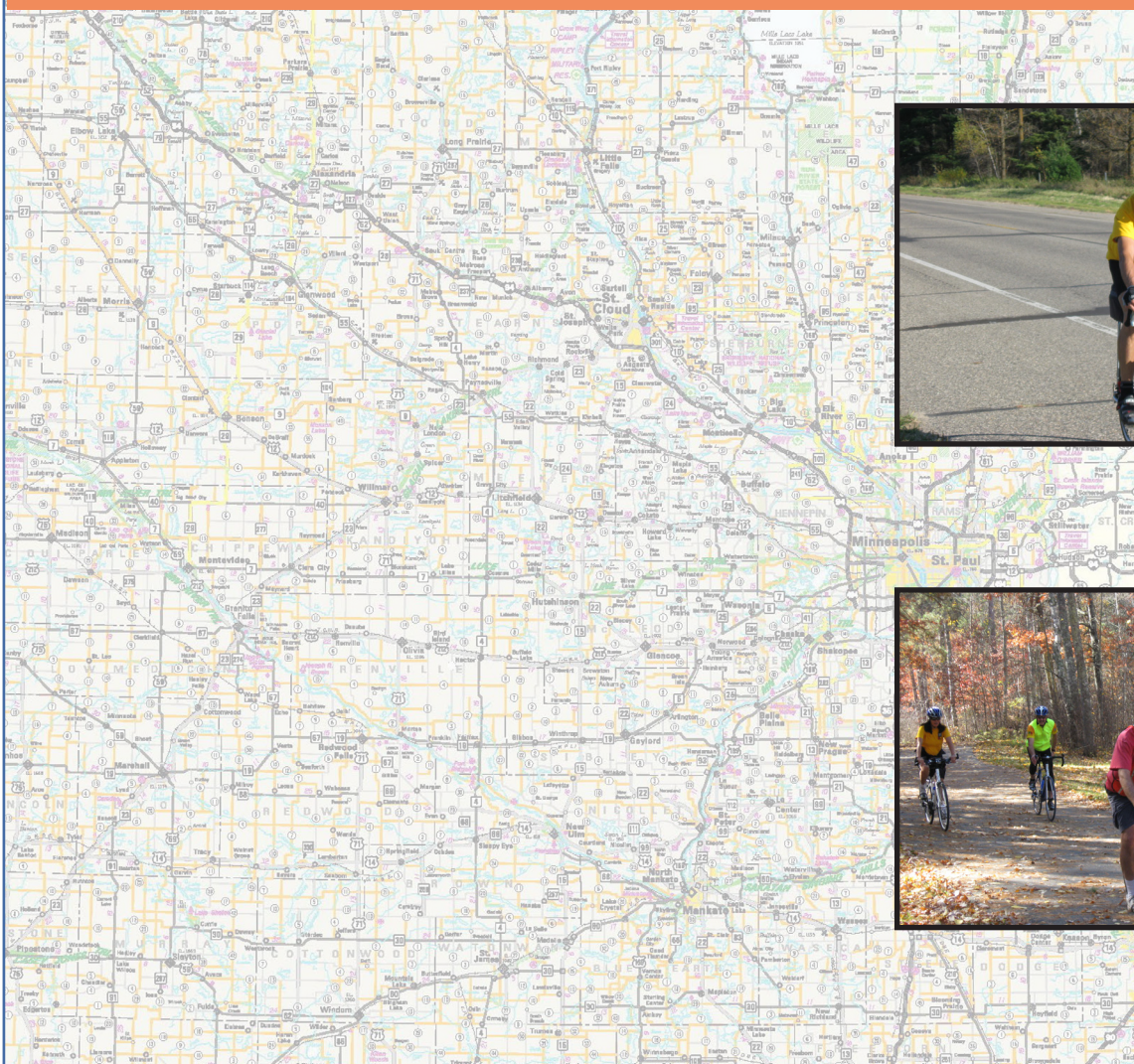


MINNESOTA STATEWIDE BICYCLE PLANNING STUDY



MARCH 2013



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Executive Summary

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INTRODUCTION

Bicycling is a critical component of Minnesota's multimodal transportation system. Bicycling makes positive contributions to quality of life for Minnesota's residents and visitors and provides multiple economic, social, health and environmental benefits.

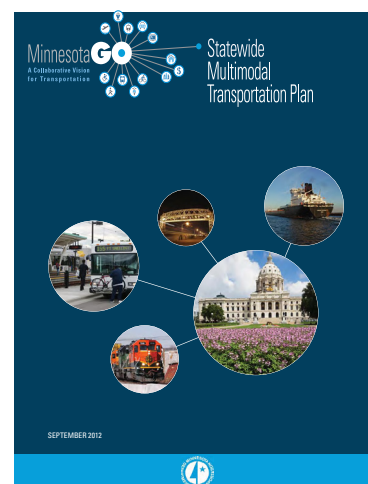
The Minnesota Department of Transportation (MnDOT) is a multimodal agency committed to improving conditions for bicyclists in Minnesota. During the past 20 years, much has been done in Minnesota to improve conditions for bicycling, including building bicycle facilities, producing and updating a bikeway facility design manual, implementing a statewide Share the Road campaign, designating the Mississippi River Trail (MRT) as the first state bikeway, and implementing the MRT as Minnesota's first route in the emerging United States Bicycle Route System (USBRS). This work and the work of partner agencies, organizations and advocates have contributed to Minnesota currently being ranked the second most Bicycle Friendly State in the country by the League of American Bicyclists.

The purpose of the Statewide Bicycle Planning Study (Study) is to provide foundational information to assist MnDOT in better integrating bikeway facility planning and implementation into its day-to-day business. This Study includes multiple components integral to further improving conditions for bicycling on Minnesota roads so that the economic, social, health and environmental benefits can be delivered to those living in, visiting or traveling through Minnesota. Study goals include:

- Identify and document inconsistencies and gaps between the following: MnDOT and Federal policy, Minnesota State Statutes and rules and other policy and guidance that affect how bicycle facilities are integrated into MnDOT projects and practices and provide an analysis of how these elements are applied by MnDOT.
- Provide recommendations for use by MnDOT in the planning, programming, scoping, design and implementation of trunk highways projects and associated initiatives with consideration to state bikeways (i.e., MRT) the emerging USBRS (i.e., MRT is USBR 45).
- Establish the legislatively mandated Bikeways Registry and methods for regular updates.
- Create an updated statewide bicycle map
- Research and provide recommendations on bicycle related performance measures



Minnesota GO Vision—a multimodal transportation system that maximizes the health of people, the environment and our economy



The principles outlined in the Statewide Multimodal Transportation Plan support the intent to integrate bicycles in the transportation system. Implementation forms the framework for clarifying policy objectives and enhancing policy language, identifying lower cost high benefit bicycle asset investments, training and guidance that help support integration of bicycles and meeting multimodal transportation system goals.

While the Study has technical components and deliverables, the emphasis is on process. Understanding and collaboratively addressing the diverse needs of the eight MnDOT district offices was a priority since districts staff are in charge of project initiation and delivery. The study provides guidance for how MnDOT can improve its operations to integrate bicycles based on broad outreach efforts with district staff, partner agencies and members of the public, and discussions with the Policy Advisory Committee (PAC), Policy Technical Advisory Committee (Policy TAC), and Data Technical Advisory Committee (Data TAC) convened for this Study.

The Study makes a comprehensive examination of bicycle related policies statewide as a whole, but focuses its recommendations on MnDOT's Trunk Highway System and elements of the emerging USBRS. While the study is meant to serve MnDOT primarily, it could serve as guidance for other agencies as well.

MAJOR STUDY INITIATIVES

In January and February 2012, the Bicycle and Pedestrian Section staff and the consultant team kicked off the Study by convening meetings with the PAC, Policy TAC, and Data TAC as well as engaging the State Non-Motorized Transportation Advisory Committee (SNTC). The purpose of the series of meetings was to introduce the Study goals, generate ideas for the Study's major initiatives and identify issues that MnDOT can address in order to better incorporate bicycling into its day-to-day business. The majority of the discussion focused on the vision and goals for the three major initiatives:

1. Policy and Practice Analysis
2. Statewide Bicycle Data and Map
3. Performance Measures

The advice gathered from these advisory committees was used to refine the approach to conducting the major Study initiatives. This section provides a summary of that approach as well as the major findings and recommendations for each initiative. In addition to the following summary, each initiative is the subject of a chapter in this study with supporting information included in the Study appendices.

Study Approach and Major Findings

POLICY AND PRACTICE ANALYSIS APPROACH AND FINDINGS

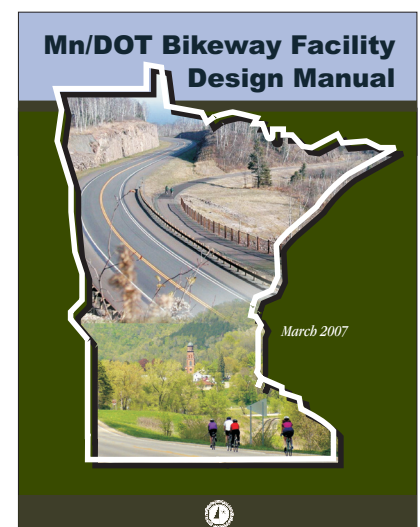
A significant goal of the Study was to understand how effective existing policy and design guidance for bicycles is in directing development of bikeways throughout the state. Since 1991, MnDOT's policies have largely followed Federal level policy established originally through the Intermodal Surface Transportation Efficiency Act (ISTEA). The state's policy language currently does not contradict federal guidance. Bicycle policy and process in the state is guided by Minnesota State Statutes, administrative rules, internal MnDOT policies and long range planning and design guidance documents. In general, state policy and planning guidance parallels federal direction and provides the same framework and intent for integration of bicycle facilities.

The federal level guidance is clear in the intent to support the development of a connected multimodal transportation system that includes travel by bicycle. Further policy guidance issued in 2010 clarified that routine integration includes all aspects of planning, designing, and maintaining the transportation network. Over the last decade, MnDOT has developed a number of policy, planning and design guidance documents to support bikeway implementation throughout the state. Some key documents include:

- MnDOT Bicycle Modal Plan – 2005
- MnDOT Bicycle Facility Design Manual - 2007
- Minnesota GO Statewide Multimodal Transportation Plan – 2012

These documents were reviewed in conjunction with state statutes and administrative rules. While these planning resources are robust, this current policy review and analysis effort confirms that the high-level policy language and planning guidance are not resulting in a clear and consistent framework for integrating bicycles in the transportation network.

MnDOT's examination of bicycle policies and procedures has been a four-phase process. This process sought to document where policy and guidance can be refined to better support routine integration of bikeways into the broader multimodal transportation network.





PHASE 1 – Assessing the environment for bicycling and project development

In Phase 1, the Central Office staff and the consultant team sought to understand how high-level policy was being interpreted at the local level during 'on the ground' bikeway development. Central Office staff and the consultant team visited each of the MnDOT districts, in February and March 2012, for internal workshops with district staff and public workshops with partner agencies and members of the public. Activities included nine public workshops, an on-line workshop and workshops with district staff in each of the eight districts. Prior to the district staff workshops, team members conducted interviews with the Central Office Bicycle and Pedestrian Section staff contacts for each district office, as well as other district staff in order to gain a perspective prior to engaging district staff and the public in a workshop setting.

In the workshops with the district staff, partner agencies and the public, the team asked participants to relay their sentiments about what worked and didn't work with regard to bicycle policy and providing bicycle facilities in the state. In multiple districts throughout the state, the general public and district staff noted that while the state is clearly supportive of bicycles, the transition from policy to on-the-ground implementation of bikeways is inconsistent and lacks transparency.

The full range of concerns and opportunities expressed during this initial assessment of the environment for bicycle planning in Minnesota were considered. The areas of concern documented during outreach were grouped into six core areas as shown in Figure 1. These six core topic areas served as a guide for the further policy analysis and subsequent outreach. This analysis phase was documented in the REPORT: DISTRICT WORKSHOPS - MnDOT STATEWIDE BICYCLE PLANNING STUDY and REPORT: PUBLIC WORKSHOPS – MnDOT STATEWIDE BICYCLE PLANNING STUDY (Appendix A).

PHASE 2 – Review Policy Consistency and Deficiencies

In Phase 2, Central Office staff and the consultant team examined state and federal policies, with a focus on the issues of concern previously expressed by district staff. The purpose of the resulting report was to identify and summarize gaps in knowledge and policy direction in order to bridge the gap between bicycle policy and project implementation.

In order to understand the breadth of existing guidance related to bicycles, Central Office staff and the consultant team compiled USDOT federal laws and policy, Minnesota state statutes, administrative rules, and internal MnDOT policies related to bicycle project and program development in the state. The analysis focused on whether the state's policies were consistent with federal policies and included a specific review of existing state policy through the lens of the six core issue areas identified in Phase 1.

The analysis confirmed that current high-level policy language and planning guidance is consistent with the federal intent to support bicycles as an integral part of a balanced multimodal system. However, there were notable areas where policy language did not provide the clear direction that district staff need to support decision-making and design at the project level.

The analysis revealed a clear need to update and clarify processes for implementation of the policy intent. Within the existing policy and planning guidance, there is a notable lack of an identified comprehensive bicycle system and prioritized corridors or routes. This gap in information leaves a void for district staff to integrate policy intent directly into project development and action.

This phase of analysis was documented in REPORT: EVALUATION AND ANALYSIS OF INCONSISTENCIES IN POLICY AND PRACTICE (Appendix B).

PHASE 3 – District Staff Generate Solutions

In Phase 3, the Central Office staff and the consultant team returned to the districts in September and October 2012. Given that Phase 2 revealed that the key deficiency was translating policy into action at the project level, these workshops focused on identifying opportunities for improving process. Each district participated in a workshop-style meeting where Central Office staff and consultants gathered suggestions from district staff for improvements to process as well as products (such as design manuals and demand models) and guidance they needed in order to appropriately integrate bicycle facilities into the projects currently in the planning phases and beyond. Again, the recommendations for process solutions were focused on the six cores areas identified in Phase 1.

The solutions generated by district staff in Phase 3, as well as an update of implementation theme/issue matrix associated with the report from Phase



2 is documented in the REPORT: DISTRICT WORKSHOPS V2.0 MnDOT STATEWIDE BICYCLE PLANNING STUDY (Appendix C).

During Phase 3, a survey was developed that would allow Central Office staff and the consultant team to receive priorities and guidance from MnDOT stakeholders. These stakeholders included members of the PAC, the PTAC, and study participants and leaders from each MnDOT district office. The survey included policy initiatives, potential process improvements, and general recommendations for improving MnDOT's internal processes for integrating bicycles as part of its routine work. The policies and potential improvements that were included in the survey were first identified by MnDOT staff during the district staff solutions workshops.

The purpose of the survey was to help identify priorities for which there was broad agreement among stakeholders, and to also identify areas or specific potential policies where there was disagreement in prioritization between different groups of stakeholders - for example, to identify improvements that were ranked as "high priority" by district staff but ranked as "low priority" by PAC members. The survey results are documented in the REPORT: ANALYSIS OF FINAL PROJECT SURVEY - MnDOT STATEWIDE BICYCLE PLANNING STUDY (Appendix D)

PHASE 4 – Recommended Policy and Practice Updates

In Phase 4, Central Office staff and the consultant team prepared recommendations for policy and practice updates. The recommendations are intended to provide next steps and priorities for policy and process updates rather than specific recommendations for language or metrics. Many of the recommendations will be addressed in the upcoming Statewide Bicycle Policy Plan Project expected to begin in 2013.

STATEWIDE BICYCLE DATA AND MAP APPROACH AND FINDINGS

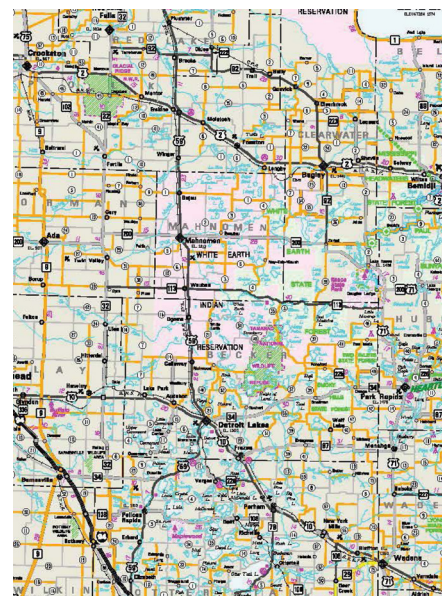
MnDOT is authorized by the State to establish and maintain a Bikeway Registry based on the requirements in Minnesota Statute 160.265. In order to fulfill this requirement, a statewide bicycle data set needs to be designed and assembled, a process for collecting, storing, managing and distributing this data needs to be established, and responsible agencies need to be identified.

