



Final Report

To: Sue Geniesse, Elizabeth Ledet, Rebecca Knudson, Sheila Lyons, Oregon Department of Transportation, Constance Beaumont, Department of Land Conservation and Development

From: Dru van Hengel, Mike Tresidder and Mathew Berkow, Alta Planning + Design

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Re: Bicycle and Pedestrian Travel Assessment Report– Final Report

Attached is a final version of the ODOT Bicycle and Pedestrian Travel Assessment Report. This report was informed by the best practices review of bicycle and pedestrian data and utilization presented in Memorandum #1 and the results of interviews with agency staff from throughout ODOT on the same topic which were presented in Memorandum #2. Both of these memos are provided as Appendices to this report. It is envisioned that the recommendations contained in this report will allow ODOT to successfully improve its collection and utilization of bicycle and pedestrian data.

This report covers the following topic areas:

Acknowledgements.....	2
Executive Summary	3
Introduction.....	6
State of the Practice	8
ODOT Practices	10
Issues and Opportunities.....	15
Conclusion	30

Acknowledgements

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The contents of this document do not necessarily reflect views or policies of the State Of Oregon.

Executive Summary

Project Purpose

Transportation planners employ well-developed, sophisticated modeling tools for measuring motor vehicle trips, and the data generated by these tools help state and local governments to determine how and where transportation dollars should be invested. In general, analytical tools for bicycle and pedestrian planning and operations are less developed than those for motor vehicles. This fact has not only contributed to the relatively lower investment in walking and biking facilities, but it also greatly impacts the ability to invest available funds wisely.

The Oregon Department of Transportation (ODOT) collects some bicycle and pedestrian data and performs analyses related to non-motorized needs, but, similar to national trends, these methods are less developed than ODOT practices for motor vehicles. **There is not a consensus within the agency with respect to the types of data that should be collected, where they should be collected, how best to collect the data, and how to analyze the data to meet various needs.** Yet it would be to the advantage of the agency to formulate a well-designed method to collect bicycle and pedestrian data to serve current and anticipated analytical needs.

The Bicycle and Pedestrian Travel Assessment Report was undertaken to compare ODOT bicycle and pedestrian data collection and utilization practices with agency goals and national trends. The Report provides an overview of national best practices, describes current Agency use of various types of pedestrian and bicycle data, and reports on Agency goals related to bicycle and pedestrian data. Finally, the report recommends immediate steps that can be undertaken by the Agency and the Transportation and Growth Management (TGM) Program to reach Agency-wide goals and objectives related to multi-modal transportation.

Project Methodology

In preparing this report, two major tasks were undertaken simultaneously:

1. **Best Practices and Literature Review** - The objective of the first task was to learn what is occurring nationally and in Oregon with respect to obtaining and applying bicycle and pedestrian travel information. This was done through a combination of best practices and literature review and selected interviews with regional and national professionals in the non-motorized planning/modeling field. The results should not be considered to represent complete documentation, either nationally or in Oregon, of current efforts to obtain and apply bicycle and pedestrian travel data.
2. **Agency Bicycle and Pedestrian Data Goals and Objectives** - The objective of the second task was to document current ODOT goals, objectives, and issues related to obtaining and using bicycle and pedestrian data. This was accomplished through qualitative analysis of a series of in-person and telephone interviews with 45 agency staff. The complete list of interviewees is included in Appendix C.

Findings and Conclusions

Organization-wide practices related to bicycle and pedestrian data collection underway at ODOT primarily relate to documenting facility characteristics and addressing safety issues.

- **Safety Data** - Safety data are routinely utilized for identifying bicycle and pedestrian needs, within the context of automobile involved collisions. Practices to document bicycle and pedestrian activity and understand user characteristics, on the other hand, are not as well institutionalized.
- **Facility Data** - Characteristics of bicycle and pedestrian facilities are often observed during the process of identifying specific safety or operational improvements. A Data Collection Users Guide has been developed to assist ODOT employees and outside contractors in gathering bicycle/pedestrian facilities, parking, ADA ramps and curb inventory information.
- **Activity Data** - Data documenting bicycle and pedestrian activity are collected on a case-by-case basis, depending upon the project needs, and are not available agency-wide. Specific counts for the purpose of capturing bicycle and pedestrian activity within communities are not generally conducted by ODOT, nor is bicycle and pedestrian activity yet incorporated into existing travel demand models. Existing analysis tools do not allow for an understanding of system use or for measuring the impacts of infrastructure projects.

