions This component provides a summary of bicycle usage statewide and locally, a summary of roadway conditions that affect bicycling, and a summary of WisDOT-collected data on motor vehicle crashes involving bicyclists. Also included is a trend analysis of this crash data, and an evaluation of fatal, injury-causing and non-injury-causing crashes. Crashes are cross-referenced by type of highway (state, county, local), by urban and rural location, and crash type.

Benefits and Impacts of Bicycling This component summarizes benefits of bicycling and bicycling improvements, and presents estimates of the costs of providing various types of bicycle accommodations.

Intercity Element This component establishes intercity (rural) bicycle planning guidelines and recommends accommodation actions. It also discusses WisDOT goals, objectives, and policies relevant to intercity bicycle transportation. Although this component is primarily policy oriented, it does recommend some specific locations for intercity bicycle improvements.

Urban/Suburban Element This component discusses WisDOT objectives and policies related to urban and suburban bicycling, as well as those recommended actions of state and local governments that will result in the proper consideration and accommodation of bicyclists' needs.

Bicycle Safety (Education and Enforcement) This component summarizes existing levels of bicycle education offered by schools,

local governments, and civic groups. It also presents key strategies for effective education and enforcement for bicyclist safety through local governments, schools, enforcement agencies, and non-profit organizations.

Implementation The final plan component discusses how WisDOT, local governments, and other interests should implement this bicycle plan. It presents comprehensive strategies for implementing the plan and describes the role of WisDOT in implementing local projects.

This page intentionally left blank.

II. Plan Vision, Goals and Objectives

Vision

In many Wisconsin communities, most people get to school by bicycling and walking. In addition, bicycle trips account for approximately 1% to over 5% of all work-related trips in Wisconsin's metropolitan areas during the peak bicycling months. As Wisconsin moves into the 21st century, it is likely that an even greater number of people will be bicycling for utilitarian, social, recreational, or exercise purposes. However, people are more likely to bicycle if cycling is made safer and more convenient. Within that context, the Wisconsin Bicycle Transportation Plan establishes this vision statement:

“To establish bicycling as a viable, convenient and safe transportation choice throughout Wisconsin.”

People are more likely to bicycle if cycling is made safer and more convenient.

Translinks 21 Goals

The following Translinks 21 (TL 21) goals were considered in the development of this plan:

Mobility Wisconsin's economy and quality of life depend upon the state's ability to move people and goods both within its boundaries and to worldwide destinations. TL 21 focused on improving travel mobility—in terms of timeliness, reliability, accessibility to destinations, and costs.

Choice Whenever feasible, practical and economical, shippers and travelers should have more than one transportation mode—highways, transit, air, rail, waterways and bikeways—available to meet a wide range of mobility needs. WisDOT's role is to support, and not limit, transportation choices.

Safety Every transportation user expects and deserves a system that is safe for personal and freight travel. Wisconsin has one of the safest transportation systems in the nation—but we can do even better. Improving transportation safety was a top priority of TL 21.

Connectivity A seamless transportation system with convenient and reliable opportunities to use more than one mode in a single trip provides a wider range of cost-effective travel options.

Translinks 21 goals were considered in the development of this plan.

Efficiency Wisconsin expects its 21st century transportation system to be efficient and economical. Opportunities to reduce the monetary and time costs involved with building, using, improving and maintaining the transportation system will be aggressively pursued.

Another means of structuring goals and objectives for the bicycle plan is using the “4-E’s” of transportation safety (engineering, education, enforcement, and encouragement). When bicycle programs began in the late 1960s, the emphasis was strictly on providing facilities. As communities gained experience and began to identify other needs, the concept of the comprehensive 4-E’s program emerged, combining the elements of engineering, education, enforcement, and encouragement. The 4-E’s approach has now been widely accepted by government bodies, agencies and institutions and has been used to outline the goals and objectives for this plan.

The Role of this Plan

Ensuring a seamless or inter-connected bicycle transportation network across jurisdictional boundaries and at different functional levels of highway/street systems is vitally important to the success of this plan. The goals, objectives, and policies presented within this plan are generalized for state and local highways and streets.

This plan addresses three different levels of roadway ownership or partnership: **state-owned**, **state-supported**, and **state-interest**. At the state-supported and state-interest levels, WisDOT is also given the responsibility of assisting in the planning and development of bikeways by Wisconsin State Statute 85.023 which reads: “The department (WisDOT) shall assist any regional or municipal agency or commission in the planning, promotion, and development of bikeways as defined in s. 84.60 (1)(a).”

The **state-owned system** is the State Trunk Highway system (approximately 11,300 miles).¹ WisDOT plans, designs, constructs, and maintains this system. WisDOT’s policies and decisions govern bicycle facilities on this system.

The **state-supported system** includes connecting highways² and other locally-owned roadways where there is state and federal investment in local government (county, village, city) projects. WisDOT collaborates in the decision-making process for projects on these routes, and thus influences the planning and design decisions made for those improvements.

This plan addresses three different levels of roadway ownership or partnership: state-owned, state-supported, and state-interest.

WisDOT plans, designs, constructs and maintains the State Trunk Highway system. WisDOT’s policies and decisions govern bicycle facilities on this system.

¹ The State Trunk Highway system includes routes signed as Interstate and U.S. highways.

² Connecting highways are municipal streets designated by WisDOT to be signed as the State Trunk Highway connections through communities.

The **state-interest system** includes the 98,000 miles of local streets and county and town roads. A substantial amount of bicycle travel occurs on this system and its connectivity to the other systems is of major importance. WisDOT has an interest in ensuring that bicycle systems are interconnected and that this system serves both the mobility and access needs of bicyclists. However, unlike the other two systems, WisDOT has no oversight responsibilities for the planning and design of this system. This plan can recommend, but not require, the types of bikeway improvements and programs that local governments choose to develop.

The goals, objectives, and action statements specified in this section apply directly to the state-owned and state-supported systems. However, WisDOT will work with local units of government to encourage them to use these goals, objectives, and actions when they plan, design, construct, or reconstruct their streets and roads.

State Bicycle Plan Goals

The state bicycle plan has two primary goals:

- ◆ **Increase levels of bicycling throughout Wisconsin, doubling the number of trips made by bicycles by the year 2010 (with additional increases achieved by 2020).**
- ◆ **Reduce crashes involving bicyclists and motor vehicles by at least 10% by the year 2010 (with additional increases achieved by 2020).**

Plan goals are to increase the levels of bicycling in Wisconsin and to reduce the number of crashes involving bicycles and motor vehicles.

State Bicycle Plan Objectives

To attain the plan goals, objectives and recommended implementation actions for each objective, have been established. A more detailed account of the implementation actions is included in the Implementation chapter of this plan. The objectives below have been structured around the 4-E's of transportation safety: engineering (and planning), education, enforcement, and encouragement.

Engineering and Planning Objectives

Objective 1 - Plan and design new and improved transportation facilities to accommodate and encourage use by bicyclists.

Recommended actions include: 1) developing local bicycle transportation plans; 2) providing suitable space for bicyclists when designing roadway projects; 3) following accepted bikeway guidance and standards; and 4) routinely considering bicyclists when developing roadway projects.

*Plan objectives are structured around the 4-E's of transportation safety:
Engineering,
Education,
Enforcement, &
Encouragement.*

Objective 2 - Expand and improve a statewide network of safe and convenient routes for bicycle transportation and touring, including safe and convenient access to and through the state's urban areas.

Recommended actions are directed at developing a usable state-wide network of bikeways and bicycle-compatible roadways, as well as supporting the mapping of the current bicycling conditions and trail locations in the state.

Education Objective

Objective - Expand the range of education activities such as driver licensing and training, bicycle safety education, traffic law enforcement, and provision of public service information to provide consistent safety messages and training to all roadway users.

Recommended actions include: 1) publishing bicycle and motor vehicle safety information materials; 2) providing demonstration grants to local communities; 3) updating motor vehicle training materials with adequate bicyclist information; and 4) continuing to monitor and analyze bicycle crash data.

Enforcement Objective

Objective - Improve enforcement of laws to prevent dangerous and illegal behavior by motorists and bicyclists.

Recommended actions include: 1) developing enforcement strategies directed at high incidence crash types; 2) developing specific bicycling education for police officers; 3) updating laws based on the current Uniform Vehicle Code; and 4) targeting motorist infractions that result in a large number of crashes with bicyclists.

Encouragement Objective

Objective - Encourage more trips by bicycles by promoting the acceptance and usefulness of this mode.

Recommended actions include: 1) publicizing examples of measures that have been shown to increase bicycle use in communities; 2) making available technical information and assistance that has led to increased bicycle use in other communities; and 3) increasing the awareness of the personal and community benefits of bicycling.

III. Current Bicycling Conditions

Bicycle Usage in Wisconsin

Nationally, 39% of all Americans use bicycles.¹ Of the 55 million adult users, 31 million are weekly users and 5 million are regular bicycle commuters.

Although a relatively small number of Wisconsin adults regularly commute by bicycle (see Table 1), many use their bicycles for a number of other types of trips. Also, many children routinely use their bikes for trips to school and other destinations. This is especially true during the warmer weather months of April through October.

A comprehensive survey of bicycle use has recently been conducted in Wisconsin. Preliminary data indicates that bicycle use is significant. According to this statewide survey, taken by the University of Wisconsin Survey Laboratory in August of 1998, 37% of all households included someone who took at least one bicycle trip in the previous week. The 1995 National Personal Transportation Survey (NPTS) can also be used to provide an estimate of bicycle use and walking in the state. The NPTS provides a year-round sample of households which is then weighted and adjusted to represent the entire population. According to the 1995 survey, 1.8% of all trips made each year by Wisconsin residents, age five and above, are made by bicycle, and another 4.3% are made by walking.

Work trips constitute about 20% all daily trips. Every 10 years, the U.S. Census Bureau reports people's "usual and predominant" means of travel to work. According to the most recent census (1990), 0.51% of the Wisconsin workforce commuted to work by bicycle in March of 1990. This is the highest percentage in the upper Midwest. Adjacent states had the following bicycle commuter percentages: Iowa - 0.32%; Illinois - 0.26%; Michigan - 0.22%; and Minnesota - 0.38%. Percentages in warmer weather states included California with 0.93%, Texas with 0.24% and Washington with 0.57%.

Bicycle use for the summer months in Wisconsin would be considerably higher than that indicated by the census. However,

History of Bicycling in Wisconsin

Wisconsin has an interesting bicycling past dating back to the 1890s when bicyclists were involved in the Good Roads Movement to improve highways for bicycling. Bicycling was so popular back then, that the Wisconsin Legislature authorized the construction of paths for bicyclists in 1901, and almost every city in Wisconsin had a bicycling club. Appendix A includes a summary of Wisconsin's rich bicycling history from past to present.

¹Bicycle Institute of America. A 1992 Louis Harris Poll for Rodale Press cited 46% of surveyed Americans riding their bicycles at least once per year.



Definition of a Bicycle

For the purposes of this plan, the definition of a bicycle is identical to the definition in Wisconsin state statute 340.01 (5): “Bicycle means every vehicle propelled by the feet acting upon pedals and having wheels any 2 of which are not less than 14 inches in diameter.” This includes adult three-wheel bicycles, and two, three and four wheel recumbent bicycles. However, it may not include some foldable bicycles whose wheels are less than 14 inches in diameter.

despite the cold weather conditions during the census survey week in March, bicycle use for work trips exceeded 1% in several metropolitan cities.

In Madison, 3.3% of all residents commuted to work by bicycle. This was several times more than the percentage of bicycle commuters in warmer weather and larger metropolitan areas as Dallas, Orlando, and Atlanta. Table 1 lists, for the central city of each of Wisconsin’s metropolitan areas, the percentage of city residents biking or walking to work during census week, 1990.

Several bicycle counts taken in Wisconsin metropolitan areas as part of the development of metropolitan bicycle plans suggest that overall bicycle use is considerably higher than that reflected by census data. For instance, 483 bicycles were counted at 13 intersections in Superior, Wisconsin during a three-hour period during July of 1993. Madison maintains several 24-hour bicycle detection devices placed in bikeways throughout the city. The average for the detection devices in bicycle paths is over 500 bicyclists per day, with a range of 50 to over 1,000 a day depending on the location and month of the year. On the University Avenue bike lanes (including the contra-flow bike lane), counts typically exceed 6,000 bicyclists per day during warmer weather months.

Bicycling is a very popular way to get to and from school. This applies to college students as well as elementary and middle school students. In Wisconsin’s college cities a significant portion of all school-destined trips are made by bicycle. The Transportation Department at the University of Wisconsin-Madison annually surveys students and employees and has consistently found that about 10% of all employees and about 25% of off-campus students commute to the university by bicycle during good weather months. Table 1 indicates that most college towns in Wisconsin have higher than average levels of bicycle commuting, with percentages ranging from 1% to just over 3% of the cities’ residents.

Road Conditions

Some bicyclists jokingly comment that “if it weren’t for the auto traffic, Wisconsin would have a great bikeway system.” The statement hints at a truth. About 80% of the state’s roads are considered fine for adult bicycling the way they are because of their very low traffic volumes, or a combination of low speeds and moderate levels of traffic.

Portions of Wisconsin’s county and town road systems are reputed to offer some of the best bicycling roads in the United States because of their low volumes, good surface conditions, and picturesque appeal. Most of the State Trunk Highway system now has wider travel surfaces that give bicyclists access to a narrow

Table 1

Biking and Walking to Work in March, 1990

(Percent of work force by place of residence)

	Walk	Bike		Walk	Bike
Large Cities			Smaller Cities		
Appleton	5.4	0.6	Barron	18.3	1.5
Beloit	6.6	0.4	Boscobel	8.9	0.8
Brookfield	1.0	0.2	Horicon	12.7	1.9
Cudahy	5.4	0.4	Kiel	9.1	0.1
Eau Claire*	10.3	1.1	Kohler	12.8	2.9
Green Bay	4.8	0.5	Manitowoc	6.6	0.4
Janesville	2.8	0.3	Mauston	9.3	0.7
Kenosha	4.0	0.4	Menomonie	22.4	1.9
LaCrosse*	12.4	1.6	Platteville*	22.7	NA
Madison*	12.7	3.3	Prairie du Chien	8.4	2.0
Milwaukee	5.9	0.3	Stevens Point*	20.0	2.1
Neenah	5.4	0.6	Tomah	7.4	0.9
Oshkosh	8.4	0.6	Two Rivers	8.6	1.7
Racine	4.3	0.7	Whitewater*	20.8	NA
Sheboygan	4.9	0.9			
Superior	7.1	0.6	Wisconsin Total	5.5	0.5
Wausau	5.8	0.5			
Waukesha	4.3	0.3			

Source: 1990 U.S. Census (STF 3a)

NA - Mode split not reported

* Cities with significant college populations

Notes:

- The above data represents work trips for a person's "usual and predominant" means of travel to work for the last week in March, 1990. A bus journey would not count as a walking trip, despite the obvious walking journey to/from bus stops.
- Biking and walking could be low in March, 1990 because of cooler and slightly rainier weather than normal, as recorded in southern Wisconsin by the National Weather Bureau.

(three foot) paved shoulder, making it easier for bicyclists and motorists to share the roadway. Additionally, many of the streets in urban areas are both low volume and low speed, making them suitable and safe for adult, and most child bicyclists.

Despite the fairly well-developed systems for vehicular travel (bicycle and motor vehicle), several problems remain. These problems were also identified in public comments on the plan.

- ◆ Although urban areas have a large percentage of local streets that are suitable for bicycling, most arterial streets with their high volumes are not wide enough to permit the creation of bike lanes or to provide wide curb lanes for side-by-side bicycle and motor vehicle road-sharing in that lane. Since World War II, in newly-developed or developing areas, the grid system of road has been replaced by a system where most traffic is channeled to major arterials. In such areas, bicyclists must travel on arterial roadways to make important connections to destinations both on and off these roadways. According to an assessment of street conditions conducted by WisDOT in 1993 and 1994, about 36% of the urban principal arterial street system² was considered suitable for bicycling because these arterials provided wide curb lanes, bike lanes, bicycle paths or paved shoulders. Paved shoulders accounted for over half of all the accommodations on these arterial streets, an indication that most bicycle accommodations in urban areas are near the outskirts of the communities, where roads have not yet been converted to curb and gutter.
- ◆ Around urban areas, many county and town roads that may have been acceptable for bicycling just 10 years ago have seen a tremendous increase in traffic volumes due to new development. Since most of these roadways have neither lanes wide enough to provide adequate lane-sharing for bicyclists and motorists nor paved shoulders, bicyclists often feel that they are being squeezed off the roadway by the sheer number of motorists or by drivers who decide to pass without adequate safe clearance. Unfortunately, motorists often grow impatient when encountering bicyclists, especially in situations when they are unable to easily move into the oncoming lane for safe passage due to the heavy amount of oncoming traffic. Many towns and counties do not have the resources to retroactively construct paved shoulders, and generally there will not be upcoming opportunities in the short term for road reconstruction, when bicycle accommodations could be incorporated.
- ◆ Most urban areas do not have fully developed, interconnected bikeway systems that supplement their basic street systems.



² The urban principal arterial street system in that study included urban State Trunk Highways (and their connecting highway segments) and principal arterial streets under local jurisdiction.

Additionally, Wisconsin has very few miles of bike lanes, most of which are found in Madison and Milwaukee. Only Madison can claim that it has a functioning bicycle system—one built over 20 years. And even in Madison, a number of weak links still exist. New challenges are occurring yearly as traffic conditions change, mostly due to increases in motor vehicle usage and new urban development.

Bicycle Crashes

Safety is often cited as a principal reason why people do not bicycle more often. The concern most often voiced is the perception of danger from motor vehicles. The following description and analysis of crash characteristics can help the public to better understand bicycle crashes and the hazards often associated with bicycling. A basic understanding of crash characteristics, crash rates, exposure, data limitations, and crash typing is essential if the Wisconsin Bicycle Transportation Plan is to lead to improvements.

Crash analysis begins with a review of data taken from the WisDOT MV4000 Wisconsin Motor Vehicle Accident Report system. While this data is useful in providing some background on bicycle crashes in Wisconsin, it is important to recognize its limitations. First, the data is aggregated for the entire state, merging many localized crash conditions into one analysis. Secondly, a crash is “reportable” through this system only if it involves at least one moving motor vehicle and results in injury, possible injury, or death to any person, or property damage of \$1,000 or more to any one person’s property (or \$200 damage to government-owned property).