At the beginning of this Study, an initial statewide data collection exercise revealed that:

- Uniform bicycle facility definitions and data standards are needed
- A statewide bicycle map based on existing data would serve as a good starting point for data review and collection
- A convenient data collection agency must be identified
- A set of data standards must accompany an easy to understand data collection method

Meetings with MnDOT's Data Systems and Coordination Section, Geographic Information and Mapping Section, Bicycle and Pedestrian Section, as well as the Minnesota Department of Natural Resources (MnDNR) and the study's DTAC, concluded that data existing in the current MnDOT roadway database is a good source to compile data related to bicycle use suitability on major roadways. MnDNR could also readily provide state bicycle trails data. A methodology was developed based on data available to produce a state bicycle map based on existing shared use paths (trails), roadway material, shoulder width, traffic counts and accessibility. It was also determined that the map could be produced by the same MnDOT sections that have been producing the Official State Highway Map. The state bicycle map could use the same layout and background information as the Official State Highway Map. This map was produced and displayed at the Minnesota State Fair in August 2012. Hundreds of public comments were collected to guide the further refinement of both the map and the development of the data set.

Following the assembly of the public comments, it was concluded that the major concerns regarding the map is data accuracy. A data update, maintenance and distribution process was established through subsequent meetings with the same MnDOT sections previously noted.



PERFORMANCE MEASURES APPROACH AND FINDINGS

As bicycling has become a more popular mode of travel, and acknowledged as integral to a safer and more livable multimodal transportation network, the need to track ridership trends and the effectiveness of the bicycle transportation systems has become clear. As MnDOT seeks to promote and increase bicycling, it is imperative that they can base investments on data and research that shows which planning and implementation policies are the most successful. Establishing targets for bicycle travel, making steady progress in improvements, and monitoring key indicators such as usage, safety, and facilities also demonstrates to stakeholder groups, other agencies, and the public, that MnDOT takes bicycling as seriously as other modes of travel that are already being tracked.

Performance measures are a critical part of system management, and have been used by MnDOT for evaluating services and investments since the 1990s. While MnDOT measures many components of automobile, rail, freight and aviation transportation, MnDOT has not previously collected data and established clearly defined performance measures for bicycling. Because performance measures for bicycle transportation are still an emerging practice across the nation, it is all the more important to begin the process of systematic monitoring. In addition, the technology and methodology for obtaining and assessing bicycle related data is still evolving. By measuring, comparing and assessing bicycling transportation and various agency actions, MnDOT can also understand the error rates associated with specific techniques, how to better collect and examine data, and come to a deeper understanding of bicycle transportation. Ultimately, this understanding can support the collaboration, policy guidance and design guidance that MnDOT and other agencies must provide for a successful multimodal system.

In order to recommend performance measures that would be both beneficial and realistic for MnDOT, Bicycle and Pedestrian Section staff and the consultant team first met with MnDOT's Office of Capital Programs and Performance Measures staff to review how the data collection system and performance measures currently worked. The consultant team also researched performance measures used or recommended by other agencies and organizations.

Guided by the performance measure principles established in the Statewide Multimodal Plan (SMMP) and the strategies considered in the Minnesota State Highway Investment Plan (MnSHIP) planning process, the consultant team recommended overall performance evaluation goals, offered criteria

the performance measures should meet, and developed three performance measures. The draft recommendations were reviewed by the PAC and PTAC and the consultant team refined the recommendations.

Summary of Recommendations

POLICY AND PRACTICE RECOMMENDATIONS

The following recommendations are organized by six core issue areas: update project planning process, project/route prioritization, facility selection, connectivity, funding and maintenance responsibility. There is some overlap between the issue areas, such as prioritization, that touch all the core issue areas. These recommendations represent tangible steps that can be addressed to bridge the gap between policy and implementation. Some recommendations will require a revision or clarification of policy language; others require better definition of practice and process.

Update Project Planning Process

- Provide a clear mandate and opportunities to explicitly integrate bikeways planning in project planning at early stages of the project, including initial scoping and the Early Notification Memo (ENM).
- Revise policy language to require clear documentation of rationale for excluding bicycles. MnDOT's existing Trunk Highway Bridge Improvement Program, Minn Stat. 165.14, already requires that projects must prove that there is an absence of need in order to exclude bikeways in the project.
- Develop a statewide bicycle policy plan and district bicycle master plans that establish a priority network for implementation.
- Develop a database that provides information about local and regional level bikeway planning to district staff.
- Central Office to develop clear and consistent resources and tools to better evaluate need, demand and costs for bicycle projects.
- Develop a protocol for Central Office support of district staff on all bicycle related projects, including support for regional and local outreach.

Lessons for Implementation:

Mississippi River Trail Bikeway

The Mississippi River Trail (MRT) is a designated national bicycle route that provides a unique bicycling experience along the length of the Mississippi River through ten states from the headwaters at Lake Itasca in Minnesota to the Gulf of Mexico. In Minnesota, the MRT is approximately 800 miles, passes through nearly seventy cities, twenty counties, ninety townships, and two reservations and tribal lands. MRT connects to eight state parks, three state trails, ten regional trails, and one national park.

MnDOT convened the various local, regional, and state road and trail authorities and other stakeholders to establish the route and begin building a collaborative partnership for implementing, marketing, and maintaining the MRT. MnDOT's comprehensive approach to collaboratively establishing and implementing MRT earned MnDOT the 2012 Planning Innovation Award from the Minnesota Chapter of the American Planning Association and the 2013 National Achievement Award for Transportation Planning from the American Planning Association.

Project/Route Prioritization

- Refine and clarify route prioritization criteria identified in the MnDOT Bicycle Modal Plan.
- Identify regional and district priorities and coordinate with statewide network goals.
- Consider requiring cities over a certain size to develop and maintain a bicycle plan.

Facility Selection

District staff are interested in consistent information to support facility selection in line with MnDOT policy. Many suggestions could be accommodated with expansion and refinement of the current Bikeway Facility Design Manual.

- Clarify potential bicyclist user types and facilities that support a diverse range of users.
- Develop/refine a facility selection tool to support decision making. Include information that includes contextual guidance such as ADT, posted speed and likely users.
- Develop clear metrics or standards related to routine integration of facilities. This should directly address and coordinate with identification of an exception to adding bicycle facilities.
- Further clarify all road design and maintenance policies with regard to bicycles, such as rumble strip policies and mill and overlay project guidelines.
- Identify design issues associated with ADA compliance and best practice.
- Clearly articulate connections to Complete Streets policy and design guidance.
- Provide training and outreach associated with design updates to ensure district staff feel confident using the tools.

Connectivity

- Identify a fully connected system statewide. Include both the Trunk Highways system and primary connections at the local level. Consider the MRT route establishment and implementation process as a model for identifying state bikeways and candidates for the emerging USBRS.
- Evaluate existing roadways and current bikeway accommodations.

- Establish a desired level of service or level of separation for bicycles based on roadway classification.
- Develop both statewide and district bikeway maps.
- Develop a database that provides information about local and regional level bikeway planning to district staff and allows local jurisdictions to access information about state and regional priorities. The statewide Cycloplan tool currently being developed by MnDOT provides an opportunity to implement this recommendation.

Funding

- Provide dedicated funds for bikeway improvements.
- Develop a funding strategy for development of a connected system over time.
- Provide a flexible cost participation policy (not just 0% or 100%)
- Explore cost sharing options with local jurisdictions for bikeway development.
- Provide clear guidance on which funding streams can support bikeway projects.

Maintenance Responsibility

- Clarify the division between state and local responsibilities, especially for on-street bikeway facilities.
- Consider bikeways as a routine inclusion in all mill and overlay projects. Engage the public and Central Office in early stages of planning for mill and overlay pavement preservation projects.

IMPLEMENTATION PRIORITIES

The prioritizing recommendations survey identified recommendations with broad agreement between district staff, the PAC and the Policy TAC. Although the survey results have their limitations, the recommendations with broad agreement represent a consensus position among the participant groups, and all that remains is assigning the agreed-upon priority to the policy, and moving it forward in implementation. The highest priority recommendations for all three participant groups are:

- Assistance in prioritizing investments: Provide tools to analyze cost/benefit of proposed bicycle projects; document before and after bicycle level-of-service; develop a district-wide bicycle plan to understand where connections to the existing and planned regional and local bikeway systems are needed as well as prioritized routes and projects
- Agency and partner coordination: Enlist the assistance and participation of the Regional Development Councils in bicycle planning; encourage MPOs to identify priority bicycle routes; encourage local partners to develop comprehensive bicycle plans
- Develop prioritization tools: Create a comprehensive bicycle planning and design toolbox; develop a methodology to rank high-priority corridors and identify projects of regional significance
- Work with the public and local partners to identify priority corridors and gaps in the bikeway system
- Identify an interconnected bikeway system for each district
- Identify priority projects to be implemented in the bikeway system plan
- Allow local jurisdictions and partners to contribute toward bicycle facility additions on State right-of-way
- Provide internal guidance and clarification on how MnDOTs bicycle policies apply to pavement preservation projects, such as mill and overlay

The prioritizing recommendations survey also identified recommendations with strong disagreement between district staff, the PAC and the Policy TAC. Although the survey results have their limitations, the lack of consensus among participant groups may indicate that the recommendation is unlikely to be implemented due to existing information, knowledge and/or attitude under which members of each group are operating. This condition of conflicting prioritization can highlight where potential conflict, blocking, or loss of support may occur over the long term if MnDOT moves forward in making policy

choices without first working to develop a foundation of common understanding among parties. The policy areas with strong disagreement (at least one group ranked it high while at least one group ranked it as a low priority) include:

- Make Central Office Bike/Ped Unit a One Stop Shop for all bicycle-related documents and contacts: Collection of local bicycle plans; list of communities with Complete Streets policies; tools for determining bicycle and pedestrian demand; crash data for projects; process and design guidance including low-cost easy-to-implement projects tied to a cost/benefit tool.

Interpretation: The PAC and Policy TAC both rated this as a low priority while the District ranked this high - this might be interpreted as the Districts expressing a desire for a centralized and accessible resource to support their bicycle and pedestrian work. PAC and Policy TAC members, most of whom do not work in a district, might not perceive this need as clearly.

- Apply prioritization tools: Apply toolbox and methodology to rank projects based on cost/benefit demand/usage safety aspects and usefulness to various types of users.

Interpretation: The PAC and Districts both rated this as a high priority while the Policy TAC ranked this low. District staff, and the majority of PAC members, are current MnDOT employees, who might be keenly aware of existing needs and practices within MnDOT, while Policy TAC membership, which includes a greater portion of non-MnDOT participants, might be less familiar with existing conditions within MnDOT. This policy can be read to express some dissatisfaction with MnDOT follow-through of directives already on its manuals - PAC and District participants are reiterating the need to apply the tools that they are also recommending be developed.

BICYCLE DATA AND MAP RECOMMENDATIONS

Public comments on the statewide bicycle map indicated that the existing data displayed on the map was inaccurate; therefore, a systematic process for transmitting, reviewing and refining the data is needed. On an annual basis, MnDOT's Data Systems and Coordination Section and the Geographic Information and Mapping Section have been working together to solicit updated roadway data from all counties and certain cities. There is an established process and resource list for this annual data update. Since roadway surface material, shoulder width and controlled access data are characteristics of roadways, it is recommended that these additional characteristics be included in the annual data update request (referred to as the "annual status update" by MnDOT) and go through the same process as other attributes of the roadways are updated. This recommendation is already being implemented. MnDOT's 2013 annual status update includes a copy of the statewide bicycle map for counties and cities to review and correct. Additionally, the statewide bicycle map is being sent to each MnDOT district, Regional Development Commissions, and Metropolitan Planning Organizations for review and corrections.

In addition to existing roadway data, the Data Systems and Coordination Section will establish a new data set to host the inventory of the on-road and off-road bikeway facilities and designated bicycle route overlays. This new data will have a similar geographic information system (GIS) format as the roadway data maintained by the MnDOT Section so that all data stays compatible. This new data can be stored, updated and distributed in exactly the same way as the existing roadway data. For example, when the bicycle data is determined to be fairly comprehensive statewide, it can be added to the data catalog downloadable from the MnDOT base map website. It can also be permanently linked to the roadway data and used to eventually-replace the data mapped on the Minnesota Bicycle Map. Since the roadway related part of the data is a direct reflection of the original roadway data, it can be mapped with the same symbol sets in the same categories.

There are many resources that could supply supplementary information regarding local bicycle facilities, supportive facilities and points of interest. There are many opportunities to utilize them through multimedia means to support the convenience of bicycle usage throughout the state.

To meet the requirements of Minnesota Statute 160.265, it is recommended that the officially developed, maintained and distributed GIS data obtained through MnDOT's status update process and displayed on the Minnesota Bicycle Map serve as the Bikeway Registry. The data collected through the status update process and displayed Minnesota Bicycle Map can continue to evolve as additional data becomes available. For example, when additional routes are designated as state bikeways or as USBR the designations should be included in the data and displayed on the Minnesota Bicycle Map.

PERFORMANCE MEASURES

The recommended performance measures are guided by the performance measure principles in the SMMP, the strategies being considered in the MnSHIP planning process, and research. The measures are proposed to be classified into three major categories: encouraging bicycling, enhancing safety, and improving access. From these categories, three primary topics for performance measurement and associated targets are recommended as follows:

Category	Topic	Recommended Performance Measure Language
Encouraging Bicycling	Usage	Increase bicycle mode share to X percentage by 20XX
Enhancing Safety	Safety	Reduce bicyclist crash rate to X percentage of bicycle trips by year 20XX
Improving Access	Assets	Increase the miles of the statewide priority network that meets specified criteria for bicycle transportation to X percentage of the total network by 20XX

To work towards establishing the performance measures, the first task is for MnDOT to institutionalize the data collection necessary for deriving the performance measures. This process may be similar to how MnDOT currently organizes data collection for motorized vehicles. The FHWA also provides a recommended process in Chapter 3 of their Guideline for Traffic Monitoring. General steps includes:

1. Review existing data collection processes to assess what MnDOT and other potential partner agencies are currently obtaining.
2. Develop an inventory of the data needed for the performance measures. This inventory should include information about resources allocated toward the performance measure goals and the agencies and organizations responsible for collecting and interpreting the data.
3. Formulate a methodology to collect and assess data. This step should include quality control measures, such as how to flag erroneous data and address data gaps.
4. Identify monitoring needs and a methodology for evaluation. In addition to equipment needs, MnDOT can explore collaboration with partner agencies.
5. Develop an overall framework for implementation, including specific plans for data collection, modeling, data interpretation and timelines.

The performance measures build on one another, which helps to define a logical order for implementation. First, the total numbers of bicycle trips must be counted in order to calculate bicycle mode share for Performance Measure #1 (Usage). The total number of bicycle trips then becomes a baseline metric, against which bicycle accident data is compared in Performance Measure #2 (Safety).

Performance Measure #3 (Assets) will require the most work before it can be implemented. MnDOT must define the extent and location of the statewide priority network, and outline a framework to address route improvements, maintenance issues, and changes. Once the initial planning process is underway, MnDOT will need to define the specified criteria the facilities along the network should meet. The criteria can be used to analyze and refine the initial statewide network identified. The MRT route establishment process can serve as a model as an initial route was identified and then MnDOT collaborated with stakeholders to identify and apply route selection criteria to finalize the MRT. After the network is established, MnDOT can begin the process of ongoing data collection to assess and monitor the conditions of the statewide priority network.

Once the initial data for each measure is obtained, MnDOT will need to establish the baseline conditions (e.g., where are we now) and performance goal targets (e.g., where do we want to be) through its established procedures and consistent with its guidelines. The upcoming Statewide Bicycle Policy Plan project provides an opportunity to engage MnDOT staff and its partners in setting the performance targets for the future.