ODOT staff generally recognizes a need to improve data collection, storage and utilization practices in order for the agency to increase efficiency generally, and also to meet its goals of becoming a multi-modal transportation agency. The major needs identified include:

- **Consistent Methodologies** - Despite professional interest in collecting and utilizing bicycle and pedestrian data, the agency does not utilize a consistent method for collecting activity or user data, nor is there an organized interface for storing and accessing such data.
- **Improved Communication** - Internally available data sources and processes are not widely understood, and a roadmap for utilizing bicycle and pedestrian data to achieve agency goals has not yet been identified. Any changes that result from this focus on bicycle and pedestrian data needs should be communicated across the agency in order to increase awareness and understanding of agency practices.

Emerging Needs for this data

Throughout this process of interviewing Agency staff, there was an acknowledgment that as ODOT moves forward to become a truly multi-modal agency, there will be an increased need for data on non-motorized use, users, facility characteristics and safety. Initiatives underway that will rely on a more systematic approach to data collection, storage and use include:

- Asset Management Integration Section's FACS-STIP initiative.
- New strategies related to Agency-wide sustainability goals including Least-Cost Planning, GreenRoads rating, Greenhouse Gas modeling and Multi-Modal Level of Service analyses.
- Successful communication of progress related to Agency goals of multi-modalism and sustainability will be key to maintaining public support for bicycle and pedestrian projects. The trend in this area is to develop measurable and repeatable performance indicators that can be used to demonstrate trends over time.

Next Steps

There is great opportunity to build upon existing ODOT data collection and integration efforts, including the Asset Management Integration Section's FACS-STIP initiative which is developing standards to improve accessibility and integration of ODOT data practices. Important bicycle and pedestrian data needs include the development of:

- Standard data collection methodologies;
- A database framework for archiving and accessing data; and
- Standard processes for utilizing bicycle and pedestrian data.

To achieve these and related goals, ODOT should:

- Create and implement a strategy for moving forward with the recommendations contained in this report.
- Build on the efforts of the Asset Management Integration Section.
- Convene a working group to meet regularly for the purposes of improving internal communication across ODOT regarding existing bicycle and pedestrian data practices and determining how to respond to current and future needs.

Introduction

Project Background

Transportation planners employ well-developed, sophisticated modeling tools for measuring motor vehicle trips. The data generated by these tools help state and local governments determine how and where transportation dollars should be invested. National data sources, including the U.S. Census, American Community Survey and National Household Travel Survey, provide some information on bicycling and walking, but are of limited value for bicycle and pedestrian planning. For example, the U.S. Census and American Community Survey generally undercount the actual number of walking and biking trips made in a community because each documents only commute trips, which make up less than 20% of all trips nationally. As a result of these and other limitations, localized data collection and analysis efforts are required.

In general, analytical tools for bicycle and pedestrian planning and operations are less developed than those for motor vehicles. There is not a widely accepted approach to gathering data on bicycle and pedestrian travel or integrating such data into traffic analyses and transportation plans. The Oregon Department of Transportation (ODOT) collects some bicycle and pedestrian data and performs analyses related to non-motorized needs, but, similar to national trends, these methods are less developed than ODOT practices for motor vehicles. There is not a consensus within the agency with respect to the types of data that should be collected, where they should be collected, how best to collect the data, and how to analyze the data to meet various needs. Yet it would be to the advantage of the agency to formulate a well designed method to collect bicycle and pedestrian data to serve current and anticipated analytical needs.

Project Purpose

The purpose of this report is to provide ODOT and the Transportation and Growth Management (TGM) Program with three types of information:

1. Emerging trends, research, and best practices related to obtaining and using bicycle- and pedestrian-related data, both at the national level and within Oregon;
2. A description of ODOT's current use of bicycle and pedestrian data, identification of Agency goals and objectives, and evaluation of issues related to developing a data collection and analysis methodology to meet ODOT's needs; and,
3. Recommended possible next steps for improving pedestrian and bicycle data collection and utilization at ODOT.

Methodology

In preparing this report, two major tasks were undertaken simultaneously:

1. **Best Practices and Literature Review** - The objective of the first task was to learn what is occurring nationally and in Oregon with respect to obtaining and applying bicycle and pedestrian travel information. This was done through a combination of best practices and literature review and selected interviews with regional and national professionals in the

non-motorized planning/modeling field. The results should not be considered to represent complete documentation, either nationally or in Oregon, of current efforts to obtain and apply bicycle and pedestrian travel data.

2. **Agency Bicycle and Pedestrian Data Goals and Objectives** - The objective of the second task was to document current ODOT goals, objectives, and issues related to obtaining and using bicycle and pedestrian data. This was accomplished through qualitative analysis of a series of in-person and telephone interviews with 45 agency staff. The complete list of interviewees is included in Appendix C.