A great many bicyclist-motorist crashes go unreported³ or are unreportable because they do not result in injury (even though the bicycle itself may have been “totaled” in a crash with a motor vehicle). Many other bicycle crashes are not recorded in the MV4000 Traffic Accident Database because they do not involve a crash with a moving motor vehicle. These include a bicyclist hitting a fixed object, another bicyclist or pedestrian, or a crash that does not occur on a public roadway. Some studies indicate that for every one reported motorist-bicyclist crash, another nine bicyclist crashes, not involving a collision with a motor vehicle, occur. Although rare, some bicyclists are fatally injured in non-motor vehicle collisions or in collisions with another bicyclist. Neither of these events would be reported in the MV4000 database, and, thus, are not considered in the following analysis.

Safety is often cited as a principal reason why people do not bicycle more often.

Some studies indicate that for every one reported motorist-bicyclist crash, another nine bicyclist crashes, not involving a collision with a motor vehicle, occur.

³A study by Stutts, Williamson, Whitley, and Sheldon - *Bicycle Accidents and Injuries: a Pilot Study Comparing Hospital and Police Reported Data* (1990), showed that almost two-thirds of bicycle-motorist crashes serious enough to require emergency room treatment were never reported as crashes to state or local officials.

On almost any level (national, state, or local), very little is known about the trips people make by bicycle — including the age of bicyclists, time they spend on their trips, trip distance, and trip frequency.

Another major limiting factor in any bicycle crash analysis is lack of information on “exposure.”⁴ On almost any level (national, state, or local), very little is known about the trips people make by bicycle—including the age of bicyclists, time they spend on their trips, trip distance, and trip frequency. One of the measures used to gauge the overall success of the safety of a road system is the number of crashes and fatalities per miles of travel. Lack of data on bicycle travel, makes it impossible to calculate bicycle crash rates that are comparable to those developed for motor vehicles.

Finally, the WisDOT bicycle crash data has never been analyzed in depth to determine major crash types. Crash types reflect critical errors/actions that led to the crash occurrence as opposed to focusing on the fault of a crash. This analysis is important to developing engineering, education, and enforcement countermeasures to reduce bicycle crashes. The original study of bicycle crash types, the Cross-Fisher study, was conducted in the early 1970s.⁵ Most modern bicyclist safety programs are based on the results of this landmark study. The National Highway Traffic Safety Administration (NHTSA) recently sponsored an update of the Cross-Fisher study, referred to below as Hunter/Pein/Stutts/Cox study.⁶ Bicycle planners in Madison modified their crash typing procedure based on the work of Cross and NHTSA system and applied this new typing to crashes reported between 1987 and 1991. These studies will be used to provide some insights into the kinds of bicycle crashes that occur in Wisconsin.

Wisconsin Crashes - Overview and Bicyclist/Driver Characteristics

Wisconsin crash data since 1970 reveals that the number of bicyclist fatalities resulting from collisions with motor vehicles peaked at 40 in 1973, and has generally decreased each year since then, reaching a low of 5 in 1997. (See Figure 1.) The number of bicyclists injured in reportable crashes with motor vehicles peaked at 2,034 in 1987, and has generally decreased since then to 1,449 in 1998.

Wisconsin crash data for the years 1989-1998 were aggregated for an analysis of statewide motor vehicle/bicycle crash experience. During those ten years, 16,586 reported traffic crashes involved at least one bicycle (an average of 1,659 per year).

⁴ “Exposure” is defined, for the purpose of this discussion, as the potential for a bicyclist to be involved in a crash with a motor vehicle. It is basically a function of bicycle and motor vehicle volumes and their potential interaction.

⁵ K.D. Cross and G. Fisher. *A Study of Bicycle/Motor Vehicle Accidents: Identification of Problem Types and Countermeasure Approaches* (1977).

⁶ W.H. Hunter, W.E. Pein, J.C. Stutts and C.L. Cox. *Pedestrian and Bicycle Crash Types of the Early 1990's* (1996).

As shown in Figure 2, from 1989 through 1998, the majority of bicyclists involved in crashes were children. In fact, about 59% of bicyclists involved in crashes were under 16 years old; 10 to 15-year olds alone accounted for 41% of the total. This is consistent with the national situation. However, it should be noted that since bicycle use by adults is on the rise nationally, there has been a gradual increase in the proportion of crashes involving adult bicyclists.

Age is an important indicator of the types of crashes in which bicyclists are involved. This will be discussed more thoroughly in the section of the plan dealing with crash types. Of all motorists, the 15 to 24-year old age group is involved in the largest number (3,631) and largest proportion (22%) of motor vehicle collisions with bicycles. This percent-age is similar to their rate of involvement in all crashes. The high crash rate of this age group is most likely due to inexperience and to risk-taking behavior by some drivers. The number of drivers in collisions with bicycles decreases with driver age. Older drivers (age 65 and over) are involved in the smallest number of collisions with bicyclists, perhaps because they do not drive as much as other drivers.

Not surprisingly, most (94%) of the 17,126 bicyclists in reportable Wisconsin crashes with motor vehicles from 1989 to 1998 were injured or killed. One hundred fifteen (0.7%) bicyclists were killed, 2,560 (15%) received serious injuries, and 13,409 (78%) received minor injuries. Almost half of the 115 fatally-injured bicyclists were between the ages of 5 and 14, and 8% were age 65 and over. About two-thirds of the seriously injured bicyclists were between the ages of 5 and 20.

Characteristics of Bicycle Crashes

Data from the 1989 to 1998 period indicates that most bicycle crashes (91%) occurred during the months when the weather is most favorable for bicycle riding, April through October. More than half of the crashes (53%) occurred during June, July and August.

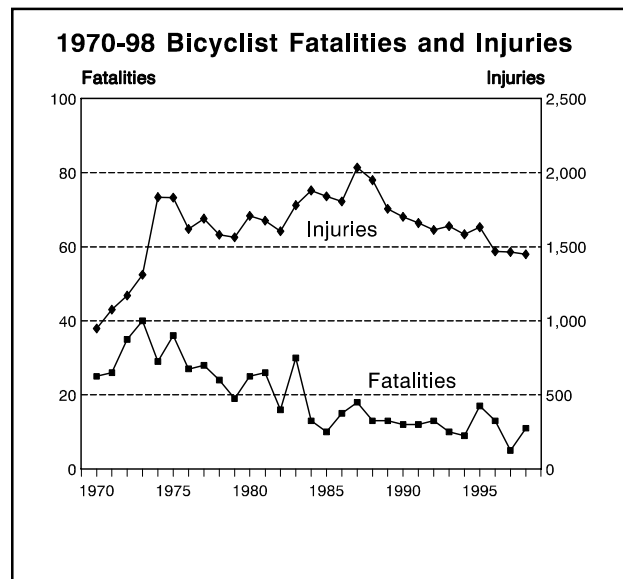


Figure 1

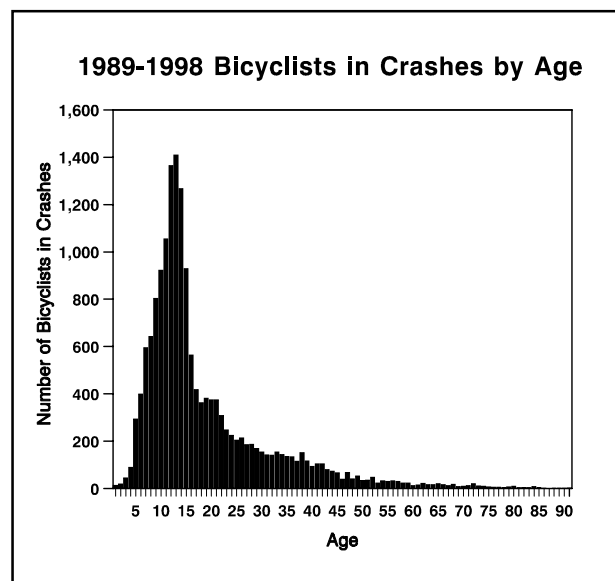


Figure 2

The relationship between bicyclist and motorist exposure is difficult to explain. For example, eight out of ten bicycle crashes occurred on a weekday rather than a weekend. This is most likely due to the fact that overall motor vehicle traffic volumes, especially in urban areas, are higher on weekdays than weekends. At the same time, more bicycling probably occurs on weekends during most people's free time.

Bicycle crashes peaked between 3 p.m. and 7 p.m. Nearly half (44%) of *all crashes* involving a bicycle and motor vehicle occurred during this time period. Most bicycle crashes occurred in daylight (83%); 12% occurred in the dark (2.2% in dark/unlit conditions and 9.4% in the dark with street lamps lit); and 5% occurred at dawn or dusk.

Bicycle crashes on rural roads in dark conditions are often fatal since faster vehicle speed gives motorists little reaction time after spotting the bicyclist. Seventeen percent of all *fatal* bicycle crashes in Wisconsin occurred in dark conditions. In contrast, national statistics indicate that almost half of all fatal bicycle crashes occur at night.⁷

Crash Location (Urban vs. Rural)

The majority (83%) of all bicycle crashes occurred in incorporated places with a population of 5,000 or more. However, only 43% of *fatal* crashes occurred on urban roadways. In contrast, only 5% of all bicycle crashes occurred on rural State Trunk Highways, but 24% of fatal crashes occurred on those highways. Likewise, only 3% of all bicycle crashes occurred on County Trunk Highways, but 19% of fatal crashes occurred on those facilities.

Most crashes occurred on local urban streets where the speed limits are low. In fact, 80% of the bicycle/vehicle crashes occurred on roads with posted speeds of 25 or 30 mph. While the *total* injury rate was similar at all speed limits, fatal and severe injury rates increase dramatically where speed limits are higher. (See Table 2.)

Seventeen percent of all fatal bicycle crashes in Wisconsin occurred in dark conditions. In contrast, national statistics indicate that almost half of all fatal bicycle crashes occur at night.

The majority (83%) of all bicycle crashes occurred in incorporated places with a population of 5,000 or more. However, only 43% of fatal crashes occurred on urban roadways.

Table 2
Injury Rates* by Speed of Motor Vehicle
1989-1998

Posted Speed (mph)	Fatal Injury Rate	Severe Injury Rate	Total Injury Rate
25-30	3.0	150	941
35-45	10.3	227	943
55	63.2	356	953

* Injury rate is defined as the number of injured bicyclists per 1,000 bicyclists in crashes at that speed limit.

⁷ Source: *Traffic Safety Facts*, 1994.

Crash Types

Obtaining information on crash types in Wisconsin from MV4000 data is very difficult. It generally requires reading the narrative section of each accident report and trying to reconstruct what happened during the crash. Even then, the narrative descriptions of bicycle/motor vehicle crashes are often so sketchy that it is impossible to determine what actually occurred.

Several national crash type studies have been conducted. One of the most intensive studies is the 1977 Cross-Fisher study which identified 36 problem types and seven general classes of crashes. While somewhat dated, its results are still valuable, as are the categories for coding crash types. This study was recently updated by Hunter, Pein, Stutts and Cox. In addition, Arthur Ross's City of Madison study⁸ modified the Cross-Fisher coding system, then used it to assess reportable bicycle/motor-vehicle crashes, as well as other bicyclist crashes not involving motor vehicles. Between these three studies, a fairly representative view of crash types in Wisconsin can be established.

Based on the Hunter/Pein/Stutts/Cox 1996 study (of crashes in 1991 and 1992), the most common crash types for all ages are listed below. These four crash types (out of 14 general crash types), constituted 63% of all crashes in that study:

- Motorist turned/merged into path of bicyclist
- Motorist failed to yield
- Bicyclist failed to yield at mid-block (mid-block ride-out)
- Bicyclist failed to yield at intersection (intersection ride-out).

Based on the Cross-Fisher study and supported by other studies, including the Hunter/Pein/Stutts/Cox study, the following classes of crashes most often involve child bicyclists:

- Bicyclist mid-block ride-out
- Bicyclist ride-out at controlled intersection
- Bicyclist makes unexpected turn or swerves into traffic.

Not only were these quite common crash types overall, but children were over-represented by their involvement in these crashes. According to the National Highway Institute's *Pedestrian and Bicyclist Safety and Accommodation Guidebook*, these three crash classes account for the vast majority of the bicyclist/motorist crashes involving children. In these crash categories, the bicyclist makes the primary error and the motorist has insufficient time to adjust and avoid a collision.

The following four crash types constituted 63% of all (bicyclist-motorist) crashes in an representative national study:

- *Motorist turned/merged into path of bicyclist*
 - *Motorist failed to yield*
 - *Bicyclist failed to yield at mid-block*
 - *Bicyclist failed to yield at intersection.*
-

⁸Arthur Ross. *Bicyclist Crash Analysis in a City of Adult Bicyclists* (1991).

Two major crash types accounted for 50% of all crashes in Madison:

- *Motorist turns or merges into the bicyclist's path (34% of all crashes)*
 - *Motorist drive-out from a stop sign (16% of all crashes).*
-

While the Cross-Fisher study analyzed mainly child crashes, the Madison study analyzed adult bicycle crashes using 1987 through 1990 data. This study found that adults accounted for most of the crashes in Madison. About 85% of all bicyclists involved in crashes were 15 years and over, and about 70% were 19 years of age and older. Because of this, Ross's Madison study provides an interesting and helpful account of crash types among adult bicyclists. The two major crash types listed below accounted for 50% of all crashes in Madison:

- Motorist turns or merges into the bicyclist's path (34% of all crashes)
- Motorist drive-out from a stop sign (16% of all crashes).

Of these two crash types, a motorist making a left turn with a bicyclist approaching from the opposite direction accounted for the most common. In stark contrast, only 12.2% of all crashes in the Hunter/Pein/Stutts/Cox study constituted this type of crash. Motorists over-taking bicyclists accounted for only 4.8% of all crashes in Madison, and 8.6% in the Hunter/Pein/Stutts/Cox study. This may be surprising to many people since this is the type of crash is often cited as the most feared among casual bicyclists and parents of child bicyclists.

A considerable number of all bicycle crashes occurred on sidewalks and in crosswalks, especially when bicyclists were riding against traffic. The Madison study found that just over 30% of all crashes occurred on sidewalks or within crosswalks with almost three-fourths (72%) of those crashes occurring while riding against the flow of traffic. By comparison, just under 20% of all crashes in the Hunter/Pein/Stutts/Cox study took place on sidewalks and within crosswalks, as did almost 40% of those crashes where a motorist failed to yield to a bicyclist.

One of the main findings of crash typing studies in general is that children and adult bicyclists are typically involved in very different crashes. Not only are the types of crashes different for child and adult bicyclists, but there is also a different pattern as to who made the critical errors in these crashes. The critical error for bicycle/motor vehicle crashes involving children is typically made by the child bicyclist. However, in adult bicyclist/motor vehicle crashes, the critical error is most often made by the motorist. The Madison study does not necessarily indicate fault. The National Highway Institute, however, indicates that in the most frequent crash types involving adults, the primary error is committed by the motorist, and the bicyclist has insufficient time to take corrective action and avoid a collision.⁹

One of the main findings of crash typing studies is that children and adult bicyclists are typically involved in very different crashes.

⁹ National Highway Institute. *Pedestrian and Bicyclist Safety and Accommodation* (1996).

Crash Summary

The data summaries presented in this chapter represent total statewide data. The experience in a specific community may vary from that of the state as a whole, as indicated by the Ross study in Madison.

There are many opportunities for further study of Wisconsin bicycle/motor vehicle collisions. By looking at individual crash reports, crashes could be categorized using the Cross-Fisher/NHTSA Accident Classes and Types system. This would provide a clearer picture of what is actually happening in the crashes. Without looking at the narrative report on individual records, it is impossible to determine factors such as whether the bicyclist was riding with or against traffic, on a sidewalk, or entering or exiting a driveway.

While most bicycle crashes don't involve crashes with motor vehicles, this type of crash accounts for many serious crashes and almost all of the fatal crashes.

According to the summary findings of the Hunter/Pein/Stutts/Cox study, the basic bicycle-motor vehicle crash patterns are similar to those seen in the late 1970s. Intersections, driveways, and other junctions continue to be the location of about 75% of the crashes. The study recommends that new and reconstructed facilities be designed with this in mind.

Speed definitely affects the seriousness of crashes. When comparing crashes with fatalities by the road system on which they occurred, it appears that the speed of the motorist is a prime factor. Although the majority of crashes occur on urban roadways, only a small percentage of the fatalities occurred on those roadways, where speeds are generally lower. Just the opposite situation occurs on rural highways (state and county) where a very small percentage of the crashes occurred. Together these highways accounted for 50% of all bicyclist fatalities. Reports indicate that additional riding space (i.e., paved shoulders) has a positive effect on bicycle safety. According to the summary findings of Hunter/Pein/Stutts/Cox in their national study, about 60% of the road-related crashes occurred on two-lane roadways. Roads with narrower lanes and roads with higher speed limits were associated with more than their share of serious and fatal injuries to bicyclists.

It is often difficult to assign fault/blame in crashes because there can be numerous causes and the contributing factors are frequently unknown. Bicyclist training in how to ride with traffic is absolutely essential based on crash types and the types of critical errors in the most common child bicyclist/motor vehicle crashes. The need to better train motorists becomes even more clear. Failure to yield and failing to see bicyclists are the most common motorist errors in both Wisconsin and the nation.

Intersections, driveways, and other junctions continue to be the location of about 75% of the crashes.

Roads with narrower lanes and roads with higher speed limits were associated with more than their share of serious and fatal injuries to bicyclists.

With this plan's emphasis on reducing the rate of bicyclist crashes while increasing the rate of bicycle usage, a concerted effort at education, enforcement and encouragement will be as necessary as engineering efforts. As the Hunter/Pein/Stutts/Cox study concludes, "There is a continuing need to establish the mind set that (both) bicyclists and pedestrians are worthy and viable users of our transportation system."

IV. Benefits and Impacts of Bicycling

Benefits

Broadly stated, the benefits of bicycling can be generalized into the following categories: health, transportation, safety, environmental, transportation choice, efficiency, economic, and quality of life.

Health, Exercise & Fitness Benefits

The beneficial impacts of regular physical activity are numerous. Its role in the prevention and management of heart disease, hypertension, obesity, diabetes, osteoporosis, and depression is well documented. Health care costs are a major factor in our economy, and bicycling can help to reduce these costs. Since the most effective means of regimenting physical activity is to incorporate it into daily activities, bicycling for routine trips such as school, work, and shopping can provide exercise without having to set aside a special time for it. Bicycling at moderate levels of exertion for just 30 minutes a day has positive impacts on bicyclists' health.

People sometimes question the overall pay-off when health gains from bicycling are weighed against the perceived hazards often associated with bicycling. However, the relationship between health benefits and risk of injury is difficult to quantify and may improve over time. In fact, this plan calls for both an increase in bicycling and, at the same time, a reduction in the number of crashes.

According to the *National Bicycling and Walking Study*:¹ “The key may lie in first working to create safer, more friendly environments, both physical and social, for bicyclists and those that 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.”

The benefits of bicycling can be generalized into the following categories: health, transportation, safety, environmental, transportation choice, efficiency, economic, and quality of life.