Next Steps

While the integration of bicycling into MnDOT's day-to-day business has advanced as a direct result of the Study, there is much work to be done in the future. The next phase of the Study will be the Statewide Bicycle Policy Plan (Plan). The scope of work for the Plan is a direct result of the findings and recommendations from this Study, and is likely to lead to implementation of the top recommendations from MnDOT staff, partners, and the public. The Plan will include the following major initiatives:

- The Statewide Bicycle Policy Plan will provide a framework for developing performance targets and guidance for developing District Bicycle Master Plans
- A Bicycle Master Plan will be developed for each of MnDOT district
- Education and outreach will assist MnDOT staff with effectively collaborating with bicycling partners through a holistic approach

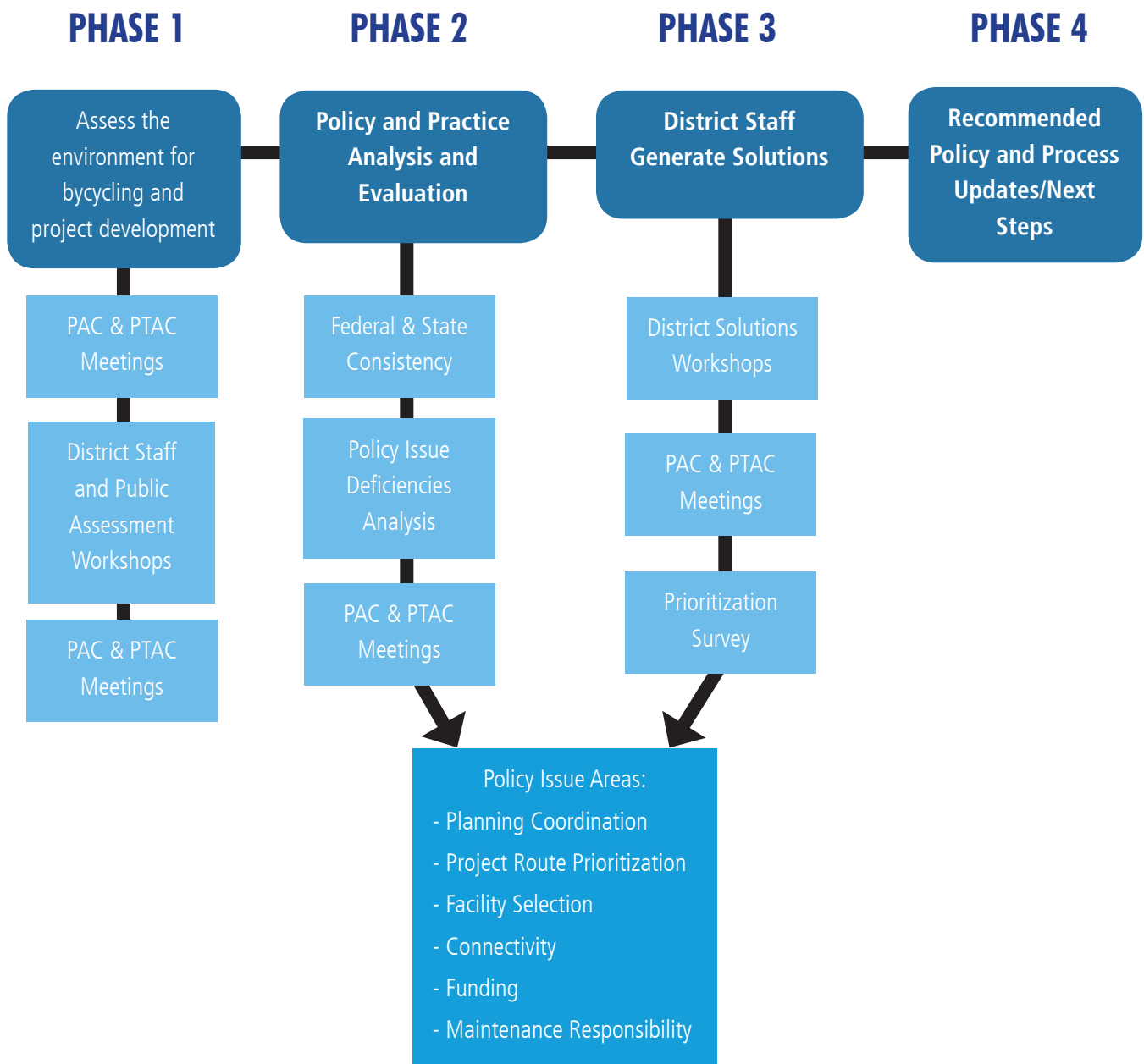
Chapter 1

POLICY AND PRACTICE ANALYSIS

A significant goal of the Study was to understand how effective existing policy and design guidance for bicycles is in directing development of bikeways throughout the state. MnDOT's examination of bicycle policies and procedures has been a four-phase process. This process sought to document where policy and guidance can be refined to better support routine integration of bikeways into the broader multimodal transportation network.

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Policy and Practice Analysis Approach Summary



Phase 1: Assessing the environment for bicycling and project development

In Phase 1, the Central Office staff and the consultant team sought to understand how high-level policy was being interpreted at the local level through 'on the ground' bikeway development. In January and February 2012, the Bicycle and Pedestrian Section staff and the consultant team kicked off the Study by convening meetings with the he Study's Policy Advisory Committee (PAC), Policy Technical Advisory Committee (Policy TAC) and Data Technical Advisory Committee (Data TAC) as well as engaging the State Non-Motorized Transportation Advisory Committee (SNTC). The purpose of the series of meetings was to introduce the Study goals, generate ideas for the Study's major initiatives and identify issues that MnDOT can address in order to better incorporate bicycling into its day-to-day business. The advice gathered from these advisory committees was used to refine the approach to assessing the environment for bicycling and project development.

DISTRICT STAFF ASSESSMENT WORKSHOPS

A major goal of the Study is to understand the needs of MnDOT district staff regarding effectively incorporating bicycling into their projects. Meeting the needs of the eight districts is a priority, as district staff is in charge of project initiation and delivery.

The first round of district staff outreach was conducted between February 28 and March 15 of 2012. A total of eight workshops were held: one meeting was convened within each of the eight MnDOT districts. Nearly 80 district staff participated and over 500 comments were received. Prior to the district workshops, consultant team members conducted interviews with the Central Office staff from the Bicycle and Pedestrian Section, as well as district staff members in order to gain a perspective prior to engaging the district staff in a workshop setting.

At each workshop, an introductory presentation was first shared with participants, providing an overview of the purpose and goals of the project, and including a brief video introduction by the MnDOT Commissioner. Following the presentation, workshop participants were guided through a SWOT (Strengths, Weaknesses, Opportunities and Threats) exercise where they assessed bicycling-related facilities, policies and issues in their respective districts and the state overall. Comments were recorded on Post-It notes and posted on the wall for their colleagues to view and comment. Following the



MnDOT Bicycle Planning Study	Totals	All Districts			
District Workshops		Participants: 80			
		S	W	O	T
Funding - infrastructure	96	8	14	12	62
Policy/Guidance	81	18	39	21	3
Coordination- external	75	31	12	24	8
Coordination - internal	44	32	6	2	4
Network - Develop/encourage	28	4	11	13	0
Emphasis on off-road system	23	10	8	1	4
Funding - maintenance	23	2	10	2	9
Design	17	6	8	1	2
Mapping	17	1	6	7	3
Safety concerns about bikes on road	14	1	4	3	6
Planning	11	1	5	1	4
Education – public	10	0	7	3	0
Bikeways on paved shoulders	8	2	1	5	0
Bikes don't pay their way	7	0	0	0	7
Encouragement!	6	2	1	3	0
Rural living negates utility of cycling	6	0	6	0	0
On-street design!	5	0	0	4	1
ROW limitations	4	0	1	0	3
Health!	3	2	0	1	0
Lack of Demand	3	1	0	0	2
Policy - Complete Streets	3	0	1	2	0
Education/Training - MnDOT	2	0	0	2	0
Operations – maintenance	2	0	2	0	0
Transportation options!	2	2	0	0	0
Backlash (from community)	1	0	0	0	1
Bike Parking	1	0	1	0	0
Different types of cyclists	1	0	0	1	0
Lack of community support	1	0	1	0	0
Safety equipment	1	0	1	0	0
Total Comments	495	123	145	108	119

exercise, participants worked in small groups to organize and categorize their responses. The categories were developed by the participants, and were then ranked by them in order of importance or relevance.

After the workshops, all district staff comments were grouped into common themes in order to identify the frequency of similar comments that were noted within each district and the state overall. The summary matrix shown in the sidebar provides a list of the common themes derived from district staff comments. In order to provide an idea of the most common concerns, the themes are sorted by frequency (totals) and a breakdown of the comments by S (Strengths), W (Weakness), O (Opportunities) and T (Threats). The theme most frequently mentioned by all the districts was Funding – Infrastructure, with a total of 96 comments and 62 of these comments were classified as T (Threats). Policy/Guidance followed with 81 comments, and then Coordination – External with 75 comments.

In general, throughout most of the district offices, there appeared to be a need for clarification of what it means to integrate bicycles within the transportation system, particularly from the federal policy perspectives that have been in place since the early 2000s.

United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations (3/2010):

“The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.”

The most frequent mention of ‘Bicycle Accommodations,’ particularly in the Greater Minnesota districts, was focused on working with local trail agencies to accommodate new trail crossings or improve existing crossings. These efforts are extensions of the districts’ commendable efforts at external coordination, which is also a topic noted in the matrix. Some districts are routinely incorporating accommodations within the roadway, such as bicycle lanes, to provide a connection between local trails.

In the Greater Minnesota districts, external coordination was primarily with trail groups and with bicycle advocacy groups. Bicycle advocacy groups are not well established in these regions.

District staff expressed a desire for clarification about when to accommodate bikes in a project. What seems to be very unclear is the 'trigger point' for when district staff should consult the MnDOT Bicycle Facility Design Manual for designing accommodations. A general observation is that bicycle accommodations occur primarily only when requested by partner organizations and/or advocates, or if they are included in a locally adopted bicycle or transportation plan. Often, these plans are not in place or are unknown to district staff, and therefore, accommodations are not typically considered or provided by MnDOT.

An issue that was raised at many district staff meetings is how districts plan and implement resurfacing projects. In past years, resurfacing projects have typically bypassed the public involvement process with the premise that MnDOT is only resurfacing the road - not repurposing it - so there was little need for public outreach. In recent years, bicycle advocacy organizations around the nation have received extensive training and education aimed at the value of identifying local resurfacing projects. These groups are taught to review annual or multi-year highway programs, and as soon as resurfacing projects appear, they are flagged for potential opportunities for fairly low-cost bicycle accommodations. This is a relatively new activity, but since the district staff typically have not been required to do public outreach for resurfacing projects, when they are approached by local organizations they can be unprepared for an adequate response.

Further, district staff are seeking clarification over what the upcoming Complete Streets policies and guidance will mean to the regions. District staff are looking forward to further direction on how to evaluate upcoming roadway projects. The results of the workshops have been shared with MnDOT staff working on implementing the Complete Streets policy.

The issue of funding was the most common comment. Staff noted the challenge of having limited funding for the many roadways that need maintenance/improvements and that the existing challenge becomes greater when adding on the cost of bikeway facilities. Comments noted the value of Transportation Enhancement funds and other sources to pay for trails and bikeway facilities. However, the majority of comments were categorized as Threats, and expressed concern about adding other obligations into the roadway funding mix. Establishing a dedicated source of funding for bikeway facilities was noted as an Opportunity.

A number of comments indicated a need for district staff to understand the types of facilities that are appropriate for different types of bicyclists. As an example, some district staff expressed concern about the safety of allowing





bikes within the roadway. As noted by several district staff, training would be most beneficial. Since several of the districts have been leading the field in bicycle accommodations (both on and off-road) for years, their expertise could provide an excellent opportunity for cross-district training.

Overall, the workshops provided an excellent opportunity to obtain a comprehensive understanding of the workings and attitudes of each district. More importantly, the workshops provided valuable information about district staff needs, information and process gaps, and what can be done to help fill those voids. This information will allow the state to move forward in assisting the district staff in more effectively integrating bicycles in the transportation system.

The district workshop results are documented in the REPORT: DISTRICT WORKSHOPS - MnDOT STATEWIDE BICYCLE PLANNING STUDY (Appendix A).

PUBLIC ASSESSMENT WORKSHOPS



In addition to engaging district staff, the first round of public meetings was conducted between February 28 and March 29 of 2012. A total of ten meetings were held: one public meeting was convened within each of eight MnDOT districts located in Greater Minnesota; two meetings were held in MnDOT's Metro District; and a web-based meeting was held on March 22 to provide an additional opportunity to participate to those members of the public who were unable to travel to the in-person workshops. Approximately 300 people participated and nearly 1,800 comments were received.



An introductory presentation was first shared with participants, providing an overview of the purpose and goals of the project, and including a brief video introduction by the MnDOT Commissioner. Following the presentation, workshop participants completed a SWOT (Strengths, Weaknesses, Opportunities and Threats) exercise focusing on bicycling-related facilities and policies in the state. Following the exercise, participants worked in small groups to organize their responses in themed categories. The themes, which were developed by the participants, were also ranked by them in order of importance or relevance.

The comments received were distributed across six general categories including community and education, policy and planning, laws and enforcement, coordination and partnerships, facilities and network, and funding and economics. "Facilities and network" was the most frequent category for

the comments received, followed by “Policy and planning” and “Community and education.”

Below is a brief summary of SWOT categories compiled on a statewide basis:

Strengths

Minnesota’s existing bicycle infrastructure was widely recognized as a great strength and asset. In addition, progressive planning policies and a strong cultural recognition of bicycling as a fun, practical, and family-oriented activity were consistently noted as assets in the workshops. Coordination and partnerships across organizations, laws and enforcement, and dependable funding for bicycling were not as often recognized as strengths.

Weaknesses

Consistently across most districts, Minnesota’s facilities were also noted by participants as a prominent weakness. Many of these comments referred to gaps or lack of connectivity in existing networks hampering the potential usefulness of these facilities. In addition, there were frequent concerns about inadequate shoulder space, poor maintenance, and presence of rumble strips creating hazards for bicyclists. Planning practices and policies were also listed as a significant weakness, for example, when failing to provide safe space for bicyclists when planning or reconstructing a roadway.

Opportunities

Participants recognized opportunities to improve bicycling in Minnesota across all of the categories provided - but especially so (and fairly evenly divided) among “Community and education” (for example, by encouraging community rides or “Open Streets” events, or by sharing information on bicycling as a legitimate transportation option); “Coordination and partnerships” (for example, by coordinating development of trails and routes across agencies or jurisdictions, or by securing agreements for maintenance of facilities); “Policy and planning” (for example, by taking a leading role in identifying and addressing system gaps, or by increasing flexibility in roadway standards in lower-speed urban settings); and “Facilities and network” (for example, by increasing the number of route miles, by increasing user comfort on existing facilities, or by improving signs, wayfinding and amenities serving on- and off-street routes). An additional set of opportunities, mentioned consistently across meetings, dealt with the economic development and tourism potential that a robust and connected system could provide.





Threats

Lack of funding was consistently mentioned as an important threat - both to the development of new facilities and to the proper maintenance of the existing system. "Policy and planning" was also often mentioned as a potential threat, with concerns about transportation investment policies which may not adequately recognize bicycling as a legitimate transportation investment. Interestingly, "Community and education" was also often noted as a potential threat, with many concerns centering on a lack of general awareness and acceptance of bicycling as a legitimate form of transportation and focus of investment.

The workshop results are documented in the REPORT: PUBLIC WORKSHOPS – MnDOT STATEWIDE BICYCLE PLANNING STUDY (Appendix A).

Phase 2: Policy and Practice Analysis and Evaluation

The requirements to integrate bicycling into Minnesota's transportation system have a clear basis in both state and federal law and policy. A significant goal of the MnDOT Statewide Bicycle Planning study is to understand how effective existing policy and design guidance for bicycles are in directing development of bikeways throughout the state.

The results of the outreach workshops and subsequent summary reports provided a clear framework for which to review the role and understanding of existing policy guidance for bicycles in the state transportation system.

In order to understand the breadth of existing guidance related to bicycles, the Central Office staff and the consultant team compiled USDOT federal laws and policy, Minnesota State Statutes, Administrative rules, and internal MnDOT policies related to bicycle project and program development in the state. The compiled policies were reviewed first for any notable inconsistencies in federal and state guidance and policy regarding bicycles. This high level policy analysis was followed by a review of gaps and inconsistencies through the lens of challenges and opportunities for project initiation and delivery that were identified during public workshops and MnDOT district staff workshops.

SUMMARY OF MNDOT'S CONSISTENCY WITH FEDERAL AND STATE POLICY DIRECTION

Federal level guidance is clear in the intent to support the development of a connected multimodal transportation system including bicycles. The federal policy guidance issued in 2010 clarifies that routine integration includes all aspects of planning, designing, and maintaining the transportation network.

The State's policy language does not contradict Federal guidance. In general, state policy and planning guidance parallels Federal direction and provides the same framework for integration of bicycle facilities. However, State policy language could be strengthened to reduce ambiguity regarding the responsibility of MnDOT staff to comprehensively address bicycles in project planning. In multiple districts throughout the state, the general public and district staff noted that while the state is clearly supportive of bicycles, the



Photo Credit: Explore Minnesota Tourism



primary gap and inconsistencies are in the transitions from policy to on-the-ground implementation. The policy analysis confirms that the high level policy language and planning guidance are not resulting in a clear framework for integrating bicycles in the transportation network.

Federal policy clearly encourages states (DOTs) to go farther and provide bicycle accommodation and integration within the roadway. The Federal intent for states is to provide appropriate bicycle facilities as a matter of course, rather than as the exception, even when it requires going beyond a minimum design standard.