State of the Practice

Types of Bicycle and Pedestrian Data

There are various types of data collected to assist with planning bicycle and pedestrian facilities and networks. These data types can be grouped into several general categories, including 1) quantifying use, 2) surveying users, 3) documenting facility inventories, and 4) documenting safety concerns. In 2005, the Pedestrian and Bicycle Information Center grouped¹ the existing data sources into the following categories:

Table 1: Types of Bicycle & Pedestrian Data

Data Collection Type	Sub-group	Description
Counts to Quantify Use (Volume)	Manual Counts	Data collected by persons in the field.
	Automated Counts	Data collected through the use of automated equipment (e.g. infrared, video, pavement or pneumatic tubes).
Surveying Users (Users and Trip Characteristics)	Targeting Non-Motorized Users	Surveys administered to individuals walking, biking, or participating in another form of non-motorized transportation.
	General Population Sample	Random-sample survey where all community members have an equal opportunity to be selected in a survey.
Documenting Facility Extent (Facilities)	Inventories	Collecting physical information about the transportation system (e.g., roadway segments, property parcels, crosswalk locations, etc.). May include qualitative observations regarding user behavior.
	Spatial Analyses	Mapping software (GIS/CAD) used to analyze and display facility data.
Safety (Collisions)	Crash Data	Data reported by law enforcement and the Oregon DMV.
	Trauma Data	Data reported by hospitals.

Typical Applications of Bicycle and Pedestrian Data

Examples of the data types described in the table above are provided throughout this document. Table 2, below, provides examples of typical applications for which bicycle and pedestrian data can be used. Having a wide variety of high quality data types available makes it possible to conduct more detailed and thorough planning, programming and project efforts.

Table 2 - Typical Applications of Bicycle and Pedestrian Data

Application	Description	Typical Data
Bicycle/Pedestrian Safety Action Plans	Bicycle and pedestrian safety action plans focus on improving safety for non-motorized modes. Crash data is a key input, but other information is relevant to associate crash history and relative risk with facility and demographic characteristics.	Crash Data Facility Inventory Data Demographics Data Count Data
Systems Planning - Needs Analysis and Project Prioritization	Needs analysis and project prioritization are common features of bicycle/pedestrian master plans or bicycle/pedestrian elements of a general transportation plan; Needs analyses identify areas with greatest need for bicycle and pedestrian facility improvements. Various types of data are used to develop evaluation criteria to rank projects.	Crash Data Facility Inventory Data Demographics Data Targeted User Survey

¹ PBIC Data Collection Studies (2005). The safety data collection type was not present in the PBIC table.

Bicycle and Pedestrian Travel Assessment Report

Application	Description	Typical Data
Project Funding	Safety programs are a common source of bicycle and pedestrian funding and typically focus on crash history. The data used to identify priority projects in general transportation plans are also relevant as these plans identify projects the community would like to see funded.	Crash Data Manual Count Data Automatic Count Data Facility Inventory Data
Evaluation of Facility Investments	The evaluation piece of the planning process is often neglected for a variety of reasons. However, count and survey data are used to measure before and after use as well as document user perceptions (motorized and non-motorized) of a new investment.	Manual Count Data Automatic Count Data Targeted User Survey
Report Cards	Some jurisdictions develop regular reports to monitor bicycle and pedestrian facility investment and usage. The best examples bring together various metrics into a single report, including usage, collision rates, facilities investment, progress towards plan goals, perceptions of facilities, etc.	Manual Count Data Automatic Count Data Crash Data Facility Inventory Data Targeted User Survey

ODOT Practices

Current Methods of Obtaining and Using Bicycle/Pedestrian Data

The Transportation Data Section has primary responsibility for collecting primary data, although other sections may request data as components of specific projects. Bicycle and pedestrian data are utilized throughout ODOT to varying degrees. Although many sections indicate that they do currently, and will in the future, use bicycle and pedestrian data, there was a high level of uncertainty about the extent of current use throughout ODOT.

Group or Section	Activity	Data
Director's Office		
Sustainability Program	Report on meeting benchmarks and performance measures	Facilities Inventory Investment Amount
Transportation Data		
Transportation Systems Monitoring Unit	Conducts and archives traffic counts. Bicycle and pedestrians counted upon request.	Traffic Counts
Crash Analysis and Reporting Unit	Collects and codes collision data.	Crash Data
GIS Unit	Maintains facility inventory. Every year, the unit receives data to update its GIS layers that document sidewalks, bike facilities, ADA ramps, multi-use paths, etc.	Facilities Inventory
Transportation Planning and Analysis Unit (TPAU)		
Modeling Team	Uses bicycle and pedestrian mode share data from household survey data. Most travel demand models are not designed to forecast bicycle and pedestrian activity.	Oregon Household Activity Survey
Facilities Analysis & Simulation Team	Requests pedestrians and bicycles as part of classified intersection counts. Corridor counts are performed using tube counters which only count vehicles. Beginning to collect additional facilities data to complete Multi Modal Level of Service calculations found in 2010 Highway Capacity Manual	Traffic Counts Facilities Inventory
Regions 1 through 5		