¹ Federal Highway Administration. *The National Biking and Walking Study: Transportation Choices for a Changing America* (1994).

The *National Bicycling and Walking Study* summarized a Swedish examination of bicyclist risk that reported similar findings: “while the total number of bicyclist conflicts with motor vehicles increased with increasing bicyclists flow at non-signalized intersections, the number of conflicts per bicyclists decreased. The study concluded that bicyclists seem to benefit from the presence of each other in terms of personal safety at non-signalized intersections.” A decrease in motor vehicle travel resulting from motorists switching to bicycling could very well lead to an improvement in the safety of existing bicyclists. It could certainly lower the number of interactions between bicyclists and motorists. As higher proportions of motorists become bicyclists, they are likely to be more cognizant of bicyclists and potential bicycle/motor vehicle conflicts when they are driving their motor vehicles.

A study by Mayer Hillman featured as a report in the *British Medical Association Journal*, concluded that despite bicyclist injuries incurred in a relatively “hostile traffic environment” (England), the benefits gained from regular cycling are likely to outweigh the chance for loss of life through cycling crashes. Hillman’s study aggregated, for the entire English population, the number of life years added through the health benefits of cycling and then subtracted those life years lost in cyclist deaths resulting from crashes.

Transportation Benefits

Transportation benefits of bicycling include reduced congestion, decreased need for parking, and the implementation of safety improvements that benefit all roadway users. Annual congestion costs are increasing, especially in metropolitan areas. Greater reliance on bicycling, especially when teamed with walking and transit use, can lessen congestion and hopefully help avoid some of the costs associated with new roads and parking facilities.

The bicycle’s role in reducing congestion is related to its reduced space requirements on the roadway. On most low volume local streets, no additional space is necessary to accommodate bicyclists since standard street widths allow bicyclists and motorists to safely share the roadway. Even on most busier arterial streets, which typically comprise less than 10% of a street system, only two to three feet on each side of the street are needed to improve accommodations for bicyclists. Even bicycle lanes require only an additional three to four feet on each side of the roadway. With wide outside lanes (14 feet or greater) or bike lanes, motorists’ vehicles can safely share the outside lane side by side with bicyclists. When wide outside lanes or bike lanes exist, roadway capacity is improved. Since bicyclists have their own travel space, they no longer contribute to a reduction in auto capacity, and the bicycle capacity of the street is maximized.

Even on most busier arterial streets, ... only two to three feet on each side of the street are needed to improve accommodations for bicyclists. Even bicycle lanes require only an additional three to four feet on each side of the roadway.

When bicyclists are not present, motorists benefit from the presence of additional pavement width. Even where wide lanes, bike lanes, or paved shoulders are not present, a bicyclist is considered less than the equivalent of one auto for the purposes of calculating roadway capacity.²

Safety Benefits

Improved safety for all roadway users can result when bicycle accommodations or safety-related roadway improvements are made. For instance, WisDOT has based its justification for paving shoulders on the number of lives saved and crashes avoided by motorists using these roadways. (Maintenance benefits also factored into the justification of this shoulder paving policy.) A 1987 study³ found that the addition of four-foot wide paved shoulders on rural, two-lane roads reduces run-off-the-road, head-on, and sideswipe motor vehicle crashes by 29%, while eight-foot wide paved shoulders results in a 49% reduction.

Environmental Benefits

Bicycling produces no pollution and consumes no fossil fuels. The most frequent, comfortable, and practical trips for bicyclists—those under five miles—produce the greatest environmental benefit since trips under five miles in length are the least fuel efficient and produce the highest emissions per mile.

Under the 1990 Clean Air Act Amendments, ozone and carbon monoxide non-attainment areas must take pollution reduction actions to meet air quality standards. Most of southeastern Wisconsin, including Milwaukee, is included in such a non-attainment area. Bicycling is one of the measures considered to be an effective way to achieve air emission compliance in these areas. Additionally, WisDOT's Congestion Mitigation and Air Quality (CMAQ) program was established to provide countermeasures to reduce air emissions. This program funded several bicycle-related projects over the past five years to help reduce congestion and emissions.

Transportation Choice Benefits

Some individuals have a wider range of transportation options than others. Nearly everyone can benefit from using a bicycle, but some people are more dependent on bicycling for day-to-day functions due to limited availability of other transportation options (e.g., walking, auto, transit). For these individuals, the benefits of bicycling are substantial. However, bicycle trips taken by persons who have access to other transportation modes produce the same



² Transportation Research Board. *Highway Capacity Manual*, Special Report 209 (1994).

³ Zegeer, Hummer, Reinfurt, and Hert. *Safety Effects of Cross-Section Design for Two-Lane Roads* (Federal Highway Administration, 1987).

The bicycle provides a relatively inexpensive means of transportation for the population with few transportation options. About 10% of the age 16 and over population of Wisconsin does not have a drivers license; and in some Wisconsin cities, over 20% of all households do not own an auto.

The bicycle is often considered the most time-efficient mode for shorter trips in urban areas.



level of benefits, to both that user and society at large.

The choice provided by the relatively inexpensive availability of a bicycle is a benefit in and of itself. For instance, since short trips are often more time-efficient and less costly by bicycle, even people who own cars can choose to make a trip by bicycle, thus benefiting from the diversity of choice that the bicycle permits. Society benefits since a bicycle trip may create less congestion and generates no pollution.

The bicycle provides a relatively inexpensive means of transportation for the population with few transportation options. About 10% of the age 16 and over population of Wisconsin does not have a drivers license; and in some Wisconsin cities, over 20% of all households do not own an auto. With fewer transportation choices, these segments of the population will most likely view access to safe bicycling as an important transportation choice and option.

Efficiency Benefits

There are several efficiency benefits to bicycling. As demonstrated in several commuter competitions, the bicycle is often considered the most time-efficient mode for shorter trips in urban areas. For the past several years, the bicyclist was the first finisher in a four-mile commute contest held in Madison. In many situations, “average cyclists” with normal, everyday bicycles can save time by switching from autos to bicycles. In most urban areas, bicycling becomes more time-efficient because all vehicles are moving at about the same speed and the bicyclist can park closer to his/her destination. In addition, bicycles offer the flexibility of an auto, and bicyclists, unlike transit riders, experience no time expense associated with waiting.

From an economic efficiency standpoint, bicycles are relatively inexpensive to purchase, operate, and maintain. For an initial outlay of \$250-\$350, a person can purchase both a new entry-level bicycle and a helmet. Parking a bicycle is almost always free. Recent data indicate that it costs an estimated 5 to 10 cents a mile to own and operate a bicycle.

One of the greatest efficiency benefits of bicycle transportation is that the vast majority of the bicycle “system” is in place and needs no improvement to accommodate bicyclists. Neighborhood streets and most of the county and town road systems are fine for bicycling in their present form. By concentrating improvements for bicyclists on major streets, an interconnected system can be developed, thus capitalizing on the majority of the roadway system that is already bicycle-compatible.

Economic Benefits

Bicycles and bicycling benefit the state economy in several ways. First, Wisconsin is home to several bicycle manufacturers. One manufacturer, Trek Corporation in Waterloo and Whitewater, ranks as the nation's largest producer of bicycles for sale through bicycle shops. Waterford Precision Bicycles in Waterford, a much smaller manufacturer, specializes in building handmade and custom bike frames for performance-minded buyers who are willing to pay more than the average bicyclist. Several additional manufacturers in Wisconsin specialize in producing bicycle components such as rims and brakes.

Bicycling also translates into tourism. The Wisconsin Department of Tourism has been aware of this for decades, and since the 1980s has targeted bicycle touring and trail riding as high potential tourism activities. More recently, they have added mountain biking to this list. In the past, Tourism has disseminated over 50,000 bike maps of Wisconsin annually, and recently they distributed at least that many of their new promotional piece for bicycling, *The Wisconsin Bicycle Guide*.

The economic impact of bicycle trails and bicycle touring is often considerable. Several studies of state trail-related expenditures have been conducted. The most recent, a 1994 study of expenditures by users of the Red Cedar Trail in Dunn County by the UW-Extension, estimated a per person expenditure of \$49.28, or almost \$2 million annually. A 1988 study of the Elroy-Sparta Trail indicated a per person expenditure of \$25.14. Adjusting for inflation and assuming 60,000 visitors annually, total trail-related expenditures by users of this trail would exceed \$2 million as well.

Served by both the Elroy-Sparta and the La Crosse River State Trails, the City of Sparta has proclaimed itself the "Bicycling Capital of America." These trails have contributed substantially to the area's economic vitality and the city has taken measures to help promote bicycle touring. Several businesses (such as campgrounds, bed and breakfasts, and bike repair businesses) have been opened specifically because of this trail. Similar businesses, catering to bicyclists, have also begun operating along a number of other trails.

One of the nation's largest bicycle organizations—Adventure Cycling—has included Wisconsin in two of its national routes. One runs along the Mississippi River in both Wisconsin and Minnesota and the other stretches across central Wisconsin from St. Paul to Manitowoc. These routes are popular among longer-distance cyclists and have national appeal. Similarly, State Highway 35 (the Great River Road) along the Mississippi River, under the guidance of the Great River Road Commission, is being developed as a longer-distance bicycle route. Many of the villages along



the Great River Road have begun to prosper because of the increase in tourism.

Bicycle tours have a significant impact on the economy of the state and its communities. Wisconsin's largest cross-state tour, the Great Annual Bicycle Adventure Along the Wisconsin River (GRABAAR) is estimated to have an economic impact of about a half-million dollars per year. In addition to the event's annual budget of more than \$200,000, the 1,300 participants of the eight-day tour spend more than \$30,000 per day in the communities along the route.

Quality of Life Benefits

The extent of bicycling and walking in a community has been described as a barometer of how well that community is advancing its citizens' quality of life. Streets that are busy with bicyclists and walkers are considered to be environments that work at a human scale, and foster a heightened sense of neighborhood and community. These benefits are impossible to quantify, but asked to identify civic places that they are most proud of, residents will most often name places where walking and bicycling are common, such as a popular bikeway, river front project, neighborhood market, Main Street, or downtown.

Paved shoulders, wide curb lanes, and bicycle lanes not only provide improved conditions for bicyclists, but often contribute to safer conditions for motorists and a reduction in roadway maintenance costs as well.

Multiple Benefits

As cited above, bicycle transportation offers many benefits, many of which tend to overlap. Improvements made for bicyclists often result in better conditions for other transportation users as well. For instance, paved shoulders, wide curb lanes, and bicycle lanes not only provide improved conditions for bicyclists, but often contribute to safer conditions for motorists and a reduction in roadway maintenance costs as well.

Bicycling Costs

This section briefly describes: the primary costs associated with building bicycle facilities; costs to individual bicycle users; and costs for education, enforcement and encouragement efforts.

Improvement Costs

Since most roadways in Wisconsin experience low traffic volumes and/or low vehicle speeds, they are considered suitable for bicycling as they are. For instance, almost all local residential streets are suitable for bicycling because they have 25 mph speed limits and low traffic volumes. Nevertheless, higher volume roadways can be improved with wider outside lanes, bike lanes, or paved shoulders that will maximize benefits for bicyclists and other road users as well. In some cases, standard design treatments already provide ample space on roadways for bicyclists and

motorists to easily share the same travel lane. For instance, the WisDOT *Facilities Development Manual* requires that two-lane State Trunk Highways and connecting highways have a minimum width of 36 feet when no provision is made for parking. Similarly, paved shoulders for motorist safety and maintenance purposes are required on most rural State Trunk Highways.

In other cases, it is recommended that specific improvements be added to roadway projects to benefit bicyclists. Several per-mile bicycle facility costs estimates are provided below. However, it is important to understand two concepts related to determining the cost of implementing bicycle accommodations.

■ **Incidental Improvements** The vast majority of on-street bikeway improvements will be made at the time of street reconstruction, when there is an opportunity to incorporate the bicycle accommodation at a reasonable cost. These are often referred to as “incidental improvements” because the bicycle accommodation is not made until the overall roadway improvement is needed and the bicycle facility can be integrated into the project. In such cases, only the additional cost of integrating the bicycle accommodation should be considered the true cost of the bicycle improvement. This is referred to as the “marginal cost.”

■ **Marginal Cost** The increase in the cost of the project due to the bicycle accommodation can be estimated by calculating the difference between total project cost with bike accommodations and the total project cost without bike accommodations. The marginal unit cost for the accommodation will generally be less than the average unit cost for the entire project. This is because the incremental cost of adding each additional foot of pavement decreases because some costs (e.g., mobilization of equipment, and traffic control) of the project are fixed and can be averaged over the entire project.

For most projects, the marginal costs associated with the incidental bicycle accommodations include only the cost of paving materials and labor for the bikeway installation. In some cases, marginal costs may also include some costs for bike lane markings, utility adjustments, or right-of-way (ROW) purchases. However, in most situations roadways can be made compatible for bicycling by simply providing additional width for bicyclists within the existing right-of-way. Only rarely is it necessary to acquire additional ROW for bicycle facilities, and the need to purchase additional ROW *solely* for bicycle accommodations is even more uncommon. Therefore, the unit costs below do not include ROW costs.

Similarly, the following unit costs do not include costs associated with relocating utilities (e.g., storm sewer, electrical, water service, etc.) which can be significant when streets with curb and

The vast majority of on-street bikeway improvements will be made at the time of street reconstruction, when there is an opportunity to incorporate the bicycle accommodation at a reasonable cost.

gutter (urban cross-section) are being widened. It is assumed that utility relocation would be needed anyway and, therefore, would not contribute significantly to the marginal cost of adding bicycle accommodations.

Bicycle Facility Unit Costs

The following cost estimates are based primarily on WisDOT unit cost information and data from local projects around the state. As stated above, they include only the cost of paving materials and labor for the bikeway installation



- ◆ **Paved Shoulders** - On roads with higher traffic volumes, it is generally desirable to have five feet of paved shoulders to accommodate bicyclists. The cost of paving shoulders on the State Trunk Highway system is approximately \$20,000 per mile for three-foot paved shoulders (on both sides of the roadway) where suitable gravel shoulders exist. (On most County Trunk Highways, gravel shoulders tend to be quite narrow, making the addition of paved shoulders much more expensive, though costs vary considerably from county to county.) The cost for a five-foot paved shoulder is approximately \$33,000 per mile. Since WisDOT's standard shoulder treatment on most two-lane State Trunk Highways is a three-foot paved shoulder, the marginal bicycle accommodation cost for the additional two feet is approximately \$13,000 per mile.



- ◆ **Wide Curb Lanes** - The costs of providing additional width on arterial streets is approximately \$15,000 to \$50,000 per mile depending on whether one or two feet of additional width on each side of the street is required, and whether concrete or asphalt pavement is used. The standard for a wide curb lane is 14 *usable* feet (not including the gutter). In tighter urban situations, an 11-foot inside lane (instead of the desired 12-foot lane) is sometimes used and the additional one foot applied to the outside lane. In some WisDOT projects, the standard curb-to-curb width of 36 feet is used for two lanes without any parking. In this case, there is no marginal cost for providing a wide curb lane because the standard design already includes a bicycle-compatible accommodation.



- ◆ **Bicycle Lanes** - The cost of providing bicycle lanes ranges from \$25,000 to \$90,000 per mile (for both sides) depending on surface type and whether the lane is five or six feet in width. Typically, a set of bike lanes will require an additional three or four feet on either side of the roadway, since total bike lane width is measured from the curb face. In tight ROW situations, the inner lane on a four lane arterial is sometimes narrowed to 11 feet to provide an additional foot for the bike lane. This reduces the cost of the bike lanes in that type of roadway.

- ◆ **Bicycle Paths (Multi-use Trails)** - Of all bicycle accommodations, the cost of paths varies the most. On the low end, rail-to-trail projects require little more than surfacing materials. Crushed limestone screening for final surfacing generally can be applied for less than \$10,000 per mile. Urban paths with appropriate intersection treatments, a 12-foot-width of asphalt surfacing, and a complete set of amenities (lighting, landscaping, street furniture, etc.) can easily cost in excess of \$200,000 per mile, without ROW acquisition costs.
- ◆ **Accommodations on Bridges** - Adding five-foot-wide bike lanes to bridges costs from \$240 to \$300 per linear foot. For example, adding bike lanes to a 200-foot long urban bridge would cost approximately \$48,000 to \$60,000. Standard new bridges on rural State Trunk Highways will have, at a minimum, fully paved six-foot-wide shoulders.



As pointed out above, the costs for bicycle accommodations are often already incorporated into the cost of existing projects. When this is occurs, there is no marginal cost for the bicycle improvement. It is important to keep this in mind when estimating the total cost of bicycle plan implementation.

Metropolitan Bikeway Costs

Most of the Metropolitan Planning Organization (MPO) bicycle plans include estimated costs of plan implementation. One of the most detailed methodologies for estimating costs of bike plan implementation was developed by the Southeastern Wisconsin Regional Planning Commission (SEWRPC). Estimates were for the seven-county area of southeastern Wisconsin, including the three metropolitan areas (Milwaukee, Kenosha, and Racine) in that region. Costs were estimated, not only for on-street and off-street bikeways, but also for incidental improvements such as paved shoulders and wide curb lanes on all arterial streets and highways that are not specifically identified as bikeways. No adjustments in costs were made to account for urban arterials, where widening is unlikely due to right-of-way limitations. SEWRPC estimated that the total cost of implementing the plan for the 16-year period from 1995 to 2010 was \$75 million or \$4.7 million per year. By comparison, the total cost for a smaller metropolitan area, Eau Claire-Chippewa Falls, was estimated at \$9 million over a 26-year period, or \$346,000 per year.

SEWRPC estimated that the total cost of implementing the (southeastern Wisconsin bikeway) plan for the 16-year period from 1995 to 2010 was \$75 million or \$4.7 million per year.

State Trunk Highway Costs

Most of this plan's recommended actions for physical improvements are tied directly to highway construction and reconstruction opportunities. Unlike bicycle improvements on the local system, WisDOT has the ability to directly make bicycle-related improvements to its highway system. Since bikeway improvements are

generally tied to highway improvements, it was decided to determine average costs associated with the bike plan by using the WisDOT Six-Year Highway Improvement Program as a source. This program includes all state highway and bridge projects to be carried out over the next six years. The program is updated every two years to reflect state and federal financing and other legislative actions that can affect projects.

The following briefly discusses the marginal costs associated with four major categories of improvements: shoulder paving, urban street widening, bridge widening, and trail construction.