Current bridge policies in the state (Trunk Highway Bridge Improvement Program Minn. Stat. § 165.14) require MnDOT to provide bicycle facilities, unless an alternative is available within direct proximity, or a formal study shows no potential bicycle demand. This strong policy outlines a clear process where provision of bicycles is the default action rather than additive.

While the bridge policy clearly outlines a process for integrating bicycling in projects, much of the policy language, planning and design guidance for roadways does not provide this same clear mandate to routinely integrate bicycle facilities, except where the exception is proven. MnDOT staff indicated during workshops that they are generally clear on the intent of policy directives, but do not feel that they have the detailed guidance to know how and when to meet the intent of integration as outlined in Federal and State policy.

For example, additional information gathered during outreach efforts indicates that bicycle accommodation is most often completed through development of trails. While these paths are a significant asset to bicyclists, the provision of paths is not meeting the intent of routine integration of bicycling in the greater transportation network. Both the public and district staff noted that the focus on trail development is resulting in a disconnected network. Districts have also been incorporating 8-10 foot wide shoulders in new and reconstructed roadways as a routine matter. While this is not typically done to specifically accommodate bicycles, in many cases this facility is the appropriate level of integration for bicyclists in the highway system. Design guidance regarding the connections and appropriateness of facilities is not well connected to planning and policy guidance that indicates the needs and desire for the facilities.

In sum, State and Federal policies are clear in their intent. MnDOT currently implements some facilities such as trails and wide shoulders; however, this is not always done strategically or consistently. Therefore, gaps between policy objectives and implementation practice remain.

KEY GAPS/INCONSISTENCIES IN IMPLEMENTATION

While high-level policy supporting bikeway development appears clear in intent, district staff noted key challenges or gaps in direction for implementation of bikeways throughout the state. All districts noted, to some extent, that routine integration of bicycle facilities is not the default action in project development. While each district emphasized different issues, clear themes emerged as barriers to routine integration. The team identified six core issues where clarification of policy or guidance could better support consistent project development at the district level: project/route prioritization, facility selection (when and how to develop facilities), planning coordination, maintenance responsibility, connectivity, and funding.

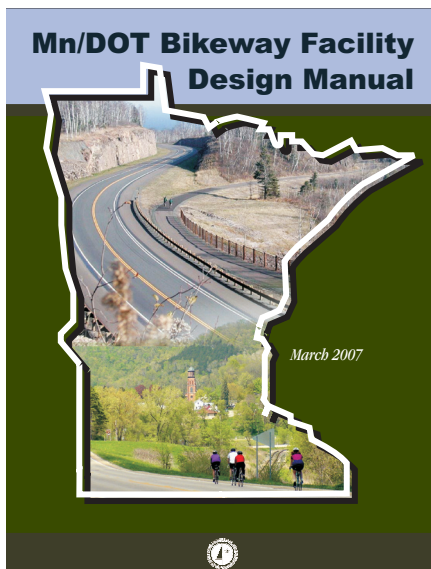
The following section summarizes the six core policy issue areas: project/route prioritization, facility selection – when and how to develop facilities, planning coordination, maintenance responsibility, connectivity, and funding. Note that they are not presented in order of priority or emphasis.

Project/Route Prioritization

MnDOT staff noted a lack of clear guidance on prioritization of investment in bikeways. This issue is connected to a broader concern about coordination with other planning processes, overall network connectivity and funding. State Statutes (Bikeway Program Minn. Stat. § 160.265) confirm that MnDOT should provide a coordinated system of bikeways within the road right-of-way. The bicycle programs call for “the development of bikeways primarily on existing road rights-of-way”.

Existing planning and statutes documents, such as the MnDOT Bicycle Modal Plan, outline some general guidance for prioritization of bikeways in urban areas and on the designated Scenic Bikeways System. However, current policy direction does not provide for prioritization of a connected network or significant network links. MnDOT staff and the public noted that while the stated priorities for serving population centers is important, the guidance falls short of providing clear priorities for a connected system throughout the state to serve multiple types of bicyclists and transportation needs. There was little mention of the Scenic Bikeways System at the district level, indicating an opportunity to redefine a connected system throughout the state that has been vetted amongst MnDOT staff, and other partners.





Facility Selection - when and how to develop facilities

MnDOT staff were concerned about a lack of clarity about when they should (or must) accommodate bicycles with an enhanced facility. For example, existing statutes and planning guidance refer to exceptions to provision of bicycle facilities due to sparse population or only where 'use levels warrant'. There is little information provided to the district staff to define these phrases in context.

MnDOT staff in some districts also indicated a preference for providing separated facilities due to traffic volumes and speeds on trunk highways. However, staff also noted again that a clear and concise framework to select appropriate facility types for all roadways in the state is not available in existing guidance.

MnDOT staff are looking for policy and guidance to have clear 'trigger points' or warrants that determine when to include a bicycle facility, as well as what to provide. Existing Federal and State policy direction indicates that this should be framed as a question of when to exercise the exception – since bicycle integration should be considered as a matter of process in all projects where they are not legally excluded.

USDOT's March 2010 refined Policy Statement recommends that States adopt policies to improve non-motorized facilities during maintenance projects. Another consistently overlooked opportunity for providing low-cost bicycle facilities within the roadway footprint has been 'mill and overlay' projects. Historically, these projects were considered pavement preservation and so they were exempt from much of the public outreach and planning coordination required for reconstruction projects. Increasingly, well-organized bicycling groups have been made aware that mill-and-overlay projects represent opportunities for low-cost bicycle facilities in their communities, and have been pressuring district staff to consider reconfiguring roadway lane striping to better integrate bicycling. This pressure, typically late in the project development phase, has caused delays in project implementation. This is a good example of how district staff are lacking guidance on how bikeways can be implemented for minimal cost, but also why expanding outreach efforts to maintenance projects could help district staff resolve this problem.

Overall, MnDOT staff requested clearer guidance for integrating bikeways. Existing guidance needs to be revisited to better clarify that bikeways should always be considered, when exceptions apply, and how to select the best facility for the context of the roadway and potential demand.

Planning Coordination

Local communities are planning, designating and developing bicycle facilities within their jurisdictions. MnDOT staff noted that they are often unaware of existing or planned bicycle facilities in local and regional plans. In addition, they may be unaware of long term planning efforts that call for integration of bicycles on state facilities as part of the locally planned network. The Bikeway Program, MnDOT Bicycle Modal Plan, Minnesota Statewide Transportation Policy Plan and others call for a coordinated approach to building regional and statewide bicycle systems. However, MnDOT staff noted no clear mechanisms or existing comprehensive data were available that supports development of a regional network.

Maintenance Responsibility

MnDOT has been actively participating in development of trails in cooperation with MnDNR and local jurisdictions for many years. MnDOT staff are concerned about the long term commitments for maintenance of the facilities over time. Maintenance concerns are tied directly to funding, coordination and safety concerns. Both MnDOT staff and the public noted concerns about maintenance for all-weather bicycling. Bikeway maintenance policy in the state is limited to guidance regarding responsibility for maintenance and local cost participation. Multiple districts noted that the policies seem to be applied inconsistently or appear to be changing.

Connectivity

Development of a disconnected network was a significant concern for MnDOT staff. The current planning and project development framework has resulted in piecemeal development of bikeways in some areas of the state. District staff and the public noted concerns about the utility of these isolated facilities. Clearly, a network of disconnected bikeways does not meet the intent of the federal and state policy. Planning, coordination and prioritization of a network are key elements for development of a statewide-connected network. Again, the Bikeway Program, MnDOT Bicycle Modal Plan, Minnesota Statewide Transportation Policy Plan and others call for a coordinated approach to building regional and statewide bicycle systems. In some districts, staff noted that they are hopeful that forthcoming Complete Streets guidance might help clarify where to prioritize bicycle facilities. Meeting the directives for a comprehensive regional approach to bikeways planning in the state should improve connectivity and district-level prioritization of bikeways.





Photo Credit: Explore Minnesota Tourism

Funding

Funding was an overwhelming concern, throughout the districts, for realizing a connected network - related to both construction and ongoing maintenance. Funding for bikeway facilities was seen as coming primarily from additive sources, such as competitive grants, rather than an integral part of the budget for roadway improvements. This is partially attributed to many existing bikeway assets being trails that are not integrated with the existing roadway pavement. District staff were concerned that the Complete Streets policy and requirements would burden existing highway budgets.

CONCLUSION

The analysis found that MnDOT's current policy and planning guidance regarding bicycles is robust. In general, policy and planning efforts are supportive and consistent with meeting Federal funding responsibilities. This point is worth reiterating. USDOT and FHWA clearly state that bicycling is intended to be an integral part of the transportation system. The intent is to use Federal transportation funds to help build a system that provides transportation choices to citizens, and these choices clearly include bicycling and walking.

Implementation practices, however, are not leading to a connected and consistent transportation system for bicycles. District staff and stakeholder feedback provided during outreach workshops suggests that routine integration of bicycle facilities is not the default practice in project planning. Within policy and planning guidance, there is a notable lack of clear and comprehensive bicycle system and investment planning. This gap in information leaves a void for district staff to integrate policy intent directly into action and project development.

There are a number of opportunities identified to strengthen language in existing policy and guidance. In addition to stronger policy, it may be beneficial to provide a summary of existing and new guidance as a tool that can be used by engineers and planners to address safety concerns and integrate a wider range of bicyclists on the state's roadways.

District staff indicated that a comprehensive bicycle system plan, that can be easily updated, would support implementation and help clarify priorities. A statewide system plan would allow district staff to identify connections and planning coordination needs in early project initiation.

Consistent funding allocation from the transportation budget for bicycle projects has been low in the state overall. Funding was noted as both a strength and a weakness for bicycle planning in the state. The ability to access funds through Transportation Enhancements and other competitive funding sources has historically been a significant source of funding for bicycling. However, the common reliance on additive funds (i.e., funding from competitive grants, rather than funding from the roadway improvement budget) to provide bicycle facilities tends to undermine the principle that bicycle travel is an integral part of the transportation system. This approach does not provide the consistent funding needed to engage in routine integration in all project planning, particularly for bicycle facilities within the highway footprint.

The new Statewide Multimodal Transportation Plan provides an opportunity to address challenges for implementation of bicycle facilities in the State. The guiding principles outlined in the plan support the intent to integrate bicycles in the transportation system. The implementation of the GO Plan can be the framework for clarifying policy objectives and enhancing policy language, identifying lower cost high benefit bicycle asset investments, training and guidance that will help support integration of bicycles and meeting statewide multimodal transportation system goals.

The analysis is documented in REPORT: EVALUATION AND ANALYSIS OF INCONSISTENCIES IN POLICY AND PRACTICE (Appendix B). The report includes a summary of each policy issue area with corresponding existing policy language and noted deficiencies or comments relevant to routine integration in a matrix. Because of the close association between many of the themes, the tables consolidate into the following categories:

1. Planning Coordination: planning, prioritization, and connectivity
2. Implementation: Facility Selection
3. Maintenance and Funding



Phase 3: District Staff Generate Solutions

Central Office staff and the consultant team engaged district staff, the PAC, and the Policy TAC to develop recommendations to address the issues raised in Phase 1 and Phase 2. Engagement activities included a second round of workshops with each district, meetings with the PAC and PTAC, and developing a survey to allow the project team to receive priorities and guidance from MnDOT stakeholders. These engagement activities along with lessons learned from Minnesota's first state bikeway and first route in the USBRS (e.g., the Mississippi River Trail Bikeway) led to the policy and practice recommendations presented in this chapter of the Study.



DISTRICT STAFF SOLUTIONS WORKSHOP

A second round of district staff workshops were conducted in September and October. Information on what was learned from the first round of public workshops, district staff workshops, and policy evaluation and analysis was shared. Given that Phase 2 revealed that the key deficiency was translating policy into action at the project level, these workshops focused on identifying opportunities for improving process. Each district participated in a workshop-style meeting where Central Office staff and consultants gathered suggestions from district staff for improvements to process as well as products (such as design manuals and demand models) and guidance they needed in order to simplify and improve the process of integrating bicycle travel into the state's transportation network.

The following provides an overview of the recommendations identified by district staff within each of the six core policy issue areas.



Planning Coordination, district staff suggested:

Scoping: Changes to their internal processes to enhance the bicycle-related information collected during the scoping phase of a project. Changes included expanding on the bicycle-related section in the scoping form, creating a scoring mechanism to assist in prioritizing projects, creating a project planning checklist, and incorporating a bicycle-related SWOT (strengths, weaknesses, opportunities, and threats) analysis. Also, they suggested clarification on how to define "purpose and need" for bicycle facilities, and establishing a rule or policy that bicycle facilities must be considered or incorporated in new construction and preservation projects. Finally, encouraging field site-visits by bicycle during the scoping phase was suggested.

Early Notification Memo (ENM): Enhancing the ENM to include more bicycle-related coordination; providing ENMs on all projects, not just major construction; providing ENMs earlier in the process in order to ensure adequate planning, and finally, ensuring a feedback loop to facilitate follow-up.

Project Planning: Documenting bicycle level-of-service based on existing conditions and proposed improvements; not excluding bicycles from short-term projects; and changing approach to “if not providing for bicycles, explain why.” Also, providing tools to assist with prioritizing investments, including a methodology for analyzing cost/benefit of bicycle projects.

District staff felt that enhancing outreach and engagement efforts with local partners and other stakeholders was critical, as was ensuring that outreach was done during the early planning phases.

Many district offices suggested that they needed a district-wide bicycle plan, so that they could understand where connections to the existing and planned regional and local bikeway systems were needed, as well as prioritized routes, priority projects, etc. This plan should include existing shoulder widths to show the location of existing bike-able roadways.

Coordination between district staff and Central Office staff: District staff encouraged creation of a one-stop-shop resource for bicycle and contact information located in the Central Office. This shop could collect local bicycle plans, maintain a list of communities who have adopted Complete Streets policies, provide a mechanism to assist in determining bicycle and pedestrian demand, provide crash data for projects, and provide process and design guidance.

The Central Office could keep closer track of project development, could assist with public outreach efforts, and provide a list of low-cost, easy-to-implement projects tied to a cost/benefit tool.

Several district staff suggested identifying a district bicycle coordinator who can liaison with the Central Office bicycle unit.

Planning coordination with external agencies: District staff suggested enlisting the assistance of the Regional Development Councils, encouraging local partners to do comprehensive bicycle planning, encouraging MPOs to identify priority bicycle routes, and encouraging inclusion of partners and advocacy organizations during project planning activities.

District staff also suggested encouraging public outreach efforts with mill and overlay projects, but also getting groups of bicyclists to speak from one voice to avoid mixed messages.





Project/Route Prioritization, district staff suggested:

Create a comprehensive bicycle planning and design toolbox and a methodology to rank high priority corridors and identify projects of regional significance. This toolbox would create a methodology to rank projects on a variety of factors, including cost/benefit, demand/usage, safety aspects, and usefulness to various types of users. This toolbox would be applied uniformly across district offices.

Connectivity, district staff suggested:

Establish a goal of identifying a statewide interconnected bikeway system. District staff would coordinate with the public and local partners to identify priority corridors and gaps in the bikeway system. The result of such planning coordination would be identifying an interconnected bikeway system in each district and the district bikeway systems would in turn be used to create the statewide bikeway system. Priority project should be identified to implement the bikeway system plan.

Facility Selection (when and how to develop facilities), district staff suggested:

These included expanding the scope of the existing bicycle facility design manual to include a simple outline of state policies including warrants, which are both qualitative and quantitative. The expanded manual would also include the steps involved in various processes, including scoping, planning, design, and maintenance.

The manual would also include more comprehensive guidance about the planning process, including guidance on the different types of bicyclists, types of trips, and types of facilities. Also, the manual should include how to define “purpose and need,” and better process and design guidance to minimize judgment calls, guidance on how to select projects, how to prioritize projects, and how to estimate demand.

The manual should include guidance about the different types of bicyclists, and the different kinds of facilities that serve the variety of bicyclists. It should also include a discussion of ‘8-to-80’ bicycle networks and how they serve communities, as well as include a discussion of the kinds of facilities that can and should be included within the state’s right-of-way.

The guide was also viewed as an opportunity to include Complete Streets policy, guidance, and direction. District staff referenced the Department’s ADA

guidance as a document they appreciate and respect, and would like the new bicycle design manual to follow that example.

Most districts discussed the need for training to accompany the new bicycle manual and processes. They felt that training would provide the opportunity for staff to review all aspects of bicycle integration processes and obligations, as well as the intent of legislation, statutes and rules. Further, district staff saw a need to provide better driver education and safety information about bicyclists on the road, as well as provide education to local residents and advocates about the Department's processes, scoping, and design.

Funding, district staff suggested:

A lack of adequate funding was an underlying concern to all district staff. Staff asked for guidance on what project elements can be funded, and from which pots of money. Many district staff asked for additional money in order to accomplish bicycle improvements, as well as dedicated funds for these improvements.

Staff asked for a clarification of the use of Transportation Enhancement funds (now Transportation Alternatives) on the State system. Finally, they suggested a flexible cost participation policy, and an ability to allow locals to contribute to bicycle additions.

Maintenance, district staff suggested:

District staff were looking for additional guidance on how these bicycle policies apply to pavement preservation projects, such as mill and overlay. Staff were also looking for guidance on who maintains on-street bicycle facilities.

The solutions generated by district staff in Phase 3, as well as an update of implementation theme/issue matrix associated with the report from Phase 2 is documented in the REPORT: DISTRICT WORKSHOPS V2.0 MnDOT STATEWIDE BICYCLE PLANNING STUDY (Appendix C).

PRIORITIZING RECOMMENDATIONS SURVEY

A survey was developed that would allow the project team to receive priorities and guidance from MnDOT stakeholders. These stakeholders included members of the PAC, the Policy TAC, and workshop participants and leaders from each MnDOT District Office.

The survey included policy initiatives, potential process improvements, and general recommendations for improving the Department's internal processes for including bicycles as part of its routine work. The policies and potential improvements that were included in the survey were first identified by MnDOT staff during the district solutions workshops.

The purpose of the survey was to help identify priorities for which there was broad agreement among stakeholders, as well as identify areas or specific policies where there was wide disagreement in prioritization between different groups of stakeholders - for example, to identify improvements that were ranked as "high priority" by district staff but as "low priority" by PAC members.

Process

Three identical surveys (available online, and in paper form) were developed that allowed respondents from each of the three respondent groups (PAC, TAC and District staff) to rank specific policy recommendations on a scale between 0 (should not be a priority) to 4 (highest priority).

The survey was presented to members of the PAC and Policy TAC in a facilitated session held as part of their regular meeting. To increase transcription accuracy, reduce processing time, and make use of available technology, members of the PAC and Policy TAC were invited to bring their iPads and other mobile devices to directly take the online survey during the meeting (paper copies, later entered by the project team, were also available). District respondents were invited to take the online survey through two invitations sent by Central Office staff.

The recommendations presented to survey respondents were grouped in the six core policy issue areas:

- Planning and coordination,
- Project and route prioritization,
- Connectivity,
- Facility selection,
- Funding, and
- Maintenance responsibility

Following the closing of all three surveys (the PAC and TAC surveys were only available during each group's meeting, while the District surveys were kept open through the end of 2012), responses were analyzed and summarized by the project team.

Limitations

Although this survey was successful in obtaining guidance from members of the PAC, Policy TAC, and several dozen District staff, it is important to note the following limitations:

- In some cases, variation in the rankings assigned to potential policies in a policy group is slight (there is not much distance between the highest priority and the lowest priority). Caution should be used if dismissing a policy because of a low relative ranking.
- Small sample size, especially for District results: although the PAC and Policy TAC surveys did capture the participation of most of the members of each committee, results from district staff (40 completed surveys) it is not a majority of district staff participants in earlier stages of this work approximately (100 district staff participated in the district workshops).
- Non-uniformity across districts: as was seen in earlier stages of this work, opinions, needs and priorities can vary widely across district offices. This survey aggregates rankings from all district participants to present a single ranking for each recommendation, which might not match the prioritization offered if staff from a single specific district office were asked to rank it.

Summary of Survey Results

These are the **PAC**'s top priorities for each core policy issue area:

Policy Group	High Ranked Policy
Planning and coordination	Assistance in prioritizing investments
Project and route prioritization	Developing prioritization tools
Connectivity	Identifying an interconnected bikeway system for each district
Facility selection	Expanding the Bicycle Facility Design Manual so it includes better process and design guidance
Funding	Offering additional flexibility in cost participation policies
Maintenance responsibility	Providing internal guidance and clarification on how MnDOT's bicycle policies apply to pavement preservation projects

These are the **Policy TAC**'s top priorities for each core policy issue area:

Policy Group	High Ranked Policy
Planning and coordination	Assistance in prioritizing investments
Project and route prioritization	Developing prioritization tools
Connectivity	Working with public and local partners to identify priority corridors and gaps in the system
Facility selection	Expanding the Bicycle Facility Design Manual to offer additional guidance on cyclists, developing bicycle networks and benefits
Funding	Setting up dedicated funds for bicycle improvements
Maintenance responsibility	Providing internal guidance and clarification on responsibility for maintenance of on-street bicycle facilities

These are the top priorities identified by **district participants** for each core policy issue area:

Policy Group	High Ranked Policy
Planning and coordination	Assistance in prioritizing investments
Project and route prioritization	Developing prioritization tools
Connectivity	Working with public and local partners to identify priority corridors and gaps in the system
Facility selection	Internal training and education
Funding	Allowing local jurisdictions and partners to contribute toward bicycle facility additions on State right-of-way
Maintenance responsibility	Providing internal guidance and clarification on how MnDOT's bicycle policies apply to pavement preservation projects

Interpreting survey results

Comparing survey results across participant groups (the PAC, the TAC, and respondents from MnDOT Districts) can be helpful in two ways:

1. By identifying policies about which there is broad agreement - either as high priorities (“we all agree that we ought to do this”) or as low priorities (“we all ranked this policy as a low priority, and so agree that we should concentrate on implementation of other policies first”), and
2. By identifying policies where different groups vary widely in their prioritization - for example, where a policy that is ranked as a high priority by district staff is independently rated by the PAC to represent a low priority for implementation.

The usefulness of the first set of results is easy to understand: there is a consensus position among the participant groups, and all that remains is assigning the agreed-upon priority to the policy, and moving it forward in implementation.

The usefulness of the second set of results is perhaps a little harder to see, but they are potentially even more valuable, as they provide indication of a policy area where consensus among critical actors for implementation (members of the PAC, the Policy TAC, or the Districts) is not only lacking, but is actually unlikely to occur under the current regime of information, knowledge and/or attitude under which members of each group are acting. This condition of clashing prioritization can highlight areas where potential conflict, blocking, or loss of support may occur over the long term if the MnDOT moves forward in making policy choices without first working to develop a foundation of common understanding among parties.

POLICIES WHERE THERE IS STRONG AGREEMENT - HIGH PRIORITIES

There is strong agreement among all three groups that these policies should be high priorities moving forward:

Policy Group	High Priority Policy
Planning and coordination	<ul style="list-style-type: none"> • Assistance in prioritizing investments: Provide tools to analyze cost/benefit of proposed bicycle projects; document before and after bicycle level-of-service; develop a district-wide bicycle plan to understand where connections to the existing and planned regional and local bikeway systems are needed as well as prioritized routes and projects • Agency and partner coordination: Enlist the assistance and participation of the Regional Development Councils in bicycle planning; encourage MPOs to identify priority bicycle routes; encourage local partners to develop comprehensive bicycle plans
Project and route prioritization	<ul style="list-style-type: none"> • Develop prioritization tools: Create a comprehensive bicycle planning and design toolbox; develop a methodology to rank high-priority corridors and identify projects of regional significance
Connectivity	<ul style="list-style-type: none"> • Work with the public and local partners to identify priority corridors and gaps in the bikeway system • Identify an interconnected bikeway system for each district • Identify priority projects to be implemented in the bikeway system plan
Facility selection	<ul style="list-style-type: none"> • None in this policy group
Funding	<ul style="list-style-type: none"> • Allow local jurisdictions and partners to contribute toward bicycle facility additions on State right-of-way
Maintenance responsibility	<ul style="list-style-type: none"> • Provide internal guidance and clarification on how MnDOTs bicycle policies apply to pavement preservation projects such as mill and overlay

POLICIES WHERE THERE IS STRONG AGREEMENT - LOW PRIORITIES

There is strong agreement among all three groups that these policies should be low priorities moving forward:

Policy Group	Low Priority Policy
Planning and Coordination	<ul style="list-style-type: none"> Expand Central Office role: Bike/Ped unit to keep closer track of project development; provide assistance with public outreach efforts; establish direct communication with a district bicycle coordinator / liaison / key contact
Project and route prioritization	<ul style="list-style-type: none"> None in this policy group
Connectivity	<ul style="list-style-type: none"> None in this policy group
Facility selection	<ul style="list-style-type: none"> Expand the Bicycle Facility Design Manual to include Complete Streets policy guidance and direction * Use MnDOT's ADA guidance as a model for the new/expanded Bicycle Facility Design Manual
Funding	<ul style="list-style-type: none"> None in this policy group
Maintenance responsibility	<ul style="list-style-type: none"> None in this policy group

POLICIES WHERE THERE IS STRONG DISAGREEMENT - CONFLICTING PRIORITIES

The following are policies where there is strong disagreement between groups (at least one group ranked a policy high while at least one other group ranked it as a low priority):

Policy Group	Conflicting Ranking for Policy
Planning and coordination	<ul style="list-style-type: none"> Make Central Office Bike/Ped Unit a One Stop Shop for all bicycle-related documents and contacts: Collection of local bicycle plans; list of communities with Complete Streets policies; tools for determining bicycle and pedestrian demand; crash data for projects; process and design guidance including low-cost easy-to-implement projects tied to a cost/benefit tool
Project and route prioritization	<ul style="list-style-type: none"> Apply prioritization tools: Apply toolbox and methodology to rank projects based on cost/benefit demand/usage safety aspects and usefulness to various types of users
Connectivity	<ul style="list-style-type: none"> Identify an interconnected bikeway system for the entire state
Facility selection	<ul style="list-style-type: none"> Expand the scope of the Bicycle Facility Design Manual to include existing state policies including qualitative and quantitative warrants for bicycle facilities and definition of purpose and need Expand the Bicycle Facility Design Manual to include better process and design guidance to minimize judgment calls including guidance on how to select and prioritize projects and how to estimate demand
Funding	<ul style="list-style-type: none"> Set up dedicated funds for bicycle improvements Provide internal guidance and clarification of the use of Transportation Enhancement funds (now Transportation Alternatives) on the state system
Maintenance responsibility	<ul style="list-style-type: none"> None in this policy group

The policy prioritization survey is documented in the REPORT: ANALYSIS OF FINAL PROJECT SURVEY - MNDOT STATEWIDE BICYCLE PLANNING STUDY (Appendix D)

Lessons for Implementation:

Mississippi River Trail Bikeway

The Mississippi River Trail (MRT) can serve as an effective model for establishing, implementing and sustaining future state bikeways and routes for the USBRS. MRT is a designated national bicycle route that provides a unique bicycling experience along the length of the Mississippi River through ten states from the headwaters at Lake Itasca in Minnesota to the Gulf of Mexico. In Minnesota, the MRT is approximately 800 miles, passes through nearly seventy cities, twenty counties, ninety townships, and two reservations and tribal lands. MRT connects to eight state parks, three state trails, ten regional trails, and one national park.

Route Establishment and Implementation

MnDOT convened and worked collaboratively with stakeholders to establish, market, and create bicycle-friendly communities along the 800-mile route to enhance quality of life and promote economic development. In 2010, MnDOT facilitated fourteen community workshops to collaboratively refine the MRT alignment. Where consensus was not achieved, MnDOT rode and evaluated the alternatives with local officials, staff, advocates, and long distances bicyclists to come to consensus on the route. MnDOT created a map book and digital route file downloadable into your

Phase 4: Policy and Practice Recommendations

The following recommendations are organized by six core issue areas: update project planning process, project/route prioritization, facility selection, connectivity, funding and maintenance responsibility. There is some overlap between the issue areas, such as prioritization, that touch all the core issue areas. These recommendations represent tangible steps that can be addressed to bridge the gap between policy and implementation. Some recommendations will require a revision or clarification of policy language; others require better definition of practice and process.

UPDATE PROJECT PLANNING PROCESS

- Provide a clear mandate and opportunities to explicitly integrate bikeways planning in project planning at early stages of the project, including initial scoping and the Early Notification Memo (ENM).
- Revise policy language to require clear documentation of rationale for excluding bicycles. MnDOT's existing Trunk Highway Bridge Improvement Program, Minn Stat. 165.14, already requires that projects must prove that there is an absence of need in order to exclude bikeways in the project.
- Develop a statewide bicycle policy plan and district bicycle master plans that establish a priority network for implementation.
- Develop a database that provides information about local and regional level bikeway planning to district staff.
- Central Office to develop clear and consistent resources and tools to better evaluate need, demand and costs for bicycle projects.
- Develop a protocol for Central Office support of district staff on all bicycle related projects. Including support for regional and local outreach.

PROJECT/ROUTE PRIORITIZATION

- Refine and clarify route prioritization criteria identified in the MnDOT Bicycle Modal Plan.
- Identify regional and district priorities and coordinate with statewide network goals.
- Consider requiring cities over a certain size to develop and maintain a bicycle plan.

FACILITY SELECTION

District staff are interested in consistent information to support facility selection in line with MnDOT policy. Many suggestions could be accommodated with expansion and refinement of the current Bikeway Facility Design Manual.

- Clarify potential bicyclist user types and facilities that support a diverse range of users.
- Develop/refine a facility selection tool to support decision making. Include information that includes contextual guidance such as ADT, posted speed and likely users.
- Develop clear metrics or standards related to routine integration of facilities. This should directly address and coordinate with identification of an exception to adding bicycle facilities.
- Further clarify all road design and maintenance policies with regard to bicycles, such as the rumble strip policy and mill and overlay project guidelines.
- Identify design issues associated with ADA compliance and best practice.
- Clearly articulate connections to Complete Streets policy and design guidance.
- Provide training and outreach associated with design updates to ensure district staff feel confident using the tools.

CONNECTIVITY

- Identify a fully connected system statewide. Include both the Trunk Highways system and primary connections at the local level. Consider the MRT route establishment and implementation process as a model for identifying state bikeways and candidates for the emerging USBRS.
- Evaluate existing roadways and current bikeway accommodations.
- Establish a desired level of service or level of separation for bicycles based on roadway classification.
- Develop both statewide and district bikeway maps.
- Develop a database that provides information about local and regional level bikeway planning to district staff and allows local jurisdictions to access information about state and regional priorities. The statewide Cycloplan tool currently being developed by MnDOT provides an opportunity to implement this recommendation.

smart phone or GPS for navigating the route. The route establishment approach is documented in the MISSISSIPPI RIVER TRAIL (MRT) BIKEWAY TRUNK HIGHWAY PHASE COMMUNITY ENGAGEMENT REPORT (Appendix E)

MnDOT created the Mississippi River Trail Bikeway Marketing Toolbox (Marketing Toolbox) to further MnDOT's strategy of having local business and civic interests market the MRT. MnDOT used this tool to further engage stakeholders to promote bicycle tourism and bicycle friendly communities (BFC). MnDOT hosted a series of marketing and promotion meetings and BFC workshops in collaboration with the Bicycle Alliance of Minnesota along the route in 2011 and 2012.

After creating the Marketing Toolbox and hosting workshops in 2011, MnDOT took MRT implementation to the next level in 2012. MnDOT created a competitive process for MRT cities to apply for technical assistance from MnDOT and its consultant team. The goal was to both create a string of bicycle friendly communities along the MRT and get riders on the MRT.

Seven selected communities were asked to engage local stakeholders to form a "marketing team" and a "BFC team" to participate in unlocking the Marketing Toolbox to create their own local MRT Marketing Action Plan and to conduct a BFC assessment.

The marketing and BFC teams forged unconventional partnerships that included broad representation from the city (planners, engineers, administrators, elected and appointed officials, law enforcement and parks), school district, tourism office, chamber of commerce, citizens, businesses, bicycling advocates, MnDNR Resources, and Explore Minnesota Tourism. The BFC assessments completed by the Bicycle Alliance of Minnesota provide numerous strategies for local communities to implement by amending their comprehensive plans and ordinances, creating civic capacity through bicycle advisory committees, and hosting bicycle events. The marketing plans created new bicycle events held along MRT and the City of Bemidji was granted the bronze BFC designation by the League of American Bicyclists (LAB) in 2012.

MnDOT's also provided marketing and BFC assistance to the Mississippi National River and Recreation Area (MNRRA) – a National Park Service unit located along the Twin Cities riverfront. MNRRA has fully embraced the MRT and biking the MRT is the backbone of the environmentally-friendly alternative transportation system for visitors travelling through MNRRA (i.e., the bicycle is encouraged over the car!).

FUNDING

- Provide dedicated funds for bikeway improvements.
- Develop a funding strategy for development of a connected system over time.
- Provide a flexible cost participation policy (not just 0% or 100%)
- Explore cost sharing options with local jurisdictions for bikeway development.
- Provide clear guidance on which funding streams can support bikeway projects.