- ◆ **Shoulder Paving** - WisDOT will complete an average of 270 miles of reconditioning and reconstruction improvements per year over the next five years. Shoulder paving is standard on these projects except on low volume roads. Three-foot paved shoulders are typical on two-lane roadways, while shoulders on four-lane facilities are generally paved to a width of eight feet or more. There are no marginal costs for bicycle accommodations on the low volume roads that need no additional bicycle accommodations, or on the four-lane facilities where WisDOT standards already require wide paved shoulders. On the remaining two-lane roads, the total annual cost of increasing three-foot paved shoulders to five feet in width would be approximately \$885,000, assuming the width increase on 25% of all two-lane State Trunk Highways being reconditioned or reconstructed. If increased paved shoulder width is assumed on 50% of all reconditioned or reconstructed highways, the annual cost would increase to about \$1.8 million. Currently, just over 1,150 miles of State Trunk Highways are identified as Priority Corridors in the Wisconsin Bicycle Transportation Plan. About 200 miles are low volume routes where paved shoulders are likely to be unnecessary.



- ◆ **Urban Street Widening** - WisDOT will complete reconstruction projects on about 10 urban streets over the next five years, averaging about eight miles per year. Assuming additional pavement width would be necessary for bicycle accommodations on all projects, the annual cost of providing these accommodations would total approximately \$272,000. (This figure does not include ROW costs or utility relocation costs.)
- ◆ **Bridge Widening** - Most of the bridges built by WisDOT are already bicyclist-compatible since they provide six-foot or wider paved shoulders. The two categories of bridges that need to be further assessed for additional costs are urban and High Cost bridges, both urban and rural. Since most urban bridges have 12-foot lanes with a 2-foot gutter sections integral with the outside lanes, an additional two or three feet on either side of the roadway would be needed for either wide curb lanes or bike lanes.

High Cost bridges are those bridges with a deck area of 40,000 square feet or more. These structures often require unique bicycle accommodations such as separated two-way paths along one side. WisDOT spends approximately \$26 million per year on improvements to urban and High Cost bridges. A \$2 million annual cost was estimated for additional bike space on these bridges.

- ◆ **Priority Corridor Trail Construction** - Construction costs were estimated for the bicycle trails (paths) that were recommended in the statewide analysis of bicycle Priority Corridors. Projects are potentially funded through a variety of WisDOT programs, provided that they have a local sponsor.

The combined length of these trails is 82 miles. Total cost is estimated at about \$4.1 million, or an average of \$186,000 per year over the life of the plan. Only the trails (paths) that are identified as Priority Corridors are included here. They were selected because they parallel a State Trunk Highway and there are no alternative facilities on which bicyclists could be accommodated. Many other trails that serve a more localized bikeway need are recommended in the MPO plans. Their costs have not been included since they are not associated with the State Trunk Highway system.

Total annual estimated costs for all the three types of bicycle accommodations on the State Trunk Highway system and the construction of the bicycle trails cited above would range from \$3 to \$4 million, assuming five-foot shoulder paving on 50% of the two-lane roads being reconditioned or reconstructed.

Personal Transportation Costs

Although the relatively low cost of bicycling was cited as a benefit in the above discussion, bicycling does carry the initial cost of acquiring equipment (e.g., bicycle, helmet, lock) as well as ongoing operating expenses for maintenance, tires, etc. However, the bicycle is a relatively inexpensive mode of transportation. Costs, as reflected by reimbursement amounts provided to employees using bicycles for work-related trips, average between 5 and 10 cents per mile. In contrast, average per-mile costs for driving a new auto range from 40 cents to 50 cents per mile.

Other Costs

It is impossible to estimate costs for education, enforcement, and encouragement efforts since they are often incidental to over-all education and enforcement efforts occurring at the state and local levels. For instance, learning bicycle laws and safe driving practices are part of drivers' training programs, and bicycle education is often folded into very short, partial-day instructional



segments at schools. Enforcement of bicycle laws is treated as part of an enforcement agency's overall duties.

At the state level, WisDOT currently spends about \$260,000 a year for bicycle and pedestrian education and enforcement, including a full-time program manager, public information distribution, training, and grants for community programs.

V. Public Involvement

The state bicycle planning process was guided from the start by an advisory committee composed of representatives of local governments, metropolitan planning organizations, bicycling advocacy groups, the Federal Highway Administration, and other state agencies. This committee met regularly throughout the planning process and played a key role in determining the components and direction of the plan. A complete list of the committee members is included at the beginning of this document.

Public input was also provided through a series of outreach meetings. At the mid-point of the development of this plan, meetings were held to gather opinions and attitudes regarding major bicycling issues. The major issues voiced by the public at those meetings were: 1) the lack of bicycle facilities; 2) the lack of safe road-sharing practices by motorists; and 3) the lack of safe crossings for cyclists over major new roadways. The public also indicated that new land developments spread destinations too far apart for bicyclists and create considerable motor vehicle traffic, especially at the edges of cities.

Another series of public meetings was held in December of 1997 to solicit comments on the *Final Draft Plan*. Almost 200 people attended these meetings. Approximately 30 additional people sent written comments.

While comments received at this last series of meetings were generally favorable toward the plan, some concerns were cited. Several individuals were concerned that the plan did not prescribe specific changes at the local level, especially for county and municipal road systems. They were puzzled that a “statewide” plan only made *recommendations* for changes at the local level, but did not cite specific local roadway improvements that would benefit bicycle routing through counties and communities. Several people said that they felt that the plan should have been more specific in its recommendations regarding the education of motorists in the basic laws concerning bicyclists. Lastly, there were questions and concerns raised about implementation of the plan, especially in the areas of funding and local coordination.

The state bicycle planning process was guided from the start by a diverse advisory committee and by a series of 12 public outreach meetings.



VI. Intercity Element

Introduction

Intercity and Urban/Suburban plan elements have been developed to meet the objective of planning and designing new and improved transportation facilities to accommodate and encourage use by bicyclists. Along with this objective comes this recommended implementation statement: “Strongly consider the provision of appropriate bicycling accommodations (suitable space) when planning, designing, constructing, reconstructing, or financing a transportation facility. These accommodations should be pursued unless the costs or adverse impacts of such accommodation are excessively disproportionate to the expected usage.” Additional implementation actions are necessary to give more direction to the intended users of this plan. More detailed actions have been identified in two general plan elements: Intercity and Urban/Suburban. This section covers the Intercity element and provides both an overall intercity strategy and more detailed intercity implementation actions. Relevant national guidance precedes the recommended action statements.

The successful implementation of this plan depends on the level of funding at state and local levels. Additionally, many of the improvements, especially in urban and suburban areas, will have to be implemented locally. WisDOT cannot commit the financial resources of other agencies or public bodies.

Related Federal Regulations and AASHTO Guidelines

The following regulations and guidance form the framework and rationale for many of the plan’s detailed action statements. They apply to both the Intercity and Urban/Suburban plan elements. The first two items are federal requirements and the third item is guidance from the American Association of State Highway and Transportation Officials (AASHTO), which establishes guidelines and standards for the design of transportation facilities.

- “The safe accommodation of pedestrians and bicyclists should be given full consideration during the development of highway projects, and during the construction of such projects. Where current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort shall be made

Serious consideration should be given to the accommodation of bicyclists when roadway projects are planned and designed.

to minimize the detrimental effects on all highway users who share the facility.” (23 Code of Federal Regulations (CFR), Part 652 Pedestrian and Bicycle Accommodations and Projects.)

- “In any case where a highway bridge deck being replaced or rehabilitated with federal financial participation is located on a highway, other than a highway access which is fully controlled, on which bicycles are permitted to operate at each end of such bridge, and the Secretary (of US DOT) determines that the safe accommodation of bicycles can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodation.” (ISTEA, 217(e). Bicycle and pedestrian walkways.)
- “To varying extents, bicycles will be ridden on all highways where they are permitted. All new highways, except those where bicyclists will be legally prohibited, should be designed and constructed under the assumption that they will be used by bicyclists. Bicycle-safe design practices, as described in this guide, should be followed to avoid the necessity for costly subsequent improvements.” (AASHTO’s *Guide for the Development of Bicycle Facilities*, page 11, Roadway Improvements.)

Intercity Strategy

Two methods were used to identify intercity bicycle connections. The first method assessed road conditions for bicycling on all County Trunk and State Trunk Highways. This **Conditions Assessment** was based primarily on pavement width and volume of traffic, but also considered, as secondary factors, percent and volume of truck traffic, passing opportunities, and pavement quality. Maps generated by this analysis were reviewed by numerous county highway commissioners/committees and WisDOT district staff.

This analysis of conditions can be used by planners and designers when they consider bicycle-related improvements to roadways when reconstruction opportunities occur. This approach does not generally identify preferred connections between communities or other bicyclist destinations. However, preferred county and town road connections are indicated for those counties that have an approved bicycle plan. Counties that do not currently have plans are encouraged to use these maps and to work with WisDOT district offices to refine this analysis into a more detailed system-level plan.

The second method identified intercity bicycle connections and linkages with the intent of recommending a complete system of **Priority Corridors and Key Linkages** connecting communities over 5,000 population and other major bicyclist destinations. A complete system would have included routes on both State Trunk and County Trunk Highways. Criteria for route selection focused on current suitability for bicycling, including roadway width, traffic volume and

The Intercity Strategy provides a highway-by-highway analysis of bicycling conditions across the state. It also identifies a group of priority corridors and key linkages on state highways.

route length. Due to time constraints, WisDOT could not seek local approval for all connections routed over County Trunk Highways. Therefore, the Priority Corridors and Key Linkages recommended in this plan cover only the State Trunk Highway system.¹

The Wisconsin Bicycle Transportation Plan incorporates a combination of the Conditions Assessment and the Priority Corridors and Key Linkages approaches in the following manner:

- The State Trunk Highway segments that have been selected as Priority Corridors for bicycling will be given highest priority for improvement by WisDOT. Except on low-volume highways, wider paved shoulders will be strongly considered when the roadway is reconstructed. The Priority Corridors system should also be used by counties and WisDOT district offices as they work together to further refine bicycle systems in their areas.
- A two-step process should be followed when using this combination approach for evaluating State Trunk Highways for bicycle improvements. Step one involves checking the statewide Priority Corridors and Key Linkages map enclosed at the back of this plan to determine if a specific stretch of state highway is located on the map as a recommended priority corridor or key link. If a stretch of State Trunk Highway is not on the statewide map, the second step involves further evaluation of the roadway for improvements for bicycle accommodations. Not all of the key bicycle connections on State Trunk Highway have been identified on the statewide map in this plan, since it was considered impossible to identify all *locally* and *regionally* significant routes.
- The Conditions Assessment process can be used by county governments to consider bicycle-related improvements on their systems when reconstruction opportunities exist. It can also be used as a starting point for the development of countywide bicycle plans where no plans currently exist. See Map 1 for an example of a county map showing current conditions for bicycling. Appendix E includes an order form to request similar maps for other counties.
- All of the recently prepared and approved county bicycle plans are incorporated into the Wisconsin Bicycle Transportation Plan and reflected in individual county maps. (See Map 1 for an example.)
- The intercity recommendations of the *Regional Bicycle and Pedestrian Plan for Southeastern Wisconsin* plan are incorporated into the Wisconsin Bicycle Transportation Plan and also



¹ Priority Corridors are State Trunk Highway connections between major bicyclist destinations; Key Linkages are short segments of State Trunk Highways that connect into communities or link county roads that were identified as bicycling connections. For a copy of the Priority Corridors and Key Linkages Map, contact Tom Huber at (608) 267-7757 or Thomas.Huber@dot.state.wi.us.

reflected on individual county maps.

- Seven key intercity trail segments are incorporated into the Wisconsin Bicycle Transportation Plan. Because of their locations and the corridors they serve, these seven are considered key intercity bicycle transportation trails.

Seven key intercity trails are incorporated into this plan:

- ⇒ Eau Claire to Chippewa Falls - 10 miles
- ⇒ Wild River Trail - Rice Lake to Cameron - 6 miles
- ⇒ Madison to Belleville - 16 miles
- ⇒ Lakefront Trail - South Milwaukee to the Racine County Trail - 6 miles
- ⇒ Wiowash Trail - New London to the Waupaca/Shawano County Line) - 24 miles
- ⇒ Hurley to Upson Segment - 15 miles
- ⇒ North Hudson to Houlton - 5 miles

Recommended Intercity Improvement Actions

The following actions are recommended:

1. WisDOT should provide an on-going analysis of factors affecting bicyclist safety on all State and County Trunk Highways. These highways should be classified by bicycling-related factors, such as width and traffic volumes, in order to plan routes and consider improvements to roadways. A current analysis exists for each and every county. Map 1 is an example of the maps that result from this analysis.
2. Suitability of highways for bicycling is most affected by traffic volumes and widths. Therefore, the following three actions should be considered, especially when roadways are reconstructed:
 - On all higher-volume rural roadways (generally with motor vehicle volumes exceeding 1,000 per day), paved shoulders should be provided.
 - On higher-volume roadways (exceeding 1,000 vehicles per day) with a moderate number of bicyclists currently using or anticipated to use the roadway, wider paved shoulders should be provided. Most of the State Trunk Highways on the plan's Priority Corridors and Key Linkages meet this criterion.
 - On lower-volume roadways (under 1,000 vehicles per day), generally no special improvements are necessary to accommodate bicyclists. These lower-volume roadways should be identified and mapped to provide bicyclists with appropriate information to help them make connections between communities and rural recreation and commercial areas/sites.

3. When improvements are being considered on County Trunk Highways, counties should strongly consider the recommendations of county bicycle plans.
4. WisDOT should assist counties, with guidance or technical assistance, in preparing county or regional bicycle plans. Federal funds should continue to be made available for such planning efforts.
5. Multi-use paths (separated, primarily two-way bikeway facilities often referred to as trails) should be considered when: 1) bicyclists cannot be safely accommodated with on-street facilities; or, 2) an opportunity exists to improve the transportation aspects of bicycling by locating a rural bicycle path within an abandoned rail corridor, utility corridor, or river grade. This plan, in concert with the Department of Natural Resources' *Draft State Trails Action Plan*, identifies key path segments needed to complete connections between cities.
6. Safe crossings should be maintained when paths (trails) intersect highways. Additionally, crossing controls or grade separations (overpasses or underpasses) should be considered where gaps in traffic are inadequate for safe crossing.
7. WisDOT will help local jurisdictions to fund "stand-alone" bikeway projects as part of its multimodal programs (e.g., Transportation Enhancements and the Surface Transportation Program Discretionary programs). The extent of WisDOT assistance will depend on the annual funding level for these programs. Bicycle path facilities are eligible when they are consistent with an approved plan and result in improved bicycle transportation options. These projects are not generally associated with other highway improvements and require the participation of local governments in developing, maintaining, and funding the project.



Intercity Trail Improvements

Wisconsin has been a leader in converting abandoned and discontinued rail grades into bicycle trails. The Department of Natural Resources (DNR) alone owns 23 corridors, with over 900 miles of trails. In addition to the DNR facilities, counties and other local units of government have converted many more miles of former rail corridors into trails. Most of these trails are well-suited for bicycling.

WisDOT works closely with DNR to preserve these trail opportunities by passing on its first right of acquisition for abandoned privately owned rail lines to DNR, and by conveying to DNR or counties full or partial rights to lines that WisDOT owns. This occurs after WisDOT has considered abandoned lines for continued rail or other transportation usage.

Trail opportunities have been enhanced by the federal "rails-to-trails"

Wisconsin has been a leader in converting abandoned and discontinued rail grades into bicycle trails.

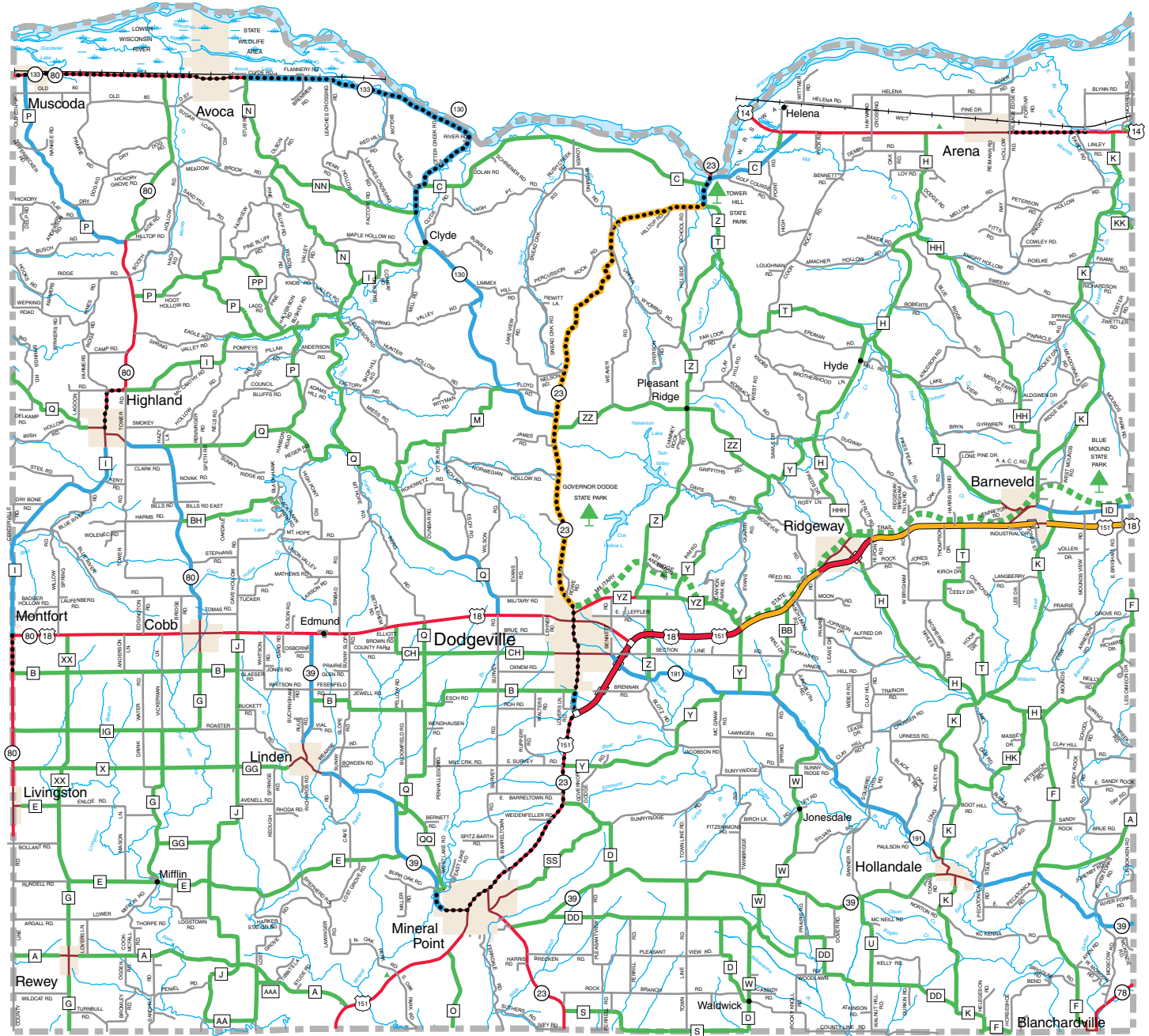
program, and by the rail-banking provision of the National Trails Act. This provision allows a railroad company to enter into a voluntary agreement with a trail provider to allow an out-of-service rail corridor to be used as a trail until such time that the corridor may again be needed for rail service. This provision greatly facilitates the conversion of discontinued rail lines into trails, while at the same time preserving the option for future rail use.

Several specific intercity trail improvement actions will help serve the interests of bicycling in terms of both connectivity and safety. First, the specific seven trail recommendations cited above should be pursued (in addition to urban and suburban trails included in metropolitan bike plans). These trail recommendations were identified using the DNR *Draft State Trails Action Plan* and the recommendations included in that document. Key trail segments were selected in those corridors where lower-volume roadways could not be found and the trail segment offered a corridor or linkage opportunity. It should be noted that WisDOT may assist in the development of these trails, but a trail sponsor (owner) will be necessary if the trail is to be developed.

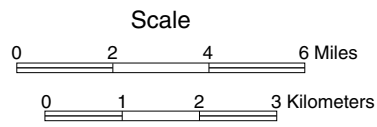
Secondly, WisDOT will continue to facilitate increased trail opportunities by coordinating rail-to-trail conversions with the DNR and local units of government. Since this plan cannot foresee every future rail abandonment, there may be some rail corridor conversions that will further complement the State Trunk Highway bicycle Priority Corridors recommendations.

Lastly, since this plan does not identify State Trunk Highway improvements that will help connect trailheads to communities, it is important to make this a recommended action of the plan. More specifically, it is a recommendation of this plan to strongly consider safe and convenient bicycle access to trailheads that are located within reasonable distances of communities (generally, not more than five miles in length). Except in very unusual situations, these improvements will be paved shoulders.

Map 1: Bicycling Conditions Assessment with State Highway Priority Corridors and Key Linkages Iowa County



- Town Roads
- Best Conditions for Bicycling
- Moderate Conditions for Bicycling
- Highways with Wider Paved Shoulders with Higher Volumes
- High Volume; Undesirable Conditions
- Bicyclists Prohibited or Not Recommended
- Bicycle Touring Trails
- Urban Escape Routes
- Major Urban Streets
- State Highway Priorities and Linkages



GENERALIZED BICYCLING CONDITIONS
Width of Roadway

Traffic Per Day	Width of Roadway			
	Narrow (22' and <)	Moderate (23'-24')	Wide (25'-28')	Paved Shoulders (29'-32') Wide Paved Shoulders (33' and >)
Low				
1000				
1500				
2000				
2500				
3500				
High				
5000				

The table illustrates, in a generalized fashion, how state and county highways were classified by their conditions for bicycling. Traffic and width of roadways are the two primary variables affecting bicycling conditions. Secondary variables, such as sight line conditions and truck traffic, also affect bicycling conditions. These secondary variables were factored into the model that classified the bicycling conditions.

This page intentionally left blank.

VII. Urban/Suburban Element

Introduction

This chapter outlines the second major geographic component of the Wisconsin Bicycle Transportation Plan—the Urban/Suburban element.

The plan's two major goals are to increase bicycle usage and to reduce the rate of bicycle crashes. Implementing the Urban/Suburban element of the plan is critical to attaining those goals. This section outlines what is needed in a successful urban and suburban strategy. Much of this strategy is tied to the implementation of completed metropolitan bicycle plans. More detailed actions on the development of bicycle facilities in urban and suburban settings have also been included.

The successful implementation of many of the recommended actions depends on the level of funding at federal, state and local levels. Additionally, many of the improvements in urban and suburban areas must be implemented locally. WisDOT cannot commit the financial resources of other agencies or public bodies.

Implementing the Urban/Suburban element of the plan is critical to attaining (the plan's) goals.

Urban/Suburban Overview

Urban and suburban areas are defined, for purposes of this plan, as cities and villages with populations of at least 5,000 people. According to the 1990 census, about 50% of Wisconsin's population lives in metropolitan areas of over 50,000 people, while another 11% reside in non-metropolitan urban areas (cities and villages with populations of between 5,000 and 50,000). Urban areas generally have greater densities and more transportation options than smaller communities. This is especially true for those urban areas where transit is available. In portions of urban areas constructed before 1950, streets are generally built in a grid pattern. While this pattern creates numerous options for users, it also creates more conflict points because of the high number of intersections. Larger cities, such as Milwaukee, Madison, Racine, and Kenosha, have higher densities which are conducive to walking and bicycling, but also result in higher traffic volumes.

According to journey-to-work data described in Chapter 3, some of Wisconsin's largest metropolitan areas have thousands of residents who people commute to work by bicycle. However, college cities have the highest percentages of bicycle commuters.

The potential for bicycle commuting is greatest in smaller urban areas where average distances to work are short enough (generally under five miles in length) to make bicycling to work can be an attractive option.

Urban Bicycle Usage Target

One of the two primary goals of this plan is to increase levels of bicycling throughout Wisconsin, doubling the number of bicycle trips by 2010. If this goal is to be achieved, bicycle use within urban areas—where the number of potential bicycle trips is greatest—will have to more than double.

Metropolitan Bicycle Plans

Metropolitan bicycle plans form the backbone of this Urban/Suburban element. Implementation of the metropolitan bicycle plans provides the greatest opportunity to achieve the bicycle usage goals of the Wisconsin Bicycle Transportation Plan.

All of the state's 11 Metropolitan Planning Organizations (MPOs) have either produced a bicycle plan or prepared a bicycle element as part their overall transportation plan. These plans cover all 14 of Wisconsin's metropolitan areas (urbanized areas with populations over 50,000). Most of these bicycle plans have been developed in conjunction with a pedestrian plan. The Southeastern Wisconsin Regional Planning Commission (SEWRPC)—the MPO for the seven-county region that contains the urbanized areas of Milwaukee, Racine and Kenosha—not only prepared a bicycle plan for the three metropolitan areas, but also developed a region-wide plan for the rest of its seven counties. MPO bicycle plans range in their level of detail, with some offering specific street-by-street bikeway recommendations (wide curb lanes, bike lanes, bicycle route, path, etc.), and others making only general recommendations for major street corridors with no recommendation as to the type of bikeway that should be developed. The metropolitan bike plans offer more specific details on bikeway recommendations than possible in a statewide bicycle plan. However, most of the MPO plans address the same four basic components of bicycle safety as this plan—engineering, education, enforcement and encouragement.

Every MPO bicycle plan offers a system with adequate spacing of recommended bikeways. The goals, objectives and actions included in these plans call for increased bicycle usage, while reducing the rate of bicycle crashes. In addition to recommending a bicycle system, the plans also call for the consideration of bicyclist-friendly improvements on all major streets.

Metropolitan bicycle plans form the backbone of this Urban/Suburban element. Implementation of the metropolitan bicycle plans provides the greatest opportunity to achieve the bicycle usage goals of the Wisconsin Bicycle Transportation Plan.



Multi-modal Integration

With the exception of walking, the bicycle is the most adaptable form of transportation. A bicycle can be placed or “piggy-backed” on just about every other form of transportation (rail, bus, auto, ferry, etc.). The fact that 12 bicycles can be parked in the space of one auto attests to the flexibility of the bicycle even when it is stationary. Given these characteristics, one would expect the bicycle to have been woven into the multi-modal fabric of urban transportation systems. However, unlike most northern European countries where bicycles are accommodated on most forms of mass transit, Wisconsin has only two transit systems where bicycles can be loaded onto buses (Duluth-Superior and La Crosse), and one city (Kenosha) where a pilot “bikes-on-busses” program is now underway. However, all of the ferry services (public and private), airlines, many intercity buses, and AMTRAK (Chicago to Seattle/Portland route) allow bicycles to be boarded.



Two methods can be used to improve “multi-modalism” for bicycles: on-mode accommodations, and improved access to transfer points. The accommodations cited above are examples of direct on-board accommodation of bicycles. Although important, perhaps even more critical, is the need to improve access to points of transfer between modes (e.g., railroad stations, ferry terminals, major bus stops and transfer points, airports, and park and ride lots). Bicycle connections to these facilities must be safe, and suitable and secure parking for bicycles must be available. Improvements may include paved shoulders, bike lanes or bike paths, as well as bike racks or bike lockers at the point of transfer.

Urban Bicycle Crashes

The majority (83%) of bicycle crashes in Wisconsin occur in urban areas, with 66% occurring on urban streets under local jurisdiction. Most crashes occur where speed limits are low. In fact, 80% of all crashes occur where the posted speed for vehicles is 25 or 30 mph.

The most thorough surveys of bicyclist/motorist crashes in urban areas indicate that intersections are the primary crash locations. Crashes were likely to occur both in the street and in the crosswalks since bicyclists frequently use sidewalks until they reach the crosswalks. According to the recent study, *Bicycle-Motor Vehicle Crash Types: The Early 1990's*, intersections, driveways, and other junctions continue to be locations where about 75% of the crashes occur. Arthur Ross' study of bicycling in Madison indicated that the main crash types are also intersection-related, with crashes often occurring in crosswalks. Just over 30% of all crashes in the Madison study occurred on sidewalks or within crosswalks, and 72% of those crashes occurred while the cyclist was riding against the flow of traffic.

These crash characteristics and types should be considered when designing facilities and educating motorists and bicyclists. (For a more thorough discussion of crashes, see Chapter 3.)

The Two-Tiered Approach: Highway Design and Bikeway Planning

This plan, the WisDOT Bicycle Planning Guidance, FHWA guidance, and MPO plans advocate the accommodation of bicyclists through a two-tiered approach—basic street and highway design and bikeway planning. Bicyclists will use every roadway that they are permitted to use. Therefore, a basic level of urban accommodation is highly desirable to improve bicyclist safety along all roadways and to provide access to destinations along those roadways. Since the vast majority of urban streets are currently suitable for bicycling because of their low speeds and traffic volumes, major streets are most in need of improvements. Wider outside lanes (14 feet of usable space) or bicycle lanes are needed. The second element of this two-tiered approach is to plan and implement a complementary urban bikeway system that uses a combination of bike lanes, paths and designated low volume neighborhood streets within key travel corridors.

The most important aspects of the two-tier approach are access, encouragement and safety. By having a planned system, most urban destinations will either be located directly on or within a short distance of the bikeway system. This will encourage use of designated bikeways. The designation of acceptable levels of improvements on major streets will provide improved access to destinations along those streets. Some bicyclists will prefer to use those major streets as their main routes, while others will need to use only short segments to make connections to other bikeways and streets. Safety and convenience for bicyclists will be improved through either designated bicycle facilities or the provision of adequate space for bicyclists and motorists to share the roadway with minimum need for changing lanes or lane position.

Related Federal Regulations and AASHTO Guidelines

The federal regulations and AASHTO guidance that form the framework and rationale for many of the detailed action statements contained in the Urban/Suburban plan element are the same as those cited in the discussion of the Intercity element. See pages 35-36.

Recommended Urban/Suburban Improvement Actions

The following actions are recommended:

1. Bicycle provisions on urban arterial streets (i.e., wide curb lanes, bicycle lanes or paved shoulders) should be made in accordance with MPO and community bicycle plans unless the costs or adverse impacts of such accommodations are excessively disproportionate to expected usage. Communities that do not have bicycle plans should seriously consider bicycle accommodations on arterial streets. Because of the potential for bicycle travel, bicycle accommodations will most likely be needed on the vast majority of urban streets. It is especially important that accommodations facilitate bicycle access to major commercial, recreational and institutional destinations along or near the highway. Most of Wisconsin's metropolitan bicycle plans call for wide curb lanes, bike lanes, or paved shoulders on arterial streets/highways often to augment an established or planned bikeway system.
2. On urban collector streets, especially those in Wisconsin's largest metropolitan areas, bicycle provisions for wide curb lanes, bike lanes, or paved shoulders should be made if the costs or adverse impacts are not excessively disproportionate to expected usage. These improvements should be made in a manner consistent with community bicycle plans.
3. On urban State Trunk Highways, where suitable accommodations for bicyclists now exist, new highway improvements will be planned to continue an acceptable level of service and safety for bicyclists.
4. On urban State Trunk Highway bridges, bicycle accommodations should be provided unless the cost of such accommodations is considered to be excessively disproportionate to the projected bicycle use. Bicycle accommodations on the roadway approaches to the bridges should be continued across the structures.
5. WisDOT will cooperate with local jurisdictions to help develop "stand alone" bikeway projects, including bicycle path facilities, when they are consistent with an approved plan and provide important bicycle transportation improvements. These projects are not generally associated with other highway improvements. They require the participation of local governments in developing, maintaining, and funding the projects.
6. Safe crossings should be maintained or created when bikeways and streets intersect highways. Crossing controls or grade separations (overpass or underpass) should be considered where there are inadequate gaps in traffic for safe bicycle path crossing.

Bicycle provisions on urban arterial streets (i.e., wide curb lanes, bicycle lanes or paved shoulders) should be made in accordance with MPO and community bicycle plans.

Where suitable accommodations for bicyclists now exist, new highway improvements will be planned to continue an acceptable level of service and safety for bicyclists.



7. Intersection design should consider the needs of bicyclists. All intersections should be wide enough for safe bicyclist crossing; signalized intersections should include such treatments as appropriate signal timing, bicycle-sensitive traffic detectors, and push-button devices to activate signal changes. An adequate number of bicycle crossings (on-street and grade-separated bicycle underpasses/overpasses) should be considered whenever a limited access highway is built or improved.

VIII. Bicycle Safety

Overview

Improving safety in any area requires changing individual behavior, the environment, and the equipment or materials being used. Safety in transportation focuses on three key elements: engineering, education, and enforcement. Other factors are often added, including encouragement and emergency response. The engineering and maintenance of roadways affect both the environment and the equipment, as do individual and group choices and behavior. Because engineering of bicycle facilities is the focus of much of this bicycle plan, only an overview of engineering design impacts will be discussed in this chapter. Education can be addressed to bicyclists, motorists, parents, peers, teachers, law enforcement officers, engineers, designers and many others. Accurate information and research must be used to set policies and recommend the appropriate tools.

A community's maintenance decisions and those of residents along bicycling routes can improve or decrease safety for bicyclists. For example, overgrown shrubbery can obstruct the view of a driveway, intersection, traffic sign, or other important traveler information. Debris along the curb or lamp posts too close to a bike path can create a hazard on an otherwise good bikeway. Engineering decisions can be improved through education, clear standards, training, and by understanding requests or complaints of users. It is sometimes difficult to identify which of the decision makers need, and will take advantage of, training. The education challenge is to offer training and related information that will be used at the appropriate engineering decision points.

Law enforcement is an exceptionally good way to educate the public about the importance of bicycle safety to a community. Enforcement works as education when the laws identified for selective enforcement can be clearly tied to local crash and injury causes and when the enforcement agency works with local media to alert the public of the dangers of certain behaviors and the importance of stopping violators of the most critical laws. At the same time, officers must recognize and acknowledge that the majority of people will do the right thing as long as they know what is expected.

Safety in transportation focuses on three key elements: engineering, education, and enforcement.

Law enforcement is an exceptionally good way to educate the public about the importance of bicycle safety to a community.

Enforcement stops of bicyclists should focus on wrong-way riding, nighttime riding without a headlight and rear red reflector, driveway and mid-block ride-outs (failures to yield), and stop sign and red light violations. Officers should stop motorists because of speed, operating while intoxicated, ignoring traffic controls, failure to yield (especially on left turns), not sharing a lane or keeping at least three feet from a bicyclist when passing, and any behavior that is aggressive toward a bicyclist. This includes such behavior as: yelling and throwing objects; touching the bicyclist while passing; unwarranted braking after passing; and tailgating with or without blowing the horn.

To educate the public, police officers and their supervisors and agency decision makers need to know the causes of most bicycle/motor vehicle crashes.



To educate the public, police officers and their supervisors and agency decision makers need to know the causes of most bicycle/motor vehicle crashes. This information can be acquired by attending WisDOT-sponsored workshops about child instruction which include information on crash causes, or courses designed specifically for traffic officers.

There are two training courses for officers who do all types of police work by bicycle, from undercover work to emergency operation to community policing. Their work may or may not include enforcement for bicycle safety. The two certified training programs do not emphasize general bicycle safety, but rather the advanced bicycling skills needed to assure officer safety in performing police work. More police officers using bicycles on the job adds to the visibility of bicycles as part of everyday traffic. This visibility and legitimacy should contribute to safety of other bicyclists in the following ways: 1) other motorists expect to encounter bicycles on the road; 2) these officers expect and understand some of the challenges facing bicyclists and may act on more traffic errors made by both bicyclists and motorists; and 3) non-bicycling officers gain respect for bicyclists as they become aware of their peers' abilities on bikes.

Safety-oriented activities can be grouped into three general categories: 1) prevent crashes and therefore injuries; 2) prevent certain types of life-threatening injuries; or 3) help to prevent situations that have been shown to result in injuries. A state bicycle plan, state and national policy, and data or research do not make safety happen. Ultimately, the local community decides which, if any, of these activities to implement. Individual and collective commitment to correcting what's wrong, teaching what's right, and rewarding good behavior, is a local task to make a safe community. When all Wisconsin communities share this commitment, this state will be a safe place where bicycling is an easy and frequent transportation choice.

Bicycle Safety Action Strategies

The best way to prevent serious injuries and deaths involving bicycles is to prevent the crashes. The second way is to intervene in the crash so that injury is minimized. The third is to provide quality emergency response and follow-up medical care when there is a crash to reduce long-term costs to the individual and to society. Wisconsin communities need to use the best resources and tools available and focus on all three areas to improve the safety of all bicyclists.

Children and novice adult bicyclists are involved in crashes that most often result from bicyclist error, while more experienced bicyclists are most frequently involved in crashes where the motor vehicle operator or other person is in error. Time of day is another factor in crashes, especially for children. The large majority of their crashes occur in the three to four hours right after school. Location is also a factor. For children, crashes generally take place on neighborhood streets and often involve mid-block or stop sign ride-out. For adults and experienced teen bicyclists, crashes often occur on higher volume city streets or country roads. Many of these crashes are caused by a left turning motorist who does not look for, or does not see, the smaller vehicle or does not judge the bicyclist's speed accurately. Over one-third of bicycle crashes with a motor vehicle involve a bicyclist traveling against on-coming traffic rather than in the same direction as the traffic flow. Wrong-way travel by bicyclists is illegal and creates an unexpected situation for motorists who may be unable to change lane position to avoid a head-on crash which will most likely cause serious injury for the bicyclist. Most motorists do not respond safely or quickly to the unexpected.