MAINTENANCE RESPONSIBILITY

- Clarify the division between state and local responsibilities, especially for on-street bikeway facilities.
- Consider bikeways as a routine inclusion in all mill and overlay projects. Engage the public and Central Office in early stages of planning for mill and overlay pavement preservation projects.

IMPLEMENTATION PRIORITIES

The prioritizing recommendations survey identified recommendations with broad agreement between district staff, the PAC and the Policy TAC. Although the survey results have their limitations, the recommendations with broad agreement represent a consensus position among the participant groups, and all that remains is assigning the agreed-upon priority to the policy, and moving it forward in implementation. The highest priority recommendations for all three participant groups are:

- Assistance in prioritizing investments: Provide tools to analyze cost/benefit of proposed bicycle projects; document before and after bicycle level-of-service; develop a district-wide bicycle plan to understand where connections to the existing and planned regional and local bikeway systems are needed as well as prioritized routes and projects
- Agency and partner coordination: Enlist the assistance and participation of the Regional Development Councils in bicycle planning; encourage MPOs to identify priority bicycle routes; encourage local partners to develop comprehensive bicycle plans
- Develop prioritization tools: Create a comprehensive bicycle planning and design toolbox; develop a methodology to rank high-priority corridors and identify projects of regional significance
- Work with the public and local partners to identify priority corridors and gaps in the bikeway system
- Identify an interconnected bikeway system for each district
- Identify priority projects to be implemented in the bikeway system plan
- Allow local jurisdictions and partners to contribute toward bicycle facility additions on State right-of-way
- Provide internal guidance and clarification on how MnDOT's bicycle policies apply to pavement preservation projects such as mill and overlay

The prioritizing recommendations survey also identified recommendations with strong disagreement between district staff, the PAC and the Policy TAC. Although the survey results have their limitations, the lack of consensus among participant groups may indicate that the recommendation is unlikely to be implemented due to existing information, knowledge and/or attitude under which members of each group are operating. This condition of conflicting prioritization can highlight where potential conflict, blocking, or loss of support

Effectiveness and results

Minnesota's MRT has achieved the vision of bringing communities together in unconventional ways to promote bicycle transportation, recreation and tourism, and bicycle-friendly communities. MRT is the "big idea" that brought communities together to determine how they can enhance the quality of life for their residents, businesses, and visitors by being more bicycle-friendly and bringing in tourism dollars.

MRT has significantly helped Minnesota move forward in being a more bicycle-friendly state. The MRT is the "big idea" that led Minnesota to finally designate its first state bikeway long after having authorizing legislation in place decades ago. In 2012, two MRT segments became Minnesota's first route in the USBRS system (USBR 45). Now Minnesota has MRT as the backbone of its emerging state bikeway and USBRS.

Achieving state bikeway designation and being a USBR are a testament to the success of the collaborative planning endeavors led by MnDOT. The USBR designation requires local road and trail authorities to adopt resolutions of support. MnDOT successfully obtained resolutions from all authorities to establish USBR 45 from Lake Itasca to Elk River, from Hastings to the Iowa border and is in the final stages to nominate the Twin Cities segment.

MnDOT's comprehensive approach to collaboratively establishing and implementing MRT earned MnDOT the 2012 Planning Innovation Award from the Minnesota Chapter of the American Planning Association and the 2013 National Achievement Award for Transportation Planning from the American Planning Association. MRT can serve as an effective model for establishing and implementing future state bikeways and routes for the USBRS.

may occur over the long term if MnDOT moves forward in making policy choices without first working to develop a foundation of common understanding among parties. The policy areas with strong disagreement (at least one group ranked it high while at least one group ranked it as a low priority) include:

- Make Central Office Bike/Ped Unit a One Stop Shop for all bicycle-related documents and contacts: Collection of local bicycle plans; list of communities with Complete Streets policies; tools for determining bicycle and pedestrian demand; crash data for projects; process and design guidance including low-cost easy-to-implement projects tied to a cost/benefit tool.

Interpretation: The PAC and Policy TAC both rated this as a low priority while the District ranked this high - this might be interpreted as the Districts expressing a desire for a centralized and accessible resource to support their bicycle and pedestrian work. PAC and Policy TAC members, most of whom do not work in a district, might not perceive this need as clearly.

- Apply prioritization tools: Apply toolbox and methodology to rank projects based on cost/benefit demand/usage safety aspects and usefulness to various types of users.

Interpretation: The PAC and Districts both rated this as a high priority while the Policy TAC ranked this low. District staff, and the majority of PAC members, are current MnDOT employees, who might be keenly aware of existing needs and practices within MnDOT, while Policy TAC membership, which includes a greater portion of non-MnDOT participants, might be less familiar with existing conditions within MnDOT. This policy can be read to express some dissatisfaction with MnDOT follow-through of directives already on its manuals - PAC and District participants are reiterating the need to apply the tools that they are also recommending be developed.

Chapter 2

BICYCLE DATA AND MAP

One of MnDOT's responsibilities is establish and maintain a Bikeway Registry based on bicycle-related data and displayed on a statewide map. This project includes not only the production of a Statewide Bicycle Map, but also a plan for regular data collection and map updates. This chapter explains the methodology used for the development of the Statewide Bicycle Map as well as recommendations for implementing regular updates.

Background

The last time MnDOT produced a statewide bicycle map was in 2001. The map depicted roadway suitability for bicycle travel based on surface condition (paved vs. unpaved), traffic volume (low to high), roadway shoulder width ($\geq 6'$), and where bicycles are prohibited.

There was a clear need not only for an update, but for a plan to avoid future delays in updates.

In order to achieve the regular production of a current statewide bicycle map, an up to date inventory of bicycling conditions is needed. There are generally four aspects in creating and maintaining such an inventory: data collection, storage, maintenance, and distribution. For each of these four aspects, there are five key elements that need to be addressed: data type (what), source (where), format (how), time frame (when), and responsible party (who).

These aspects are addressed in this study through the following steps and recommendations.

Data Collection Test

At the beginning of the study, the primary questions regarding statewide bicycle data were: “what exists?” and “what is the best way to obtain the data?”. To find out “what exists”, an initial data request was sent via e-mail in early March 2012 to representatives of RDCs and MPOs. The request asked the agencies to provide existing bicycle related data in any format to a central FTP site. By the deadline at the end of April, most of the sources sent in their replies and a large amount of data was collected.

From this initial data collection exercise, some key findings were observed:

1. There are a lot of existing and planned facilities and data from these various agencies.
2. The data exist in very many formats and vary greatly in attributes.
3. Respondents identified bicycle facilities as only being trails and sidewalks (e.g., not on-road facilities)
4. While most people were supportive in the exercise, response and attitude toward such data collection method could vary from region to region, person to person.
5. The process was time consuming.

It was obvious that similar data collection would be difficult to carry out on a periodic basis and the data collected would need much work from MnDOT to prepare for use in any usable GIS format. This was also evident from an earlier exercise by the University of Minnesota to establish a statewide trail database, MINNESOTA STATEWIDE BICYCLE PLANNING STUDY

which resulted in much work and time spent creating a usable GIS database. A plan for updating the database has not yet been developed.

In order to address the data collection issues, the following steps should be taken:

- Establish uniform bicycle facility definitions and data standards
- Create a statewide bicycle map based on existing data to serve as a good starting point for data review and collection
- Identify a convenient data collection agency
- Develop an easy to understand data collection method with a set of data standards

Revised Data Collection Approach

After recognizing the vast efforts and challenges met with the data collection test, the project team recognized the need to integrate data for the Statewide Bicycle Map into existing processes. This approach would utilize MnDOT's existing resources rather than create the need for regularly contracting out for assistance in keeping the statewide bicycle map up to date.

This would require some more legwork developing relationships and researching opportunities for integrating bicycling initially, but would offer opportunities for long-term payoffs, more efficient use of existing resources, and a more robust process for ensuring an up-to-date product for the public.

To understand what data has since been developed and might be usable for a new map, meetings with MnDOT's Data Systems and Coordination Section, Geographic Information and Mapping Section, Bicycle and Pedestrian Section, as well as MnDNR were conducted. These meetings concluded that:

1. MnDOT's Data Systems and Coordination Section maintains as part of the state roadway database attributes for each roadway segment including number of lanes, surface material, jurisdiction, rural vs. urban character, Annual Daily Traffic (ADT), and shoulder width and material.
2. MnDOT's Geographic Information and Mapping Section regularly publishes an Official State Highway Map that indicates municipalities, counties, state parks, forests, water bodies, roadways and access points, and points of interest.



3. MnDNR is the entity that maintains the most up-to-date state trails including bike trails.
4. As of the date of this study, there is no existing central database that contains local bicycle facilities. Regional efforts are underway but not uniformly complete or standardized among major metropolitan areas.
5. Numerous tools and materials are available to the general public via multiple media for local and regional bicycle navigation convenience.

Based on these findings, it was determined that the new statewide bicycle map could use a similar approach to the 2001 map with addition of state bicycle trails. The new map should also emphasize a statewide context (e.g., state and county roads). Municipal and township roads are generally bike-able as long as the surface material is suitable for bicycles. Navigation on local roads can be more adequately guided by local maps or online resources such as Cyclopath, Google, and MapMyRide.

After careful examination of the available GIS data and various bicycle facility standards, including the current MnDOT Bicycle Modal Plan and AASHTO guidelines, the methodology for developing the new statewide Minnesota Bicycle Map is as follows:

1. Only the state and county roads are mapped. This includes US highways, state highways, and county roads. All other roads are mapped as greyed out background information.
2. The state and county roads are classified into four groups: 2-lane rural, 2-lane urban, 4-lane rural, and 4-lane urban.
3. For each of the four groups, a median ADT is determined.
4. A traffic level attribute is assigned to each road segment based on ADT above or below the median.
5. Roads with bicycle-suitable surface material are selected.
6. Roads with right side shoulders of at least 4' width and suitable surface material are identified.
7. Based on the above selections and calculations, the state and county roads are symbolized into 8 categories:
 - 1) State and County 2 Lane Roadways with 4'+ Shoulder and Lighter Traffic
 - 2) State and County 2 Lane Roadways with Lighter Traffic but no 4'+ Shoulder

- 3) State and County 2 Lane Roadways with 4'+ Shoulder but Heavier Traffic
- 4) State and County 2 Lane Roadways with Heavier Traffic and no 4'+ Shoulder
- 5) State and County 4 Lane Roadways with 4'+ Shoulder and Lighter Traffic
- 6) State and County 4 Lane Roadways with Lighter Traffic but no 4'+ Shoulder
- 7) State and County 4 Lane Roadways with 4'+ Shoulder but Heavier Traffic
- 8) State and County 4 Lane Roadways with Heavier Traffic and no 4'+ Shoulder
8. For mapping purposes, the above 8 categories are further simplified into 4:
 - 1) State and County Roadways with Lighter Traffic and 4"+ Shoulder
 - 2) State and County Roadways with Lighter Traffic but no 4"+ Shoulder
 - 3) State and County Roadways with Heavier Traffic and 4"+ Shoulder
 - 4) State and County Roadways with Heavier Traffic and no 4"+ Shoulder
9. Interstate highways and state and county roadways with controlled access are mapped as prohibited for bicycle use.
10. Federal and state bicycle trails are mapped.
11. The data is obtained from the MnDNR and the MnDOT Data Systems and Coordination Section. It is then analyzed and organized before given to the MnDOT Geographic Information and Mapping Section for importing into the existing Official State Highway Map template. The roadway information from the Official State Highway Map is replaced by this bicycle related data while the majority of the rest of the background information is maintained.
12. The base data is to be maintained and updated as it is currently maintained and updated as part of the MnDOT roadway database at the Data Systems and Coordination Section. The Data Systems and Coordination Section is to perform the above described analysis and derive the bicycle data on a biannual basis for the Geographic Information and Mapping Section to update the Minnesota Bicycle Map at the same time as it updates the Official State Highway Map.

This methodology was agreed upon by the PAC, Policy TAC, and Data TAC in July, 2012. A draft Minnesota Bicycle Map, 2013 was produced accordingly and presented to the public for comment during the Minnesota State Fair at the end of August. Hundreds of comments were received by the end of the commenting period. Most of the comments addressed the accuracy of the data displayed on the map, specifically, the roadway shoulders information and the inclusion of all major bicycle trails.

Management for State Bicycle Data

Minnesota State Statute 160.265 Bikeway Program Subdivision 1 stated that “...The commissioner (of transportation) shall compile and maintain a current registry of bikeways in the state and shall publish and distribute the information contained in the registry in a form and manner suitable to assist persons wishing to use the bikeways. The Metropolitan Council, the commissioner of natural resources, the commissioner of employment and economic development, the Minnesota Historical Society, and local units of government shall cooperate with and assist the commissioner of transportation in preparing the registry ...”. Bikeways are defined in Minnesota State Statute 169.011 Definitions Subdivision 9 as “... a bicycle lane, bicycle path, or bicycle route, regardless of whether it is designed for the exclusive use of bicycles or is to be shared with other transportation modes.”

Based on these Statutes, MnDOT is authorized by the State to establish and maintain a Bikeway Registry. This registry will include data of bike-able facilities both on-road and off-road. The Statutes did not explicitly define the format of this registry. Therefore, there is possibility to design both the content and the format of this registry through a multi-faceted approach.

The first item to address is the data to be included in the registry. If defined by physical location, there are three types of facilities to be inventoried and included in the registry: the physical on-road and off-road facilities and the designated bicycle route overlays. Classified in more detail, in addition to the roadways themselves, the on-road facilities include the following:

1. Bike Lane (typically 5-6 ft. wide)
2. Paved Shoulder (typically 4-10 ft. wide)
3. Shared Lane (typically 11-12 ft. wide)
4. Wide Outside Lane (between 14 and 16 ft. wide)

The off-road facilities include the following:

1. Shared-Use Paths
2. Trails
3. Greenways
4. Sidewalks

The definitions of the above mentioned on-road and off-road facilities can be found in both the MnDOT Bikeway Facility Design Manual and AASHTO guidelines.

Currently, there is fragmented data available regarding the inventory of these on-road and off-road facilities. The available data format, attributes, and accuracy are not uniform. A new data set with a standard data structure should be established to organize the available data into a uniform database and later augment it with additional and updated information.

A designated bicycle route overlay includes stretches of on-road and/or off-road facilities designated by a government entity under a unified name to encourage bicycle use on a linear path connecting certain amenities. An example is the newly designated US Bicycle Route 45 which is the Minnesota segment of the national Mississippi River Trail Bikeway (MRT). The MRT runs from the Minnesota Iowa border up north to the Headwaters in Itasca State Park. It utilizes numerous roadway segments and bike-able off-road trail segments. It is also a living route in the sense that the alignment will constantly shift as local roadway and trail conditions change.

A second issue to be addressed for establishing the registry is the human resources involved. As part of the State Bicycle Map process, three agencies within MnDOT emerged as logical resources for managing the bicycle data on an on-going basis:

1. The Data Systems and Coordination Section
2. The Geographic Information and Mapping Section
3. Bicycle and Pedestrian Section

Most of the data related to roadways originated from an existing database maintained by the Data Systems and Coordination Section. The data was simply derived from the database by executing a series of queries. The information related to traffic volume, surface material, shoulder type and width, and controlled access were all simple attributes associated with individual roadway segments uniquely identifiable by a unique identification number. As these attributes are updated through regular roadway information updates, the bicycle related data will automatically be updated each time the series of queries are executed. Therefore, this data should stay where it is and be maintained the way it is currently maintained. The data queries should be run every time an updated State Bicycle Map is to be published.

The queries to run can be found in Appendix F of this Study.

It has become clear that the information on surface material, shoulders and controlled access has not been updated or checked for accuracy for some time. This is the main reason why there were many comments on the Minnesota Bicycle Map 2013 regarding the data accuracy. Now that this issue has been identified, a process is underway to address it.

On an annual basis, MnDOT's Data Systems and Coordination Section and the Geographic Information and Mapping Section have been working together to solicit updated roadway data from all counties and certain cities. There is an established process and resource list for this annual data update. Since roadway surface material, shoulder width and controlled access data are characteristics of roadways, it is recommended that these additional characteristics be included in the annual data update request (referred to as the "annual status update" by MnDOT) and go through the same process as other attributes of the roadways are updated. This approach leverages existing MnDOT procedures and simply adds a new mode to the annual status update. The data will reside in its current location, keep its existing format, be maintained by its current owner, and distributed through its current process of distribution.

The first such combined request was underway at the end of 2012. In addition to the standard roadway map, a second map with the existing bicycle related information together with a corresponding letter were included in the package sent to individual counties and certain cities for verification. As an enhanced push for this initial data collection, the Bicycle and Pedestrian Section also sent similar materials to individual RDCs and MPOs. Depending on the result of these efforts, the three involved MnDOT Sections will make a decision in 2013 on the format of future annual status update request materials and the organizations that will receive the request.