Strategies that a community can follow to prevent crashes, reduce injury, or intervene once a crash occurs are offered below. However, communities should examine their choices every few years to make sure they still work, are the best approach for the identified local bicycle crash concerns, and have not been superseded by better approaches. Community leaders concerned about bicycle safety should remain open to innovative approaches in the fields of engineering, education, enforcement, emergency medical services, and encouragement. Developing new strategies or trying other communities' strategies can help result in better ways to make bicycling both fun and safe.

Crash Prevention: Engineering

Eliminating competing uses of the bicycling space, or denying the bicyclist use of certain spaces reserved for others can help prevent crashes. Limiting bicyclist use can include designating slow speed user areas in locations such as trails, "pedestrians only" sidewalks, and child play areas. Bicycle use should be limited in

The best way to prevent serious injuries and deaths involving bicycles is to prevent the crashes (from occurring).

Children and novice adult bicyclists are involved in crashes that most often result from bicyclist error, while more experienced bicyclists are most frequently involved in crashes where the motor vehicle operator is in error.



This section of this chapter summarizes and supports the engineering recommendations made throughout this plan. Readers are directed to other chapters for more detailed discussion and recommendations on these engineering-related improvements leading to safer conditions for bicyclists.

areas where bicyclists are not generally expected—such as on freeways and expressways. However, care must be taken not to limit bicycle access to necessary and desired destinations.

The following are engineering and traffic-calming strategies that a community can use to protect exclusive and shared space for bicyclists:

- Limiting the use of paved roadway shoulders to bicycles and pedestrians;
- Establishing lanes for use only by bicycles, buses, and right-turning motor vehicles;
- Developing exclusive bicycle lanes that cannot be intruded on by a motor vehicle, except when it is turning;
- Restricting whole streets or neighborhoods to use only by bicycles and residents' motor vehicles; and
- Incorporating measures to reduce speed of vehicles on neighborhood streets.

Communities must make long-term observations of problem areas and critical decisions to achieve safe bicycling conditions that balance the needs of all their members. Solutions should not be adopted without: 1) documentation of the problem; 2) consideration of input from all users to ensure continued access by all to community resources (shopping, schools, activity centers of all kinds); and 3) the best compromises possible for the local users and travelers into and through the community. Decisions must be based on evidence that a recommended strategy has proven to make the environment safer for both bicyclists and others with whom they share facilities. Tools are available to make comparisons of the costs and benefits of different types of engineering or policy changes.

Additional strategies a community should pursue include:

- A bicycle road hazard identification system and reporting mechanisms;
- Complete investigation of bicycle crashes that do occur so the community can understand how similar crashes can be avoided in the future; and
- Taking advantage of educational opportunities that involve the training of planners and engineers in the planning and design of bicycle accommodations.

Crash Prevention: Education

Other ways to prevent crashes are to provide bicyclists with current information about the causes of bicycle crashes, and how those causes differ by age, gender, and rural or urban setting. Instructors must understand what knowledge and skills are needed



to prevent crashes, especially with motor vehicles, which cause 90% of the serious injuries and deaths for bicyclists.

Instructional programs for both children and adults can provide a multi-faceted approach, ranging from: 1) in-school informational and hands-on programs; 2) community single-day biking events; 3) parental rule-setting, supervision, instruction and reinforcement; 4) instruction in the proper sizing and adjustment of a bicycle; 5) bicycle maintenance by the owner and professional; 6) citizen reporting and prompt repair of road hazards; and 7) law enforcement which stresses the community's commitment to legal, respectful and safe interactions between bicyclists and pedestrians, motor vehicle operators, and other bicyclists.

Adult education for safe bicycling can be provided through courses like *Effective Cycling*TM and through bicycling courses developed for other reasons—commuting, sports training, touring, fitness and health, recreational activity. Adult bicyclists should be encouraged to seek instruction that improves their enjoyment and skills in their favorite bicycling activity (e.g., touring, racing, training, etc.). Instructors of these courses and the institutions that offer them should be encouraged to incorporate safe bicycle operation throughout the courses. The safety element of these courses will vary depending on the type of cycling being addressed. However, all safety training will lead to better, more aware bicyclists using the transportation and recreation systems of the state.

It is critical that bicyclists and parents of child bicyclists understand the importance of selecting properly sized bicycles. Bicycle cost often leads many parents to buy a bicycle too large for a child “so it will last for a number of years.” The cost of the child learning poor braking, turning, shifting and other essential elements of safe operation is ignored or unknown by the parent. The risk of a crash is greatly increased when someone rides a bicycle that is the wrong size or has more equipment than (s)he knows how to work. Buying and wearing a correctly fitted and positioned helmet on every ride is a decision made by the bicyclist and sometimes a parent. Bicyclist safety is usually improved by selecting the bicycle, helmet, shoes, gloves, clothing, reflectors and lights which will make bicycling more comfortable, visible and fun.

Bicycle maintenance by the owner or by a professional bicycle mechanic is a necessity. Bicycle maintenance falls under education because owners can be taught simple maintenance skills and how to determine when a professional should do the work. Each bicyclist should do certain basic checks of his/her bicycle before every ride. Routine annual check-ups/tune-ups should be encouraged.

The WisDOT Bureau of Transportation Safety, the National Highway Transportation Safety Administration, and other safety

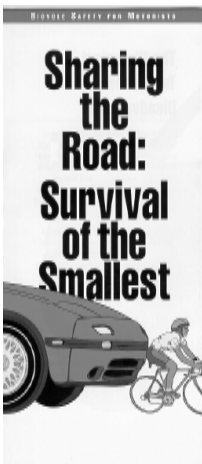


The risk of a crash is greatly increased when someone rides a bicycle that is the wrong size or has more equipment than (s)he knows how to work.



Up-to-date informational brochures, posters, bumper stickers, book covers, videotapes, training guides and full curriculum materials (are available) free or at low cost.

Education must also be directed to motorists so they have a better understanding of... how to share the streets and roads safely.



or bicycling organizations offer up-to-date informational brochures, posters, bumper stickers, book covers, videotapes, training guides and full curriculum materials free or at low cost. Some communities are still using materials or programs that do not represent the current status of bicycling—from a legal, physical, or policy standpoint. These programs are less helpful in educating the general public or bicyclists. One example is the highly competitive bicycle rodeos with a few winners and many losers. The objective to be taught should be sharing the road safely, not being first, best, or most talented. Rodeos for bicycle safety should stress that every participant is a winner due to increased knowledge of basic skills. Rodeos should emphasize knowledge, judgment, and good riding practices. Every participant should be able to successfully complete a bicycle safety course with the older/more mature or more athletic participants able to participate in more complicated activities after completing all basic skill tests.

Schools and community recreation programs can play a key role in teaching bicycle safety. A seven-session hands-on curriculum suitable for third through fifth grades is available from the WisDOT Bureau of Transportation Safety. Appendix C summarizes educational goals by age-specific target groups.

Education must also be directed to motorists so they have a better understanding of appropriate bicycling techniques, learn how to share the streets and roads safely, and understand the importance of communication and obeying laws. Driver's education instruction should focus more on how to avoid crashes with bicycles and pedestrians, and on understanding how driving violations lead to serious crashes. Parents and new drivers should be the targets of messages focused on driving in school areas and neighborhoods, as well as on keeping themselves, their child, and all bicyclists safe from preventable crashes.

Regular road-sharing messages with a local emphasis should run on television and drive-time radio. More portrayal of bicyclists as safe operators (e.g. helmet on correctly, traveling in the right direction at reasonable speed) on television shows and in movies provides more subtle safety and encouragement messages. Examples, both good and bad, are forms of education. Adults who bicycle safely educate younger or less-experienced bicyclists by their behavior. Adults who run stop signs give kids the message that such action is not only acceptable for a bicyclist, but that it is safe.

Bicycle advocates can make presentations to professional groups interested in becoming advocates of bicycling for transportation, recreation and health. Presentations can cover such topics as planning for facilities design, land use development, employee benefits, health care, and available funding sources.

Communities can demonstrate their commitment to safe bicycling by providing secure bicycle storage in areas that are safe for individuals to access (e.g., at schools, parks, businesses, and employment locations).

Crash Prevention: Enforcement

Law enforcement agencies can project the community's commitment to making bicycling a safe, enjoyable activity for community members and visitors through a clear policy that bicycle safety law enforcement is part of their traffic enforcement and community policing activities. Up to 90% of bicycle crashes with motor vehicles can be prevented by selective enforcement of those few vehicular laws whose violation causes most crashes. WisDOT's Bureau of Transportation Safety has materials available that identify these laws and recommend how, when, and why to enforce them. WisDOT's 16-hour course, "Enforcement for Bicycle Safety," will be offered for ten or more officers at the request of a law enforcement agency or through a police science program. An introduction to bicycle safety that encourages traffic officers to actively enforce bicycle safety-related laws to save lives is also available for showing at police rollcalls.

Parents and schools also play a role in enforcement.

- Parents are responsible for disciplining their children for any violation of bicycle laws. This discipline must be accompanied by further efforts to educate children on expected safe bicycling.
- School authorities must educate students regarding bicycle policies and rules. Schools should ensure that the rules and policies exist to protect the child bicyclist, and are fair to all students. The school should provide accurate information about specific bicycle crash causes in the community.

A balanced enforcement effort targeted at both bicyclists and motorists, and combined with good public information, is essential for bicycle safety enforcement to be effective and not viewed as harassment of bicyclists.

Crash Intervention: Helmet Ownership and Use

Head injury causes 75% of the 900 bicyclist deaths in the United States each year. About 50% of bicycle injuries are from falls. Falls with resulting head injury can occur anytime. The most effective way to prevent head injury—the single largest killer and permanent disabler of bicyclists—is to wear a correctly-sized and fitted helmet. Correctly worn helmets can prevent up to 88% of bicyclists' brain injuries.

Community programs can help prevent deaths and incapacitation caused by head and brain injury. Promotion of the correct use of an approved helmet and the prompt replacement of a helmet

Up to 90% of bicycle crashes with motor vehicles can be prevented by selective enforcement of those few vehicular laws whose violation causes most crashes.



Head injury causes 75% of the 900 bicyclist deaths in the United States each year. The most effective way to prevent head injury - the single largest killer and permanent disabler of bicyclists - is to wear a correctly-sized and fitted helmet.

struck in a crash are fundamental to bicycle safety. Examples of helmet-related programs/projects a community can offer include:

- Emergency rooms and doctor's offices can have helmets to offer free or at a low cost to patients or the parents of children who have just been involved in a bicycle crash, but were not wearing helmets.
- Groups can make bulk purchases of quality helmets and sell them for a small profit that can be used to support other safety activities.
- Rewards can be given to children and adults who are observed wearing a helmet. Local restaurants, bakeries, and other businesses may contribute to such projects.
- Law enforcement officers can recognize cyclists for correct helmet wearing, and encourage others to obtain a helmet and wear it correctly. In addition, officers can have a supply of helmets available for children who may be in need of one.
- Assistance in sizing and adjusting helmets for correct fit and instruction on proper wearing should always be a part of helmet distribution and on-bike instruction events.
- Accurate information about a bicycle helmet's effectiveness in preventing head injuries if worn every ride, not just in traffic, should be provided.

Medical Services Response

Emergency Medical Services (EMS)

Prompt response by well-trained emergency personnel can save lives. Quick, correct intervention can limit the severity of injuries. Even brain injury can sometimes be prevented if the head injury can be identified and correct intervention applied as soon as medical resources arrive. EMS staff can advise emergency room staff of apparent correct or incorrect helmet use, or non-use, so that the likely site of brain injury can be more quickly identified.

To ensure that communities are addressing the most serious bicycle crash circumstances, they should take advantage of EMS knowledge gained at the site of crashes and in treating injuries. Data on types of crashes and injuries can identify additional areas of focus that WisDOT data does not provide, since it is limited only to motor vehicle-related bicycle crashes. Crash information provided by EMS can help plan to direct community investments in crash prevention and In addition, EMS could take the lead in helmet distribution and bicycle safety instruction.

Communities should support a well-trained emergency response unit that has had specific training in identifying and treating the most common life-threatening types of bicycling injuries.

Quick, correct intervention (by emergency medical service personnel) can limit the severity of injuries (to bicyclists).



Training and other elements of providing a community with a good emergency response team may be requested from the WisDOT, Bureau of Transportation Safety, Injury Prevention Program Manager.

The Role of Other Medical Care Providers

Medical personnel should expect head injuries, internal injuries, neck, and spinal cord injuries in bicyclist patients who have been involved in a crash with a motor vehicle. Head injury leading to brain swelling is the most serious problem for these patients when they survive and enter the emergency room, hospital, or even the doctor's office. It is also important to examine bicyclists involved in "fall-off" crashes for head injuries before they are discharged from care. Emergency room and hospital staff should continue to participate in "e-coding" (citing the external cause) which links data on injury causes with medical outcomes (i.e., site of injury on body, extent of injury, recovery level). If a bicycle-related injury is recorded only as a traffic injury it is more difficult to determine the severity of bicycle crash and the best countermeasures to use.

Doctors, especially pediatricians or their nurses or assistants, should discuss bicycle and other safety topics with their patients during their annual visits. Regular and correct helmet use can be reviewed at this time. Rules or limits that parents set for a child's riding should match the child's developmental level. As children reach driver's licensing age, doctors can discuss safe driving with them, and encourage their continued bicycling for health reasons and to set a good example for younger children.

Physicians, nurses and other health care providers should take a broad look at all ways to make or keep their patients healthy. In regard to bicycle safety, they can do more than promote helmets for head injury prevention. Instruction, encouragement, and even reward systems may be developed by health care providers to promote bicycling as a healthy way to stay fit, have fun, and travel. Even disabilities like blindness, hearing loss and balance control need not keep people from safely enjoying bicycling. Tandem or connected side-by-side bicycles and other adaptations, such as a third wheel or multi-speed gears, can be used.

Health professionals have a role in helping improve bicycle safety. Discussions on helmet use and bicycle safety at annual visits can be quite effective.

Safety Conclusions

Bicycle safety is ultimately a personal and local commitment. State plans and state staff provide data, resources, tools, standards, and advice. Program choice and implementation are the responsibility of the town, village, county, city, and tribe in their efforts to make safe and welcoming places for bicyclists. Necessary decisions fall into four areas:

- ◆ **Safe bicycling facilities** While state and local programs may emphasize different aspects of bicycling (e.g., touring, commuting, child cycling, etc.), it is important that the facilities provided are safe for the users.
- ◆ **Effective outreach** Both bicyclists and motorists must be educated on the need to safely share the roadway where necessary and to respect non-shared spaces such as bike lanes and pedestrian walkways.
- ◆ **Improved crash prevention** Communities must develop ways to expand bicycle-related crash prevention knowledge, and to improve the skills and judgment of children, parents, adult cyclists, and motorists.
- ◆ **Selective enforcement** Effective selective enforcement campaigns are necessary to communicate that bicycle safety is an important part of a safe community and that reduction of violations can eliminate 90% of bicycle/motor vehicle crashes.

IX. Implementation

Introduction

This chapter discusses how WisDOT, local units of government, and other groups and agencies can implement this bicycle plan. Successful implementation requires a systematic approach by transportation agencies and affected parties. Additionally, it will take a number of years of implementation and additional investments to create a transportation system that fosters increased and safe bicycle use.

One of the main purposes of this plan is for WisDOT to take a leadership role in encouraging increased bicycle use in a safer bicycling environment. To achieve this goal, many different entities will be called upon to implement this plan. This chapter discusses the programs and actions that are necessary to achieve the plan's vision, goals, and objectives. It addresses facilities, funding, policy and procedural issues. Appropriate roles and responsibilities are also defined.

WisDOT plays a role in the direct implementation of bicycle-related improvements on the State Trunk Highway system and encourages safer practices through its education and enforcement programs. Perhaps more important to implementation of this plan is the development of a supportive environment for bicycling in Wisconsin. That can be achieved through a comprehensive effort involving local governments, counties, and even the private sector.

WisDOT plays a role in the direct implementation of bicycle-related improvements on the State Trunk Highway system and encourages safer practices through its education and enforcement programs.

Roles and Responsibilities

This section lists the most prominent implementers or “actors” called upon to help implement this plan. Brief statements of responsibilities are listed after the likely implementation authority. Following this section are implementation strategies that discuss how these responsibilities can be put into action.

WisDOT:

- Plan and design the State Trunk Highway system with a strong consideration of bicycle accommodation.
- Review plans and designs for improvements to the state connecting highway system and local systems (where state or federal funds are involved) for consideration of bicyclists.

WisDOT should plan and design the State Trunk Highway system with a strong consideration of bicycle accommodation.



- Provide funding opportunities (such as Transportation Enhancement, Surface Transportation Program Discretionary, and Congestion Mitigation and Air Quality (CMAQ) for stand-alone (independent) bicycle projects.
- Follow the priorities for bicycle accommodations on State Trunk Highways as established in the Intercity element of this plan.
- Prepare a report that discusses current “best practices” in the planning and design of bicycle facilities.
- Develop a bicycle accommodation checklist to assist WisDOT and local officials in comprehensively examining projects for level and type of bicyclist accommodation
- Construct bicycle accommodations in accordance with this plan and its endorsed design procedures.
- Institutionalize within WisDOT the planning and design of bicycle accommodations.
- Conduct a statewide survey of bicycle travel to act as a baseline indicator of bicycle use, allowing WisDOT to measure future performance in light of the two main goals of the plan. (This survey began in September of 1998 and will be concluded in June of 1999.)
- Develop a strategy for funding the safety (education and enforcement) recommendations of this plan.
- Provide technical assistance on the planning and design of bikeways to local communities and regional and metropolitan planning agencies.
- Provide liaison and coordination with federal agencies, regional planning commissions (RPCs), MPOs, and local governments.
- Work with MPOs and communities to influence the consideration of bicyclists on local street improvement projects, especially where federal funds are used and approved through the various MPO Transportation Improvement Programs (TIPs).
- Provide training on the planning and design of bicycle accommodations to other WisDOT staff.
- Coordinate and encourage the involvement of bicycle advocates, citizens, and community officials in implementing projects and achieving the goals of this plan.
- Continue to identify critical transit and park-and-ride locations needing improved bicycle access and/or improved racks.
- Continue to help explore the feasibility of bicycles on buses and on AMTRAK (as unchecked baggage).
- Develop a marketing strategy aimed at increasing bicycle use.

- Encourage public transit systems and AMTRAK to provide bicycle accommodations at stations (e.g., bicycle parking and storage).
- Whenever possible, count bicyclists as part of manual traffic counting activities.
- Continue to assist in the development of state, regional, and local bicycle maps.
- Continue to offer to communities and schools the same basic education programs now offered, but expand the number of communities and schools that are using these products.
- Continue to support the “Safe Communities” approach to identifying and solving local bicycle problems so that every aspect of bicycle safety begins to be considered as part of an on-going community process.
- Develop enforcement strategies and programs aimed at bicyclist law violations that are most likely to result in serious crashes.
- Develop enforcement strategies aimed at motorist errors and aggressive behaviors.
- Continue to consider additions to drivers education products that emphasize safe motorist driving when encountering bicyclists on the road.
- Continue to support the education of police officers through courses such as “Bicycle Safety for Law Enforcement.”
- Develop maintenance policies and guidelines for bikeways.
- Work with local communities to develop baseline bicycle usage information and periodic updates.
- Use as examples those communities and counties that have become bicyclist-friendly and have experienced increased bicycle use.
- Continue to support the state bicycle conference on a biennial basis to promote and exchange ideas, awareness, and information on the benefits of bicycling.
- Encourage businesses to support more bicycle commuting and the use of bicycles for other types of trips.
- Make WisDOT offices good examples of workplace accommodations (e.g., changing rooms, showers, bicycle lock-up facilities such as modern racks and shelters).
- Assist in promoting bike-to-work days.



Metropolitan Planning Organizations

- Develop, revise and update long-range bicycle plans.
- Provide technical assistance to local communities, especially for plan implementation.

- Develop Transportation Improvement Program (TIP) project selection criteria that apply to bike facilities.
- Develop land use and transportation plans that will lead to compact and contiguous development.

Regional Planning Commissions

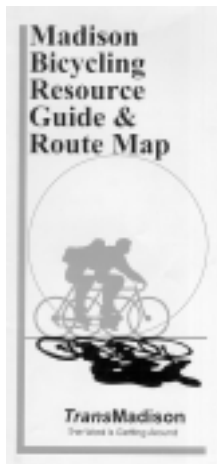
- Develop, revise and update long-range bicycle plans.
- Provide technical assistance to local communities, especially for the preparation of community and county bicycle plans.
- Develop, revise and update long-range land use and transportation plans to promote increased bicycling.

Counties

- Consider the needs of bicyclists in all road projects and build facilities accordingly.
- Develop, revise and update long-range bicycle plans and maps.
- Consider adopting a shoulder paving policy.
- Promote land use policies that are bicyclist-friendly.
- Educate county sheriffs on share-the-road safety techniques and enforcement strategies for specific high-risk bicyclist and motorist infractions of the law.

Communities

- Develop, revise and update long-range bicycle plans and maps.
- Consider the needs of bicyclists in all street projects (especially collector and arterial streets), and build bicycle facilities accordingly.
- Promote and offer bicycle safety programs.
- Promote bicyclist-friendly development through plans, zoning and subdivision ordinances.
- Provide bicycle racks at public and commercial areas.
- Consider providing locker room facilities for employees.
- Consider bicycle racks on buses.
- Encourage business involvement as a means to increase bicycle commuting and other functional trips.
- Help promote bike-to-work/school days.



School Districts

- Provide school-based, on-bike, crash prevention and bicycle traffic safety training.
- Consider bicyclist access in all school drop-off plans.
- Provide modern bicycle racks.

- Make bicyclist safety an integral part of driver's education courses.

Department of Natural Resources

- Help WisDOT and counties identify connections to trail heads.
- Complete the *State Trails Action Plan* with input from this bicycle plan.
- Continue to work with WisDOT, counties and communities to develop trails on abandoned rail lines that could serve bicyclists.
- Continue to work with WisDOT and MPOs on strategies involving bicycling to reduce reliance on single-occupant vehicles.



Tourism Interest Groups

- Develop awareness of the importance of bicycling to the local economy through newsletters, news articles and workshops.
- Work with local units of government on the development of fund-raising events.
- Promote bicycling at information displays and events.
- Continue to encourage bicycle usage through promotional materials prepared by the Department of Tourism.
- Provide bicycle parking/lock-up facilities at key tourist attractions.

Shopping Centers

- Provide internal connections within shopping centers (also important for pedestrian access).
- Provide bicycle racks that are close and convenient to shopping center entrances.



Developers

- Ensure that new developments have proper access for bicyclists, especially neighborhood connections (e.g., path connections between cul-de-sacs).

Employers

- Promote work practices that will encourage bicycling, such as alternative work schedules, flextime, and relaxed dress codes.
- Provide locker room facilities and sheltered bicycle racks.
- Sponsor bicycling programs and events.
- Work with local communities to ensure safe and convenient access to surrounding neighborhoods.



Bicycle Groups/Clubs/Trail User Groups

- Help in the development of bicycle plans.
- Serve on bicycle advisory committees.
- Provide comments and input on bikeway projects.

Implementation Strategies

The following section describes the major strategies for the implementation of bicycle facilities. They are structured so that different implementers (listed above) are brought together to form coordinated strategies.

Urban Strategy

Implementation of MPO and community bicycle plans will be necessary to meet the goals and objectives of this plan. Close destinations and appropriate densities in urban areas increase the likelihood that bicycling can be a practical transportation choice.

Bicycle plans have recently been developed for the 14 metropolitan areas in the state. A number of communities and counties have also prepared plans. The Wisconsin Bicycle Transportation Plan recommends that metropolitan areas implement these plans and their recommended bikeway systems. In urban areas where a local plan does not exist, it is important that there be a serious consideration of bicyclist accommodations when streets are constructed and improved. These accommodations should be pursued unless the costs or adverse physical or environmental impacts do not warrant or permit such accommodations. Communities that do not have plans are encouraged to prepare them.

Intercity Strategy

This plan makes specific recommendations regarding bicycle accommodations on critical links in the State Trunk Highway system. In addition, *all* state highway projects will be examined to consider wider paved shoulders when roadways are reconstructed. These recommendations will help ensure the provision of appropriate bicycle facilities when WisDOT reconstructs the affected roadways. However, this plan does not make any specific recommendations for the County Trunk Highway system. Where counties have prepared bicycle system plans, those plan recommendations have been included in this statewide plan (and are shown on the individual county maps). Counties without bicycle plans should develop them, including a recommended bicycle system.

During the initial stages of the development of this plan, some draft “skeletal systems” of a statewide system (including both state and county highways) were developed. Ultimately, only State

A major component of the Urban Strategy is continued support of the implementation of adopted metropolitan and community bicycle plans.

The Intercity Strategy provides an analysis of bicycling conditions for each county. It designates a group of priority corridors and key linkages on State Trunk Highways.

Trunk Highways and County Trunks that are part of adopted county bicycle plans were selected to form the Priority Corridors for intercity connections. However, the county routes that were part of the initial skeletal system can be used as points of departure for other counties as they consider the development of their bicycle systems. These skeletal system maps are available from WisDOT upon request.

Facilities Design Strategy

An effective means of encouraging the development of bicycle facilities is to provide illustrations of their design or present photos of where and under what conditions they are being used. The basic types of bicycle facilities described in this section are further described in three documents: *Wisconsin Bicycle Planning Guidance*, 1993; Procedure 11-45-10 of the *WisDOT Facilities Development Manual (FDM)*; and the *AASHTO Bicycle Facilities Development Guidelines* (1991, but to be updated in 1999). WisDOT will prepare a report that discusses current “best practices” in the planning and design of bicycle facilities. This report will present a number of different cross-sections showing bicycle accommodations and provide guidance as to where their application is most appropriate. An important part of the discussion will be recommended design options for bicycle accommodations in constrained right-of-way settings.

Additionally, WisDOT will develop a bicycle accommodation checklist to assist WisDOT and local officials in comprehensively examining projects for level and type of bicyclist accommodation.

The basic bicycle facility types are: shared roadways, wide curb lanes, paved shoulders, bicycle lanes, and bicycle paths or multi-use trails. These are discussed briefly below. For more detailed information on the design of bicycle accommodations, see the three documents referred to above.

Shared roadway:

Shared roadway facilities are commonly low volume city streets, and narrow town roads and County Trunk Highways. On a shared roadway, bicyclists and motorists are accommodated in the same travel lane and no additional improvement is needed to make the roadway bicycle-compatible. Because of narrow widths or parked vehicles, motorists may will most likely find it necessary to overtake bicyclists by switching into the on-coming travel lane. Shared roadways will continue to be a common form of bicycle accommodation on low volume routes.

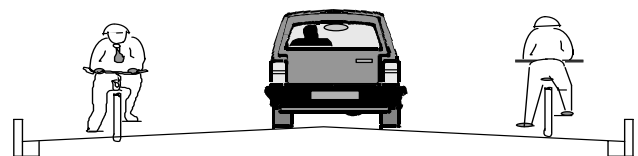


Figure 3. Shared Roadway

Wide curb lane:

On major streets (arterial streets and some collectors with higher motor vehicle volumes) a wider outside lane (curb lane) of 14 feet is desirable in order to better accommodate both bicyclists and motorists in the same travel lane. The wide curb lane allows motorists to pass bicyclists without changing lanes and has a positive impact on motor vehicle capacity whether bicyclists are present or not. A lane width of 14 feet of *usable* width (not including the gutter) is desirable on road segments where parking is not permitted in the curb lane. If parking is permitted in the curb lane, the width of the curb lane (with parking) should also be about 14 feet but the measurement should be taken from the curb face and include the

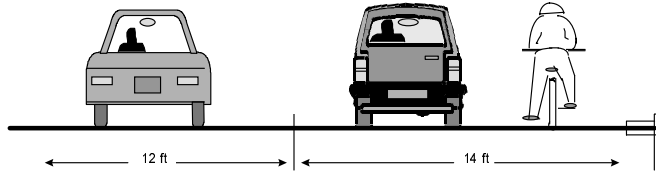


Figure 4. Wide Curb Lane

gutter. Wide curb lanes are not striped, marked or generally promoted as “bicycle routes,” but are often all that is needed to help accommodate bicycle travel on major urban streets.

Bicycle lanes:

Bicycle lanes are the most effective way of encouraging bicycle travel on urban arterials. Bicycle lanes should be considered when it is desirable to delineate available road space for preferential use by bicyclists and motorists and to provide for more predictable movements by each. Bicycle lane markings can increase a bicyclist’s confidence that motorists will not stray into his/her path of travel. Bicycle lanes are delineated by painted lane markings and should be one-way facilities.

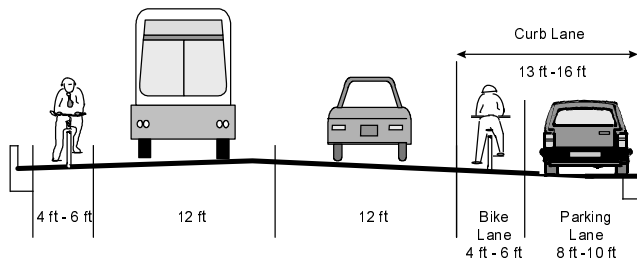


Figure 5. Bicycle Lane

Paved Shoulders:

While wide curb lanes and bicycle lanes are usually preferred in urban areas, widened paved shoulders are generally used in rural settings. Only rarely are paved shoulders marked as bicycle facilities. Paved shoulders are generally found on rural arterial and collector highways and are considered a safety enhancement for both bicyclists and motorists. WisDOT paves a three-foot shoulder when reconstructing or reconditioning its two-lane State Trunk Highways where average daily motor vehicle traffic counts are 1,250 or above. A five-foot paved shoulder is often used where a highway has reached this traffic threshold and been included in a

bicycle plan or has at least a modest amount of bicycle traffic (25 cyclists per day). This plan identifies Priority Corridors for bicycle travel. Most of these State Trunk Highways would become prime candidates for five-foot paved shoulders when repaving or reconstruction roadwork is performed. Some of the very low volume highways will most likely not need the addition of paved shoulders.

Bicycle paths:

Lastly, bicycle paths or multi-use trails offer good bicyclist mobility under many circumstances, especially where the paths are truly isolated from motor vehicles, such as along river grades, greenways, abandoned rail lines, and connections between subdivisions and cul-de-sacs. Caution is always advised when considering a bicycle path adjacent to an urban street, because of the increase in hazards associated with motorists' turns. Every MPO bicycle and pedestrian plan has recommended a number of bicycle paths/trails. This state plan also contains a number of priority intercity segments of trails recommended in the DNR *Draft State Trails Action Plan*.

These are good examples of the types of bicycle and roadway facilities that can improve conditions for bicyclists. In addition, WisDOT should review its *Facilities Development Manual* procedures and other related procedures to ensure consideration of bicyclist accommodations in accordance with this plan. Local communities and counties can use these guidelines or prepare similar guidance for use in considering the needs of bicyclists on all roadway projects. WisDOT and AASHTO guidelines can provide sound direction.

Citizen Involvement and Local Support Strategy

WisDOT and MPOs should continue to use bicycle advisory committees to help develop and implement plans. WisDOT should continue to coordinate activities with bicycle advocates. Bicycle advocacy groups should meet with WisDOT district offices, MPOs and local communities to offer comments and suggestions on plans and specific projects. It is important that comments be offered beginning in the very early stages of a project's development. Advocacy groups should try to attend public meetings related to relevant roadway and bikeway projects.

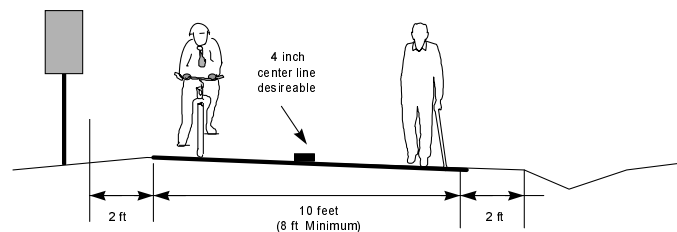


Figure 6. Typical Bicycle Path

Funding Strategy

The vast majority of bicycle accommodations on the State Trunk Highway system will occur as “incidental” improvements, folded into larger roadway projects.

Effectively funding bicycle facilities is critical to the implementation of this plan. One popular means of funding projects advocated by this plan is to incorporate bicycle accommodations as part of larger roadway improvement projects. Such “incidental” improvements are made in conjunction with new construction and reconstruction projects, many of which use state and/or federal funding. Incidental improvements could include paved shoulders, bike lanes, or wide curb lanes. WisDOT applies standards to determine where and what type of the accommodations should be provided.

WisDOT and many communities and counties have made significant improvements in bicycle accommodations through this means. This plan recognizes the importance and efficiencies of incorporating bicycle accommodations as incidental improvements. Generally, the same source of funding is used for incidental improvements as is used for the roadway improvement itself. The vast majority of bicycle accommodations on the State Trunk Highway system will occur in this manner. Funding for bicycle accommodations on the local road system should occur in a similar fashion.

Another important type of bikeway project can be described as stand-alone or independent. These projects are not necessarily tied to larger projects in terms of timing or location. To help and encourage communities and MPOs in the implementation of their local plans, WisDOT will continue to make funds available for these projects. However, funding is likely to be very limited in relation to the demand for these funds.

Administrative Strategy

WisDOT and local governments should develop and review other planning documents (e.g., the State Highway Plan) with due consideration of this plan and local bicycle plans. To measure the progress in achieving this plan’s goals, it will be necessary to develop baseline data on bicycle use that can be updated in future years.

WisDOT should continue to employ two full-time staff in its central office: one to focus on overall coordination, planning, and bikeway facilities, and one to manage the bicycle safety program with its public information, education, and enforcement activities. WisDOT should likewise continue to provide bicycle and pedestrian liaisons in each of its transportation district offices. These individuals will serve as the first point of contact on matters involving the planning and design of bicycle and pedestrian facilities.

WisDOT should prepare an ongoing professional development

series related to bicycling for its staff planners and engineers. Local professionals should also be encouraged to take part in these courses. Other professionals, such as police officers, should also be offered basic training on bicycle safety.

Enforcement and Education Strategy

Successful bicycle plans must include more than just references to miles of proposed bicycle facilities. Safety strategies incorporating education and enforcement elements are an important and integral part of this statewide plan.

WisDOT should provide data, data analysis, resources, tools, standards and guidance on bicycle safety. Local governments, school districts and civic groups need to continue and expand sessions on bicycle traffic safety, including adult courses such as *Effective Cycling*TM. WisDOT should continue to provide important instructional and informational brochures and safety literature, including those guides that will expand knowledge of laws governing the safe operation of bicycles and motor vehicles. Driver education programs should cover critical errors often made by motorists and bicyclists, legal rights and responsibilities of bicyclists and motorists, the importance of looking for bicyclists at intersections, and exercising caution and allowing safe passing distances when encountering bicyclists.

Finally WisDOT, local communities, and teaching institutions should continue to encourage and support the training of enforcement personnel in the areas of bicycle safety and law enforcement.

Land Use and Development Strategies

Local land use patterns affect the number of trips that can easily be made by bicycle. Bicycle trips can be made more practical through the construction of clustered development and new developments that are contiguous to the existing built-up areas of communities. On a large scale, changes to land use plans should be made that allow for safe and convenient travel by bicycle. Local governments should review the assumptions of land use plans and zoning ordinances and compare them with bicycle and pedestrian travel needs as revealed in community surveys.

When subdivision plats are reviewed, if a grid street pattern is not used, it is important to make sure that internal connections are made between streets (especially between cul-de-sacs) and along greenways. Underpasses or overpasses should be considered to cross major barriers and to connect adjacent subdivisions, neighborhoods and planned developments. Local governments can endorse a bicycle parking ordinance requiring bicycle racks or other forms of bicycle lock-up facilities.



This page intentionally left blank.

X. CONCLUSION

Bicycling in Wisconsin can be made safer and more convenient at a reasonable cost. There is a tremendous potential for increasing the importance of bicycling so that it is recognized as a truly viable transportation option for state residents and visitors alike. With this plan as a guide, Wisconsin has an opportunity to see that properly planned and designed facilities are implemented and that education and enforcement efforts are strengthened. This plan will serve as a solid foundation and act as a catalyst for action to make Wisconsin a bicyclist-friendly state.

However, bicycling's potential cannot be realized without a firm commitment by the many partners needed to implement the actions identified in this plan. It is imperative that WisDOT, MPOs, RPCs, counties and local communities work together in the planning and design processes to ensure that the policies and programs recommended in this plan come to fruition.

It will take time to develop a complete system of suitable roadways and bikeways that will ultimately provide greater mobility and access for Wisconsin bicyclists. Many communities and counties have an excellent start, but overall results will be best measured in the longer run. The creation of this plan marks an ideal time to strengthen our commitment to improve conditions for bicycling into the 21st century.

This page intentionally left blank.



Appendices

This page intentionally left blank.

Appendix A

History of Bicycling in Wisconsin

Bicycles first gained popularity in Wisconsin over 100 years ago as a practical transportation and recreation vehicle for adults. In the book *The Good Roads Movement in Wisconsin, 1890-1911*,¹ it was noted that the first Wisconsin bicyclists were seen in Racine “spinning around Market Square” in 1878. It is estimated that in 1890 a thousand adults in Milwaukee owned cycles or “wheels.” Several years later, this figure had climbed to 15,000 statewide.