In addition to existing roadway data, the Data Systems and Coordination Section will establish a new data set to host the inventory of the on-road and off-road bikeway facilities and bicycle route designation overlays. This new data will have a similar GIS format as the roadway data maintained by the same agency so that all data stays compatible. A preliminary list of the attributes for this new data set is as follows:

1. Type of Facility
2. Name of Facility (if route has a adopted name)
3. Owner of Facility (name of Entity)
4. Facility Maintained by (name of Entity)
5. Fee/Permit Required (Yes/No)
6. Width of Facility (in feet)
7. Side of Road (Left, Right)
8. Surface Type (Bituminous, Concrete, Block/Brick, Gravel or stone, Soil/Sod, Other)
9. Facility Status (Existing, Proposed/Planned, Funded, Abandoned)
10. Dates (of completion, adoption, abandonment, etc.)
11. Optional Attributes:
 - a. TIS Code for on-road facilities
 - b. Location and Width of Rumble Strips
 - c. Location and Type of Protection Barriers for Facility
 - d. Supportive facilities (restrooms, water fountains, parking, lodging, dining, etc.)
 - e. Points of interests and connections
 - f. Location and type of markings and signs

The initial data for this new data set will be derived from the existing roadway database with the input from the initial bicycle related data request of 2012 and the existing state bicycle trails from MnDNR. If completed in 2013, this initial data can be included in the standard data update request at the end of 2013 and expanded, maintained and updated on the same annual cycle. The requests can then also be routinely sent to MnDNR and other partner agencies. The link between this new data set and the original roadway data should be maintained so that updates to roadway related elements can be entered once in the roadway database and automatically reflected in the bicycle data set. This is important in maintaining data consistency and reducing staff work load.

In general, this new data can be stored and distributed in exactly the same way as the existing roadway data. For example, when it is in a comprehensive condition, it can be added to the data catalog downloadable from the MnDOT base map website.

In addition, this bicycle data can also eventually replace the data mapped on the Minnesota Bicycle Map. Since the roadway-related part of the data is a direct reflection of the original roadway data, it can be mapped with the same symbol sets in the same categories.

It is not envisioned at this time that the central MnDOT office will obtain and maintain a data set that includes local bicycle facilities at a more detailed level than county road and state and regional trails. There are many other resources that could provide supplemental information regarding bicycle facilities, supportive facilities and points of interest. There are many opportunities to utilize them through multimedia means to support the convenience of bicycle usage in the state.

The Bikeway Registry

To meet the requirements of Minnesota Statute 160.265, it is recommended that the officially developed, maintained and distributed GIS data obtained through MnDOT's status update process and displayed on the Minnesota Bicycle Map serve as the Bikeway Registry. The data collected through the status update process and displayed Minnesota Bicycle Map can continue to evolve as additional data becomes available. For example, when additional routes are designated as state bikeways or as USBR the designations should be included in the data and displayed on the Minnesota Bicycle Map.

Next Steps

This study set up a basic frame work for creating the Bikeway Registry and its associated data sets. A general data collection, storage, maintenance, and distribution procedure is developed to be integrated into existing MnDOT procedures. Three MnDOT sections are identified to be responsible for both the data and the State Bicycle Map. It is expected that this will result in regular updates of the Bikeway Registry through standard MnDOT channels without major impacts on resources such as funding, staff, and equipment.

As this is implemented, there are several detailed elements that need to be further defined and addressed:

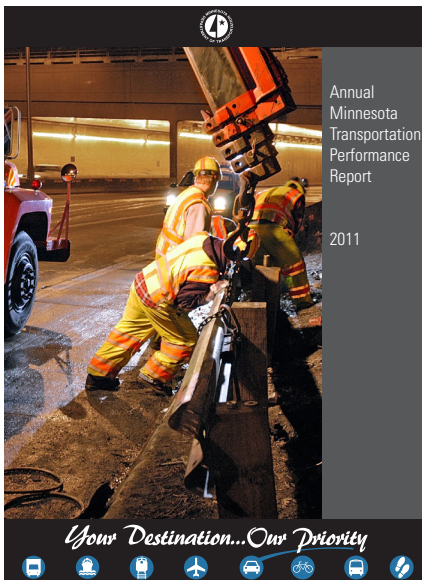
1. Data request
 - 1) Solutions/alternatives to less responsive data sources
 - 2) Shared and updated list of agencies for data request among the three MnDOT sections
 - 3) Standardize the data request procedure
2. Data input
 - 1) Standard procedure for adding new data/attributes to bicycle data
 - 2) Track of data elvolution
 - 3) Responsibilities of staff involved
 - 4) Initial input format and final data format, consistency/convertibility
3. Data storage and distribution
 - 1) Data storage location and ownership
 - 2) Format migration procedure and inventory
 - 3) Inter-agency access rights
 - 4) Metadata and other documentation
 - 5) Data sharing with other agencies and the public
4. Mapping
 - 1) Frequency in updating the State Bicycle Map and corresponding tasks to be taken by the corresponding staff for the update
 - 2) Standardize elements to be mapped on the State Bicycle Map
 - 3) Sharing of the map and elements of the map with agencies/public

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Chapter 3

PERFORMANCE MEASURES

As bicycling has become a more popular mode of travel, and acknowledged as integral to a safer and more livable multimodal transportation network, the need to track ridership trends and the effectiveness of bicycle transportation systems has become clear. As MnDOT seeks to promote and increase bicycling, it is imperative that investments be based on data and research that shows which planning and implementation policies are the most successful. Establishing targets for bicycle travel, making steady progress in improvements, and monitoring key indicators such as usage, safety, and facilities also demonstrates to stakeholder groups, other agencies, and the public, that MnDOT takes bicycling as seriously as other modes of travel.



Performance measures are a critical part of system management, and have been used by MnDOT for evaluating services and investments since the 1990's. While MnDOT measures many components of automobile, rail, freight and aviation transportation, MnDOT has not previously collected data and established clearly defined performance measures for bicycling. For instance, MnDOT has tracked the bicycle mode share of commuter trips provided by the American Community Survey (US Census) within Minnesota; however, this metric does not provide information about bicycling for other types of trips, nor is there a target set for this mode share. Another example is that while pavement conditions and maintenance information is available for travel lanes, this data is not collected for road shoulders which are critical for bicycle travel.

Because performance measures for bicycle transportation are still an emerging practice across the nation, it is all the more important to begin the process of systematic monitoring. Non-motorized transportation has many inherent differences from motorized transportation. For example, bicycle use tends to be more variable than automobile use; levels of bicycling have higher seasonal fluctuations, and are impacted by weather conditions. In addition, the technology and methodology for obtaining and assessing data is still evolving. By measuring, comparing and assessing bicycling transportation and various agency actions, MnDOT can also understand the error rates associated with specific techniques, how to better collect and examine data, and come to a deeper understanding of bicycle transportation. Ultimately, this understanding can support the collaboration, policy guidance and design guidance that MnDOT and other agencies must provide for a successful multimodal system.

As the state continues to integrate bicycling into its larger multimodal network, these performance measures can be used to track progress toward the guiding principles that were established in the Statewide Multimodal Plan (SMMP) and supported by specific strategies being considered in the Minnesota State Highway Investment Plan (MnSHIP) planning process.

Tactics

The SMMP and MnSHIP documents identify various guiding principles and strategies for bicycle transportation; therefore they have guided the formation of the performance measures in several critical ways. The performance measure system should support the following goals that have been derived from these plans:

1. Improve quality of life for system users and the environmental health of the state by providing a safe, convenient and connected bicycling network within urban areas and connecting regional centers throughout Minnesota.
2. Provide bicycling as a convenient mode choice to system users statewide
3. Maintain quality of pavement and bridge assets for bicycle accommodations
4. Apply strategies that ensure a high return on investment
5. Eliminate fatalities and serious injuries through statewide strategic infrastructure improvements and education campaigns
6. Improve accessibility, and safety for everyone traveling on, along and across roads
7. Support connections that are accessible for all Minnesotans, regardless of socioeconomic status or individual ability
8. Systematically consider bicycling trips on highway infrastructure through the scoping and planning process
9. Consistently integrate bicycle transportation into an identified priority network

The SMMP notes that the system of performance evaluation should also accomplish the following:

1. Provide quantitative information to help make better investment decisions.
2. Track economic and demographic trends as well as the effectiveness of planning and implementation strategies.
3. Track data regarding the transportation system's condition and performance.
4. Serve as tools to evaluate services and guide plans, projects and investments.

5. Align performance measures into the six objective areas of the SMMP plan. These six categories are 1) Accountability, Transparency and Communication, 2) Transportation in Context, 3) Critical Connections, 4) Asset Management, 5) Traveler Safety, and 6) System Security.

For the purposes of developing performance measures, the goals were generally classified into three major categories: encouraging bicycling, enhancing safety, and improving access. In correlation with these categories, there are three primary topics for performance measurement: usage, safety and assets. For each topic, there is a specific performance measure that defines a target for that topic, and for each target, a specific set of data that will need to be collected.

Development

The performance measures are intended for evaluating overall system progress. These measures should indicate major trends or concerns and serve as a basis for setting ongoing targets. Another type of performance measure that assesses the risks or advantages of specific projects or programs is inherently different. This type of project-specific analysis is outlined in the MnSHIP document, which contains a strategy involving performance levels that can be used to calculate the risks and returns of various investments, strategies and priorities. The performance measures included reviewing the risks and outcomes defined in the MnSHIP document so that the performance measures may help to determine whether the MnSHIP strategies are working toward the performance target.

Several other states and agencies have defined their own performance measures as well as guidelines for effective and informative metrics. The MnDOT performance measures incorporate many of these findings and examples, and have been developed based on the following criteria:

1. Measures should assess outcomes, such as usage, rather than input, such as funding.
2. Performance should be measured against baseline factors such as total populations, total miles of roads, total number of commuters etc.
3. Measurement should be quantifiable and time-constrained.
4. Measurement should provide sufficient information about a condition to convince both supporters and skeptics of significant findings.
5. Measurement should be defined consistently over time.

Recommended Performance Measures

The recommended performance measures need to be supported by a variety of data. Once the initial data for each measure is obtained, MnDOT will need to establish the baseline conditions (e.g., where are we now) and performance goal targets (e.g., where do we want to be) through its established procedures and guidelines. Therefore, the performance measures include a target of “X”% by the year “20XX”. The upcoming Statewide Bicycle Policy Plan project provides an opportunity to engage MnDOT staff and its partners in setting the performance targets for the future.

USAGE

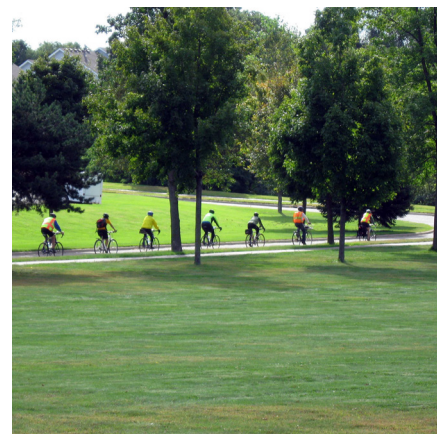
Recommended Performance Measure #1: Usage

Increase bicycle mode share to X % by 20XX.

Methodology

Level of ridership is an important indicator that the bicycle infrastructure provided is having the desired effect of inviting regular use and is a convenient and accessible travel option. There are many ways to measure increased bicycling, such as counting the number of bicyclists, total bicycle miles travelled, and total trips made by bicycle. Statewide data does not exist and will need to be developed and collected to calculate mode share. The raw numbers may be used as interim performance measures by themselves.

Measuring the bicycle percentage of mode share is useful as it considers total travel and is a more accurate read of how bicycling compares to other modes. While total trip numbers may be impacted by population changes or economic conditions, mode share offers valuable information about the choices users are making.





Data Needed

1. Total bicycle trip counts and total trip counts for other transportation modes.
2. Total trip estimates may be derived from several sources, including American Community Survey, household surveys, models and selected counts.
3. Measuring input, such as funding, resources and improvements aimed at increasing bicycle use can help evaluate how successful implementation actions are. Although this data is not critical to derive the performance measure, it is an important way to track investments and the effectiveness of facilities. Examples of input measures related to increasing usage include:
 - a. Developing new and improving existing bikeway corridor conditions
 - b. Providing services and amenities, such as lockers, showers, bicycle parking, and multimodal connections
 - c. Providing bicycle rental and check out opportunities, such as Nice Ride Stations
 - d. Dedicating marketing and educational campaigns encouraging bicycling
 - e. Providing bicycle maintenance training

Data Collection and Evaluation

The following list identifies current work MnDOT has underway to obtain bicycle count data and outlines future opportunities and challenges to consider:

1. MnDOT has been relying on the American Communities Survey, Household Travel Survey and other census data to count bicycle commuter trips; however, this information alone is not adequate for a bicycle transportation performance measure.
2. MnDOT plans to install permanent counters capable of monitoring bicycle travel in select locations throughout the state. MnDOT will also have portable counters it and partners can use for shorter duration counts. MnDOT will have a regular bicycle traffic count report including crash rate, traffic volume and effectiveness of infrastructure improvement with before and after studies.

3. MnDOT is currently partnering with the University of Minnesota to develop a systematic approach to counting bicycle trips. The team is developing a methodology to infer data from a limited number of counts to the larger population and to estimate error rates. Because bicycle use is highly influenced by factors such as weather, the patterns for time of day and seasonal variability are still being studied. While useful information may be derived from other states and organizations, the specific conditions in Minnesota will be unique.

Potential Metric Variations

The exact metric may vary or evolve depending on the data available and what MnDOT may reasonably tabulate. This metric may also be broken down into several simpler metrics, which may be helpful for MnDOT and other groups to obtain data. For example, MnDOT may have separate information on bicycle commuting rates, percentages of children who walk or bike to school, and percentages of utilitarian trips taken by bicycle. The total mode share may be derived from assigning a weight to each of these various types of trips. The following list outlines how the performance measure may be modified for use as interim measures, or by other agencies:

1. Increase bicycle mode share to X% of commuter trips by 20XX.
2. Increase bicycle mode share of X% of all trips to schools by 20XX.
3. Increase bicycle trips by X by 20XX. Increase bicycle mode share to X% on state/county owned roads by 20XX.
4. Increase bicycle mode share to X% in metropolitan areas with a population density of greater than X, and X% in areas with a populations density of less than X.

Further Applications

Measuring input related to this measure may be a useful way to gauge the success of funding or specific programs. Such input evaluations may include:

1. \$X funding dollars allocated toward bicycle transportation increased the bicycle mode share by X %
2. \$X construction dollars spent on improving facilities increased the bicycle mode share by X %
3. Increased access to X linear miles of bicycle facilities increased the bicycle mode share by X%

This performance measure may provide useful information such as:

1. How many Vehicle Miles Traveled (VMT) is reduced by the bicycle mode share vs. an equivalent automobile mode share?
2. How much emissions are reduced by the bicycle mode share?

Potential Partners

Because bicycle transportation occurs on a network owned by a wide variety of agencies, MnDOT is in a position to provide key leadership in helping partner organizations count and monitor their own bicycle usage levels. Some examples of ways where MnDOT may be able to collaborate with other organizations are listed below:

1. The State (i.e., MnDNR) and regional trail providers may be able to provide counts of bicyclists.
2. MnDOT may be able to loan temporary automatic counting devices to cities, counties and MPO's in order to obtain data on critical non-state roads. MnDOT may also provide a template of how to locate, use, and assess data to smaller organizations. See Appendix G, Role of Outside Organizations section.

Example Measures

Other states have used similar performance measures to indicate increased usage. Some states set very specific measures, allowing them to limit the amount of data that needs to be collected. Examples of this include New York, which set one goal of increasing bicycle/pedestrian commuter trips by 15%, and Tennessee which endeavored to achieve a 5% annual increase in bicycle/pedestrian counts at 40 selected locations. Some measures set by other states are less effective because they do not compare changes in bicycling to simultaneous changes in other mode share. This type of non-comparative performance measure includes Wisconsin, which set the goal of doubling the number of bicycling trips by 2010. The EPA also recommended ways to measure transportation sustainability. See Appendix G for a list of sample performance measures.

Recommended Performance Measure #2: Safety

Reduce bicyclist crash rate to X percentage of bicycle trips by year 20XX

Methodology

Measuring the crash rate against the baseline number of bicyclists is a beneficial way to assess overall safety conditions for bicyclists. In order to derive the crash rate, data collected regarding the type, location and nature of such crashes may provide other useful insights into bicycle transportation safety. While zero crashes is the ultimate goal, regardless of the level of ridership, it is important to view the crash rate against the baseline number of trips. If the actual number of crashes rises with an increase in bicycling, understanding that a lower rate may indicate better conditions is key toward developing and continuing policies that successfully reduce accidents.