Bicyclists quickly became organized in the 1890s. There were eleven organizations in Milwaukee alone. Cyclists became involved in the movement for better roads on which to ride their machines. According to *Good Roads Movement in Wisconsin*, the Wisconsin Division of the League of American Wheelmen (LAW)² spurred interest in and support for road improvements and the “Good Roads” movement in Wisconsin: “Wisconsin LAW members campaigned throughout the decade for highway reform. Their chief consuls scattered throughout the towns of the state, made reports on road conditions and continually urged their club members to request that local and state officials pay closer attention to highway problems.” The LAW focused most of its attention on improving country roads that led into trading centers.

The Wisconsin legislature, under Chapter 308, Laws of 1901, authorized counties to construct and maintain bicycle side paths along any public road or street, and to appoint a board of cyclists to serve as “side path commissioners.” The Board could issue bicycle side path licenses annually for “not less than 50 cents nor more than one dollar.”

The enthusiasm for bicycles waned soon after the turn of the century with the emergence of the motor vehicle. But unlike in Europe, where motor cars took decades to supersede bicycles, American cyclists never had the chance to coexist with the motoring public.³ As a result, when automobiles came on the scene, bicycles experienced a sudden drop in popularity and status as they went from being considered a high-class mode of transportation and pleasure to more of a child’s toy.

During the first several decades of the 1900s, it is believed that bicycle use held steady in Wisconsin, but its popularity was primarily among children. There are records of education efforts in the 1930s, including the production of a now classic bicycle safety film entitled “Bill’s Bicycle” filmed by William Stauber in Baraboo.

Bicycle use increased during World War II among both adults and children, but the sale of bicycles was restricted during the war. According to *Wisconsin Bicycle Facts* (1942), published by the Wisconsin Motor Vehicle Department, the bicycle made a bit of comeback during the war years: “The bicycle is a very useful vehicle. Youngsters run errands and pedal to and from school. One district attorney in Wisconsin has given up his car and travels to and from work on a bicycle. A new delivery bike with an oversize basket, to take the place of small truck deliveries, was displayed at the Milwaukee convention of the Wisconsin Retail Hardware Association in February, 1942. It is possible that housewives will take to the bicycle for making short shopping trips to cut down on the use of the family car.”

According to a survey taken as part of the *Wisconsin Bicycle Facts* report, police departments were involved in education efforts and seemingly satisfied with the safety literature available at the time. Police Chief Harry Mueller of Fort Atkinson stated: “If we could find some way to reach out

¹ Ballard Campbell. *The Good Roads Movement in Wisconsin, 1890-1911* (State Historical Society of Wisconsin).

² LAW became the League of American Bicyclists (LAB) in 1994.

³ In some European countries, such as Denmark and the Netherlands, vehicle miles traveled by bicycle surpassed that of autos until the early 1960s.

to the parents other than appearances in courts, we would have fewer bicycle violations.” A Green Lake County traffic officer wrote: “I am giving a series of informal talks in the schools of the county. It seems that my efforts are not in vain, because I notice that children are equipping their bikes with lights and are realizing their responsibility to others on the highway.” According to the 1942 report, an estimated 250,000 bicycles were in use within the state, and 150,000 of those were registered. The report also described what was perhaps one of first uses of bicycle lanes in Wisconsin. It states that the Police Department in the City of Two Rivers had “bicycle lanes laid out for several blocks south of the high school and bicyclists were instructed to remain in these lanes as far as possible.”

Growth in the popularity of bicycling increased during the 1950s and 1960s, as the “baby boom” generation used the bicycle as a major means of making short trips and for recreation. In the late 1960s and early 1970s, the “bicycle boom” occurred as young adults, born in the 1950s and 1960s, returned to bicycling and purchased lightweight 10 speed bicycles.

Wisconsin was an early leader in recognizing the bicycle as a growing means of transportation and recreation during this time period. In response to both the bicycle boom and to the energy crisis of the early 1970s, WisDOT and the Wisconsin Department of Natural Resources (WisDNR) co-authored two reports in 1974 and 1975 entitled “Guidelines for Developing Urban Bikeways” and Guidelines of Developing Rural Bike Routes.” Although the reports did not suggest any specific policy changes, they did provide timely guidance to communities and counties experiencing considerable increases in bicycle ridership. It was also at this time that the WisDNR began its popular and extensive rails-to-trails program with the development of the Elroy-Sparta Trail. In addition, approximately 10 to 15 counties established county bicycle route systems, many of which are still in existence today. A number of bicycle paths in parks and parkways were funded and constructed using various recreational fund sources.

In the early 1970s, Wisconsin became one of the first and only states to create a position of bicycle and pedestrian safety program manager. (This position is now in WisDOT’s Bureau of Transportation Safety.) In 1976, a Pedestrian and Bicycle Safety Plan was developed by the Division of Highway Safety Coordination.

During the 1980s, WisDOT assisted the state Division of Tourism in producing and updating the Wisconsin Bicycle Escape Map (now the Wisconsin Bicycle Map printed and sold by the Bicycle Federation of Wisconsin). The map recommended a system of over 10,000 miles of bicycle routes in the state, and identified highways that were unsuitable for bicycling. The map met the overall objective of establishing at least one north-south and one east-west bicycle route in each county, and connecting each city of 10,000 people or more. However, the intended use of the map was to guide recreational bicycling. It did not recommend routes through metropolitan areas, but relied on locally published resources.

In was also during the 1980s, that WisDOT formalized a shoulder paving policy. While the main justification for this policy was lower maintenance and improved safety for motorists, paved shoulders on state highways also became a popular improvement for bicyclists. Also popular among bicyclists during this time period was the “Share the Road” campaign urging motorists and bicyclists to safely share the road. “Share the Road” bumper stickers supporting the rights of bicyclists to use roadways are still available from WisDOT.

In late 1991, the federal Intermodal Surface Transportation Efficiency Act (ISTEA) provided significant new language regarding bicyclists. ISTEA required the consideration of bicyclists and pedestrians in the planning of highway improvements that involved the use of federal funds. In addition, all Metropolitan Planning Organizations (MPOs) and state Departments of Transportation

were required to include a bicycle and pedestrian element in their overall transportation plans.

In 1993, in response to the need for bicycle planning guidelines, WisDOT published a document entitled: *Guidelines for Metropolitan Planning Organizations and Communities in Planning and Developing Bicycle Facilities*. In January of 1994, seven new pages of standards dealing with the location and design of bicycle facilities were included in WisDOT's *Facilities Development Manual*. These standards were updated in 1997.

During 1994, most of Wisconsin's MPOs completed bicycle and pedestrian plans. In some cases, they were developed as an element of the MPO's overall transportation plan. Many of them called for specific WisDOT actions to help implement projects or programs. These plans were considered in the development of this statewide bicycle plan, especially in regard to investment, partnership, and intercity bikeway connections.

By the end of 1994, WisDOT completed its multimodal transportation plan entitled Translinks 21. While this plan included a minor element related to bicycling and walking, it focused primarily on budget recommendations for future investments. However, one of the recommendations of Translinks 21 was that WisDOT develop a comprehensive statewide bicycle plan.

This page intentionally left blank.

Appendix B

Terms and Definitions

BICYCLE - A vehicle with at least two wheels having a diameter of not less than 14 inches, propelled by feet acting upon pedals. (Source: Wisconsin State Statutes.)

BICYCLE ACCOMMODATIONS - An all-inclusive class of improvements that typically enhances roadway facilities for bicycling. Accommodations include not only bikeways, but other improvements as well, such as paved shoulders and wide curb lanes.

BICYCLE FACILITIES - A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities, mapping all bikeways, and shared roadways not specifically designated for bicycle use. (Source: AASHTO Bicycle Guidelines.)

BICYCLE LANE - A portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists. (Source: AASHTO Bicycle Guidelines.)

BICYCLE PATH - A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way; often referred to as a trail or multi-use path.

BICYCLE ROUTE SYSTEM - A system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers, with or without specific bicycle route number. Bicycle routes should establish a continuous routing, but may be a combination of any and all types of bikeways. (Source: AASHTO Bicycle Guidelines.)

BIKEWAY - A generic term for any road, street, path, or way which in some manner is specifically designated as being available for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or to be shared with other transportation modes. (Source: AASHTO Bicycle Guidelines.)

HIGHWAY - A general term denoting a public way for purposes of travel, including the area within the right-of-way. Used primarily in reference to public ways in rural settings.

RIGHT-OF-WAY - A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to transportation purposes. (Source: AASHTO Bicycle Guidelines.)

ROADWAY - The portion of the highway or street, including shoulders, typically used for vehicle use. (Source: AASHTO Bicycle Guidelines.)

SHARED ROADWAY - A roadway which is not officially designated and marked as a bicycle route, but which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or a road with paved shoulders. (Source: AASHTO Bicycle Guidelines.)

SIDEWALK - The portion of a highway or street right-of-way designed for preferential or exclusive use by pedestrians. (Source: AASHTO Bicycle Guidelines.)

STREET - A general term denoting a public way for purposes of travel in an urban setting.

TRAIL - A multi-use path that is physically separated from motorized vehicular traffic by open space, generally within an independent right of way, such as an abandoned rail line. Bicycling is likely to be a permitted use.

This page intentionally left blank.

Appendix C

Public Education Goals and Target Groups in Bicycle Safety

Target Audience	Secondary Audience	Educational Goals
Parents	Day Care Providers Pre-School Teachers After School Programs Youth Group Leaders Police Officers	<ul style="list-style-type: none"> • Proper bike and helmet size, fit and adjustment. • Encourage parents to ride with their children, observe their abilities and grant independence/responsibility as each child is ready. • Most parents will need all the information listed below for adult bicyclists, as well as the specific information for their children's age groups. • Minimum parent resource: "A Kid's Eye View" 10.5 minute videotape on basic things to teach children - available for loan at school, library, perhaps video store.
Adult Bicyclists	Motorists Police Officers	<ul style="list-style-type: none"> • Operating a bicycle as a vehicle in traffic - all rules apply, and some specific ones are in statutes related to bicycles and the interactions with motor vehicles. • Adult bicyclist needs all same knowledge and skills as listed for teaching children in following groups. • If adults want skill improvement to ride confidently in traffic, adult classes are available. <i>Effective Cycling</i> is one such course with certified instructors statewide.
Motorists	Police Officers Bicyclists	<ul style="list-style-type: none"> • How to safely share the road with bicyclists. • Bicyclists' and motorists' rights and responsibilities vis-a-vis each other. • Enforcement is the most convincing educational tool. • Traffic court could have educational class as option for offending motorist or bicyclist. • Children in Traffic issues: motorists and parents must bear the larger share of the responsibility of ensuring the safety of children in traffic.
Kids 0 - 4 (pre-school)	Parents Day Care Providers Pre-School Teachers Motorists Police Officers	<ul style="list-style-type: none"> • Directed at parents: How to safely bike with children in a child seat or bike trailer. • Riding toy safety (big wheels, etc.). • Driveway & sidewalk issues. • Stay out of street (boundaries/limits). • Helmets. • Remember that kids learn by example, and early impressions are important, especially by parents and teachers.

Target Audience	Secondary Audience	Educational Goals
Kids 5 - 7 (grades K - 2)	Parents Day Care Providers Teachers Motorists Police Officers	<ul style="list-style-type: none"> • General focus on pedestrian safety: how to cross a street safely; mid-block crossing; curb/edge of road as boundary; look left-right-left for traffic. • Visibility issues (e.g., parked car as visual screen). • Make own decision as to when safe to cross, don't just follow the leader. (Note: these lessons apply to bicycle safety as well.)
Kids 8 - 10 (grades 3 - 5)	Parents Teachers After School Programs Motorists Police Officers	<ul style="list-style-type: none"> • Beginning bicycling on the street: how to enter the street safely (re-emphasis of previous age group lessons); which side of the road to ride on; checking for traffic from behind before turning or changing roadway position; stop signs; hazard awareness and avoidance; communicating with other road users. • Use and proper fit of helmets. • Learning should take place on-bike as much as possible.
Kids 11 - 14 (grades 6 - 9)	Parents Teachers Motorists Police Officers	<ul style="list-style-type: none"> • Continuation of previous age group skills and move on to more advanced skills: emergency stop; rock dodge; instant turn; lane position in traffic and when turning; multi-gear bikes (cadence); route selection. • Bike and helmet selection, fit and adjustment. • How to fix a flat tire. • Nutrition for bicycling (eating and drinking). • Teaching bicycling as a life long activity.
Kids 15 - 18 (grades 10 - 12)	Parents Driver's Ed instructors Motorists Police Officers	<ul style="list-style-type: none"> • There are two tracks to follow at this age group: <ol style="list-style-type: none"> 1. Continuation of advanced bicycling skills - operating a bicycle in traffic as a vehicle, commuter bicycling, bicycle advocacy including bicycling and environmental and health benefits; and 2. Driver's Education, teach how motorists safe or unsafe behaviors interact with bicyclists (and pedestrians) in traffic. • Remind this age that younger children do not have the same level of developmental skill ability or maturity of judgment as they do or as more experienced drivers and adult bicyclists and pedestrians should have. Children, elderly and persons with disabilities need drivers' extra care in traffic. • Show "Children In Traffic" available for purchase from AAA, or on loan from WINS at (800) 261-9467, or WisDOT Bureau of Transportation Safety's (BOTS) Maps and Publications Film Catalog.

Specialized Target Groups	Secondary Audience	Educational Goals
<p>School Boards/ Administrators, Health and P.E. classroom teachers, Health Department or Recreation Department staff or others with sports/safety educational goals</p>	<p>Students Parents Supervisors and subordinates in target groups</p>	<ul style="list-style-type: none"> • Basic bicycle safety laws and good practices. • The cause of serious crashes and how to teach children (and their parents) how to avoid or respond to these perils. • How to help children decide to protect themselves from head injury, the most life threatening event in a any crash, but very common in bicycle crashes and falls. • Organization/planning and resources for on-bike instruction for specific grade level(s). • Materials to share with parents and bicycling staff as well as motorists around children. • Policies to prevent bicycle-pedestrian-school bus- and other motor vehicle clashes on and near school grounds or on way to school. • BOTS recommends the Basics of Bicycling (BOB) curriculum (7 class sessions) which is free upon written request from school district or others with child educational programming capacity.
<p>Engineers Designer/planners Maintenance personnel</p>	<p>County and City/Village Supervisors/Board Members and taxpayers Court personnel: District Attorney and judges</p>	<ul style="list-style-type: none"> • Investments in quality crash prevention measures are cost efficient and popular. • Specific educational programs for child and adult bicyclists are available. • Bicycle violations should be addressed by fines and/or required education for violating bicyclists or motorist. • Maintenance of curb/road edge and other bicycle ways is crucial to prevent falls and crashes. • BOTS has resources to evaluate both road hazards and the overall compatibility of streets for bicycling. • WisDOT district and central office staff can assist in the planning and design of bikeways.
<p>Police Officers</p>	<p>Court Commissioners Judges and District Attorneys</p>	<ul style="list-style-type: none"> • All of the above as well as the importance of enforcement (of both bicyclist and motorist violations) as part of the overall traffic safety program. • Enforcement for Bicycle Safety (EBS) for all traffic officers, bicycle mounted or not. • Police on Bikes training for all on-bicycle officers whether doing bicycle related traffic or any other enforcement by bicycle travel. • Court personnel must take officers judgment seriously when a bicycle related violation is cited. • Trained officers will not cite for minor violations, but will pursue those violators who create serious

This page intentionally left blank.

Appendix D

MPO and County Contacts

MPO Contacts

Appleton, Oshkosh

Ann Schell
East Central Wisconsin Regional Planning Commission
132 Main Street
Menasha, WI 54952-3100
920-751-4770
E-mail: aschell@eastcentralrpc.org

Beloit

Joseph Heck
State Line Area Transportation Study
2351 Springbrook Court
Beloit, WI 53511
608-364-2929 ext. 14
E-mail: HeckJ@ci.beloit.wi.us

Eau Claire

Don Kush
West Central Wisconsin Regional Planning Commission
Banbury Place, Mailbox 9
800 Wisconsin Street
Eau Claire, WI 54703-3606
715-836-2918
E-mail: wcrpc@execpc.com

Green Bay

Cole Runge
Brown County Planning Commission
City Hall, Room 608
100 North Jefferson Street
Green Bay, WI 54301-5026
920-448-3422
E-mail: coleru@ci.green-bay.wi.us

Janesville

Rachel Beyerle
Janesville Planning Department
18 North Jackson Street, PO Box 5005
Janesville, WI 53547-5005
608-755-3095

Kenosha, Milwaukee, Racine

Ken Yunker
Southeast Wisconsin Regional Planning Commission
Old Courthouse
PO Box 1607
Waukesa, WI 53187-1607
414-547-6721
E-mail: sewrpc@globaldialog.com

La Crosse

Larry Kirch
City Planning Department
400 La Crosse Street
La Crosse, WI 54601-3396
608-789-7512

Madison

Bob McDonald
Dane County Regional Planning Commission
217 South Hamilton, Suite 403
Madison, WI 53703
608-266-4137
E-mail: dcrpcadm@execpc.com

Sheboygan

Jeff Agee-Aguayo
Bay-Lake Regional Planning Commission
Old Fort Square, STE 211
211 North Broadway
Green Bay, WI 54303-2757
920-448-2820
E-mail: jagee@baylakerpc.org

Superior

Ron Chicka
Duluth/Superior Metropolitan Interstate Commission
221 West First Street
Duluth, MN 55802
218-529-7592
E-mail: rchicka@mail.ardc.org

Wausau

Dave Mack
Marathon County Planning Department
210 River Drive
Wausau, WI 54403-5449
715-261-6043
E-mail: dtmack@mail.co.marathon.wi.us

County Contacts

Jefferson County

Steve Grabow
UW-Extension
320 S. Main St, Rm 201
Jefferson, WI 53549
920-674-7295

St. Croix County

Dan Fedderly
St. Croix Highway Department
P.O. Box 108
Hammond, WI. 54015
715-796-2228

Marathon County

Dave Mack
Marathon County Planning
210 River Drive
Wausau, WI. 54403
715-261-6040

Wood County

Gary Popelka

Wood County Planning and Zoning

400 Market St.

Wisconsin Rapids, WI. 54494

Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington & Waukesha Counties

(A Regional Bicycle and Pedestrian Plan for Southeastern Wisconsin)

Ken Yunker

Southeast Wisconsin Regional Planning Commission

Old Courthouse

PO Box 1607

Waukesha, WI 53187-1607

414-547-6721

Appendix E

Order Form for County Plan Maps



Name:	_____		
Address:	_____		
City:	_____	State:	_____
ZIP:	_____		
County Requested:	_____		

Send to:

Tom Huber
Bicycle and Pedestrian Coordinator
Wisconsin Department of Transportation
P.O. Box 7913
Madison, WI 53707-7913