Data Needed

1. Total number of bicycle trips in a given year
2. Total number of crashes annually involving bicyclists
3. Measuring investments into increasing bicycle safety is useful in order to evaluate the success of such actions. Examples of inputs to measure related to bicycle safety include:
 - a. Develop new and improve existing bikeway corridor conditions
 - b. Safety training programs for bicyclists and drivers of motorized vehicles
 - c. Law enforcement training and targeted operations
4. A further breakdown of crash data may also offer beneficial information for smaller, more targeted performance measures. Data to be collected for this could include:
 - a. Severity of the crash (fatal, serious injury, minor or no injury)
 - b. Location of the crash





- c. Parties involved in the crash (bicycle, motorized vehicle, pedestrian, object)
- d. Time of the crash (season, date, time of day)
- e. Conditions during the crash (weather, road construction, circumstances such as emergency vehicle influence)
- f. Condition of the bicyclist (chemical influences, safety gear, bicycling experience, distractions)

Data Collection and Evaluation

1. The Department of Public Safety currently tracks bicycle and pedestrian crashes
2. MnDOT plans to release a regular bicycle traffic count report that includes crash rate data.
3. The following list contains some known and potential deficiencies in data collection regarding bicycle safety:
 - a. The Department of Public Safety does not currently track bicycle crashes on trails
 - b. Bicycle crashes tended to be underreported, especially if they do not involve major injuries or automobiles. Police accident reports do not cover bicycle on bicycle, or bicycle on pedestrian crashes. Bicyclists may have solo accidents, often because of route conditions such as potholes and debris.
4. A methodology to obtain and apply crash data is still needed. MnDOT will need to determine how to estimate the actual number of crashes from the reported crashes. Bicycle safety may be influenced by a number of factors, some of which are highly variable, such as road conditions.
5. The number of accidents, as well as the crash rate, is important since a small number of total crashes results in a highly variable rate.

Potential Metric Variations

Variations on the metric may include:

1. Reduce bicyclist crash rate to X percentage of total bicycling trips at X key intersections by year 20XX
2. Reduce bicyclist crash rate to X percentage of total bicycling trips on state/county owned roads by year 20XX

3. Reduce the annual number of crashes involving bicyclists to X by 20XX
4. Reduce the annual number of bicycle crashes resulting in serious or fatal injuries to X by 20XX.

Further Applications

MnDOT could compare the cost of bicycle safety investments against the resulting change in safety metrics. Examples include:

1. 1X funding dollars allocated toward safety education programs affected the bicycle crash rate by X% and X number of crashes in X years.
2. \$X funding dollars allocated toward safety education programs affected the bicycle crash rate by X% and X number of crashes in X years.
3. Construction projects costing \$X to improve X intersections resulted in reducing the bicyclist crash rate by X percentage at those intersections in X years.
4. Construction projects costing \$X to improve X linear miles of bicycle facilities resulted in reducing the bicyclist crash rate by X percentage along that route in X years.

This performance measure may provide useful information such as:

1. How many additional bicyclist crashes were projected to occur without the achieved reductions?
2. How much money in health care is saved by bicycle crash reductions?
3. How does the bicyclist crash rate compare to other states?

Potential Partners

There are several opportunities for MnDOT to partner with other organizations in order to obtain safety information:

1. The health care industry may have useful data regarding injured bicyclists. One example is obtaining information from emergency room admissions.
2. Questions regarding bicycle safety may be included in existing surveys, such as the Minnesota Physical Activity Survey or the MnDOT Omnibus Survey. Surveys may also be useful for tabulating the public perception of bicycle safety and whether that correlates with actual safety data. See Appendix G, Role of Outside Organizations section.



Example measures

Other states address bicycle transportation safety in a variety of ways. Many states work to reduce the total number of crashes, regardless of the baseline rate. Some states target specific locations, such as Maryland which aims to reduce crashes on state roads. Many states, such as Washington and Wisconsin separate out accidents resulting in serious or fatal injuries. The EPA recommends measuring crashes against the total number of trips. See the Appendix G for a list of sample performance measures.

ASSETS

Recommended Performance Measure #3: Assets

Increase the miles of the statewide priority network that meets specified criteria for bicycle transportation to X percentage of the total network by 20XX

Methodology

Several other states try to measure both the amount and the value of their bicycle facilities. These states may measure attributes such as the miles of bicycle lanes provided, or the numbers of cities and counties with bicycle transportation plans. Another important attribute, measured in a variety of ways, is how well placed the bicycle facilities are. Examples include how many miles of bicycle routes are accessible to a large number of people, or whether the routes effectively connect people to goods and services, recreational destinations, or mass transportation. Because MnDOT will be collaborating with stakeholders to define a priority statewide bicycle network that incorporates many factors such as connectivity and access, the third performance measure addresses the priority network directly. This measure is based on the understanding that future planning work will identify a priority network, and the performance measure can evolve to be based on the length of the priority network. MnDOT needs to establish an approach and specific criteria for identifying and refining the priority network. MnDOT's approach to establishing and implementing the MRT can serve as a model.

Data Needed

1. Total mileage of the statewide priority network
2. Miles of the statewide priority network that meet the specified criteria for bicycle transportation and miles that do not meet the specified criteria.

Data Collection and Evaluation

1. The statewide priority network will be established in the upcoming Bicycle Policy Plan and District Bicycle Master Plans.
2. MnDOT will need to define the specified criteria that a route on the priority network must meet in order to be considered acceptable. Such criteria may include pavement quality, adequate lane or shoulder width, signage, maintenance, or intersection compliance. MnDOT may want to develop a rating system, similar to the good/fair/poor rating given to pavement conditions.
3. After the desired criteria is defined, MnDOT will need to identify the segments of the priority network that meet the specified criteria. This step involves creating an ongoing system to monitor bicycle conditions, which may improve or degrade over time.

Potential Metric Variations

Variations on the metric may include:

1. Increase the miles of the statewide priority network that meets specified criteria for bicycle conditions to X miles by year 20XX.
2. Increase the miles of the statewide priority network that meets specified criteria for bicycle conditions to X miles in selected areas by year 20XX.
3. Improve X net miles of the statewide priority network that meets specified criteria for bicycle conditions annually

Further detail could break this performance measure down by MnDOT district. For example, each district may have a different performance measure target, based on factors such as population, amount of existing bicycle facilities, etc. Improving the priority network would be a decision made within each district.

Further Applications

Input evaluations may assess the effectiveness of funding. Examples include:

1. \$X construction dollars allocated toward improving bicycle facilities enhanced X linear miles to meet the specified criteria for integrating bicycle travel.
2. Average cost per mile to upgrade facilities to meet specified criteria for bicycle conditions.



This performance measure may provide useful information such as:

1. How many additional households now have bikeway connections that meet specified criteria to transit?
2. How many additional households have bikeway connections that meet specified criteria to goods and services within two miles or less?
3. How has improving conditions on X miles of bikeways on the priority network translated into % mode share of bicycle travel?
4. How has improving conditions on X miles of bikeways on the priority network affected the number of bicycle crashes on the improved routes?

Potential Partners

MnDOT will need to partner with other agencies that own and maintain routes on the priority network to monitor corridor conditions. MnDOT may be able to loan monitoring devices to cities, counties and MPO's in order to obtain data on critical non-state roads. MnDOT may use its annual status update process to collect additional data needed to calculate the performance measures. See Appendix G, Role of Outside Organizations section.

Example Measures

Many states recognize that the value of bicycle facilities cannot be measured by quantity alone, so they incorporate specific planning information and goals into performance measures. States such as Colorado and Washington measure the importance of a route's connectivity to important destinations, and place a priority in routes where demand is high. Other states, such as Maryland and Tennessee set goals based on increasing linear miles of routes. Measuring distances of bicycle lanes alone is limiting in that it does not consider that the value of such routes varies by placement. See the Appendix G for a list of sample performance measures.

Next Steps

The first task is for MnDOT to institutionalize the data collection necessary for deriving the performance measures. This process may be similar to how MnDOT currently organizes data collection for motorized vehicles. The FHWA also provides a recommended process in Chapter 3 of their Guideline for Traffic Monitoring. General steps include:

1. Review existing data collection processes to assess what MnDOT and other potential partner agencies are currently obtaining.
2. Develop an inventory of the data needed for the performance measures. This inventory should include information about resources allocated toward the performance measure goals and the agencies and organizations responsible for collecting and interpreting the data.
3. Formulate a methodology to collect and assess data. This step should include quality control measures, such as how to flag erroneous data and address data gaps.
4. Identify monitoring needs and a methodology for evaluation. In addition to equipment needs, MnDOT can explore collaboration with partner agencies.
5. Develop an overall framework for implementation, including specific plans for data collection, modeling, data interpretation and timelines.

Phasing in data tracking will allow MnDOT to adjust the system while it is being gradually implemented. Beginning bicycle counts on heavily traveled routes will provide significant information about bicycle transportation patterns. Understanding the larger patterns, unique to bicycling, may aid MnDOT and the University of Minnesota research team in formulating a methodology to infer averages from the data and estimate error rates. MnDOT can gradually work toward smaller and less traveled routes, eventually incorporating small cities and agencies that manage trails into the bicycle count program. Similarly, by beginning data assessment in larger metropolitan areas, MnDOT may create and refine the system, before expanding to less populated areas.

Much of the data collection work has already begun. MnDOT is working with the Federal Highway Administration (FHWA) to collaborate on the development of the upcoming version of the Traffic Monitoring Guide (TMG). The Central Office is committed to working with district staff and the other communities to conduct periodic counts and is developing a schedule and format for reporting bicycle and pedestrian traffic counts.

MnDOT is also collecting bicycle facility data for the first time through its annual status update process with counties and certain cities. This data collection effort will focus on accurate shoulder and trail data with the option for local partners to provide additional data about other bicycle infrastructure (i.e., bicycle lanes, designated bicycle routes, etc.). Likewise, the Bicycle and Pedestrian Section will request bicycle infrastructure data from RDCs, MPOs and MnDOT district staff (i.e., shoulder, trails, bicycle lanes, designated bicycle routes, etc.).

The performance measures build on one another, which helps to define a logical order for implementation. First, the total numbers of bicycle trips must be counted in order to calculate bicycle mode share for Performance Measure #1 (Usage). The total number of bicycle trips then becomes a baseline metric, against which bicycle accident data is compared in Performance Measure #2 (Safety).

Performance Measure #3 (Assets) will require the most work before it can be implemented. MnDOT must define the extent and location of the statewide priority network, and outline a framework to address route improvements, maintenance issues, and changes. Once the initial planning process is underway, MnDOT will need to define the specified criteria the facilities along the network should meet. The criteria can be used to analyze and refine the initial statewide network identified. The MRT route establishment process can serve as a model as an initial route was identified and then MnDOT collaborated with stakeholders to identify and apply route selection criteria to finalize the MRT. After the network is established, MnDOT can begin the process of ongoing data collection to assess and monitor the conditions of the statewide priority network.

Once the initial data for each measure is obtained, MnDOT will need to establish the baseline conditions (e.g., where are we now) and performance goal targets (e.g., where do we want to be) through its established procedures and guidelines. The upcoming Statewide Bicycle Policy Plan project provides an opportunity to engage MnDOT staff and its partners in setting the performance targets for the future.

Chapter 4

CONCLUSION

The first outreach effort for this Study engaged MnDOT staff, partners, and the public in an analysis of bicycle-related strengths, weaknesses, opportunities, and threats. Consistent with that approach, the Study offers recommendations for building upon MnDOT's strengths, addressing current weaknesses, and seizing opportunities into the future while steering away from potential barriers.



Building on Strengths

The initial feedback from MnDOT district staff, partners and the public as well as the policy analysis revealed multiple MnDOT successes in integrating bicycling into its day-to-day business and culture. Developing frameworks that ensure the protection of these successes and strengths is recommended. Identified strengths include district staff coordination with trail groups, planning partners and Central Office Bicycle and Pedestrian Section staff; MnDOT's Bikeway Facility Design Manual; existing state policies; existing infrastructure; the Mississippi River Trail bikeway; and a prominent and healthy Minnesota bicycle culture, among others. MnDOT's work and the work of partner agencies, organizations and advocates have all contributed to Minnesota currently being ranked the second most Bicycle Friendly State in the country by the League of American Bicyclists.

Addressing Weaknesses

Although MnDOT's bicycle-related policies and practices have many areas of strength, several important weaknesses were also discovered through the work of this Study. Policy analysis and comments received directly from district staff uncovered multiple areas where policy language did not provide the clear direction district staff need to support bicycle-supportive decision-making and design at the project level. Even staff who were familiar with the MnDOT Bikeway Facility Design Manual requested additional guidance for when and where to apply its recommendations. MnDOT is currently in the process of updating the Bikeway Facility Design Manual to address the recommendations from this Study as well as new guidance from AASHTO and other sources.

The policy analysis also revealed a clear need to update and clarify processes for implementing the policy intent. An identified and comprehensive bicycle system including prioritized corridors or routes does not currently exist within existing policy and planning guidance. This lack of a guiding framework for bicycle-related network investment leaves a void for district staff to integrate policy intent directly into project development and action, and forces district staff to coordinate with external partners (e.g., cities, counties, advocacy group, etc.) on a piecemeal, project by project basis.

Funding was consistently noted as a weakness or threat. District staff noted the difficulty of having limited funding for the many roadways that need maintenance/improvements and that the difficulty becomes even greater if the development or maintenance of bikeway facilities gets added to their obligations. Comments noted the value of Transportation Enhancement funds

and other sources to pay for trails and other bikeway facilities. Establishing a dedicated source of funding for bikeway facilities was noted as an important opportunity.

Seizing Opportunities

As a part of the Study, several existing processes within MnDOT were identified as opportunities for better integrating bicycling into the MnDOT's day-to-day operations. For example, traffic forecasting and traffic counts have been conducted for many years with great success in the agency. During the course of the Study, collaboration with the department responsible for that activity was initiated as a part of the performance measures development. What resulted was the development of an improved, more collaborative process within the agency that is leveraging an existing system and adding a much-needed data collection component to the department's suite of bicycle-related tools and processes.

Another important improvement is the new partnership that has developed between MnDOT's Bicycle and Pedestrian Section, Data Systems and Coordination Section, and the Geographic Information and Mapping Section. Initial, internal conversations regarding the Minnesota Bicycle Map update revealed that the Data Systems and Coordination Section conducts an annual 'status update' for statewide roadway data, reaching out to counties and cities across the state. Now, as a result of MnDOT's commitment to fostering collaboration with internal and external partners, the annual status update will include a bicycle component in the data request, and will support the goals of the Study by establishing a sustainable bicycle data collection process. The new internal partnership with the Geographic Information and Mapping Section, the section responsible for producing the Official State Highway Map, resulted in this section producing a new Minnesota Bicycle Map using many of the same the features displayed on the Official State Highway Map that are important to bicycle travel (i.e., state parks, rest areas, historic sites, city names, etc.), but replacing the roadway line symbology with bicycle related assets (e.g., shoulder width, traffic levels, controlled access roadways that prohibit bicycles, Mississippi River Trail route, etc.) and adding federal, state and regional bike trails. Both the bicycle data collection effort and the publication of the updated Minnesota Bicycle Map have the potential of being sustainably and cost-efficiently integrated into MnDOT's current practices, thus ensuring their continuation into future years.

Establishing a dedicated source of funding for bikeway facilities was noted as an important opportunity. Bicycle infrastructure is one of the ten investment categories being contemplated in the Minnesota State Highway Improvement Plan (MnSHIP) planning process. Currently, bicycle-related improvements are typically undertaken concurrent with pavement and bridge projects. Many bridge reconstruction or expansion projects include bicycle infrastructure. Bridge projects can include paths, bike lanes, and separated trails that connect to existing trails. Pavement projects may include bicycle infrastructure to respond to identified priorities and local demand. Examples include expanded shoulders and bike lanes. Historically, many of these improvements have been funded through Transportation Enhancement funds. With the passage of the new federal transportation bill (MAP-21), some of these improvements may be funded through the Transportation Alternatives Program. Other funding sources are currently being identified through partnerships with MnDOT Office of Capital Programs and Performance measures and will continue beyond the completion of the Study.

Planning for the Future

While the integration of bicycling into MnDOT's day-to-day business has advanced as a direct result of the Study, there is much work to be done in the future. The next phase of the Study will be the Statewide Bicycle Policy Plan (Plan). The scope of work for the Plan is a direct result of the findings and recommendations from this Study, and is likely to lead to implementation of the top recommendations from MnDOT staff, partners, and the public. The Plan will include the following major initiatives:

- The Statewide Bicycle Policy Plan will provide a framework for developing performance targets and guidance for developing District Bicycle Master Plans
- A Bicycle Master Plan will be developed for each of MnDOT district
- Education and outreach will assist MnDOT staff with effectively collaborating with bicycling partners through a holistic approach