Bicycle and Pedestrian Travel Assessment Report

Group or Section	Activity	Data
Planning	<p>Bicycle and pedestrian data is used for facility design, transportation impact studies, transportation system plans, corridor plans, safety improvement plans and projects, safe routes to school projects, and Downtown Plans</p> <p>Uses existing counts and conducts or requests additional counts as needed either through Transportation Data Section or from a project consultant.</p> <p>Collects facility information as part of Transportation System Planning.</p> <p>Uses safety data in projects.</p>	<p>Crash Data Facilities Inventory Traffic Counts</p> <p>Manual Counts</p> <p>Facilities Inventory</p> <p>Crash Data</p>
Traffic	Collision or complaint data may identify the need for bicycle/pedestrian projects. Observations sometimes performed to identify exact location of treatment.	Crash Data Manual Counts Facilities Inventory/Observations
Technical Services		
Bicycle and Pedestrian Program	<p>Bicycle and pedestrian data is used for facility design, transportation impact studies, before and after studies.</p> <p>Facility inventories and related performance measure reporting.</p> <p>Safety analysis</p>	<p>Traffic Counts</p> <p>Facilities Inventory</p> <p>Crash Data</p>
Roadway Design Unit	Bicycle and pedestrian data is used for facility design.	Traffic Counts
Traffic Design Unit	<p>Transportation impact studies, before and after studies.</p> <p>Safety analysis</p>	<p>Traffic Counts</p> <p>Crash Data</p>
Transportation Safety		
Safe Routes to School Program/Bicycle Safety/Pedestrian Safety	Safety analysis and safety reporting	<p>Crash Data</p> <p>Facilities Inventory / Observation studies near Safe Routes schools</p>
Transportation Development Division		
Asset Management Integration Section	Coordinate various ODOT data sets through FACS-STIP; help develop data standards to make data easier to access.	Various

Emerging ODOT initiatives

Throughout this process, there was an acknowledgment that as ODOT moves forward on becoming a truly multi-modal agency, there will be an increased need for data on non-motorized use and users. The information in this report seeks to bring the specific issues related to collecting and using bicycle and pedestrian data into focus and suggest strategies to build on existing efforts which are already under way at ODOT. The following are current initiatives to improve data collection and reporting as well as strengthen ODOT's contribution towards sustainability.

Data Access

FACS-STIP (Features, Attributes & Conditions Survey – Statewide Transportation Improvement Program) - FACS-STIP is being developed by the Asset Management Integration Section with the purpose of including or linking to various existing ODOT data sets. A part of this effort is the development of standardized ways to collect and report data, including the recent *Bicycle/Pedestrian Facilities, Parking, ADA Ramps & Curbs: Data Collection User's Guide*, which is now being used by the ODOT regions to do facilities updates. The overall goal is to have one place to go for data about ODOT facilities rather than the multiple locations that exist now. FACS-STIP links to ITIS (The Integrated Transportation Information System), crash data, traffic count data, Safety Priority Index System (SPIS) corridors, etc. It could eventually serve as the means to find all bicycle-pedestrian related data across the ODOT system.

Sustainability

Sustainability is an umbrella phrase covering a wide range of issues and efforts. ODOT's Sustainability Plan focuses on seven areas with a framework for sustainably managing its internal and external operations. The major sustainability efforts that were noted by ODOT staff interviewed for this report are:

- Least-cost planning
- GreenRoads Rating System
- Greenhouse Gas Emission reduction/modeling
- Multi-Modal Level of Service (MMLOS)

Least-Cost Planning

Least-cost planning (LCP) was defined by the 2009 Oregon Legislature in the Jobs and Transportation Act (House Bill 2001): “Least-cost planning means a process of comparing direct and indirect costs of demand and supply options to meet transportation goals, policies or both, where the intent of the process is to identify the most cost-effective mix of options.” ODOT is now working with stakeholders to develop a least cost planning methodology that will meet the definition above. ODOT expects LCP to enable a more comprehensive evaluation of possible solutions and improve consistency, transparency, and accountability for decisions made with LCP. One challenge in developing the LCP methodology will be to determine how to compare the costs and benefits of various investment strategies, such as non-motorized transportation projects,

transit projects or land use changes. LCP will almost certainly require addition bicycle and pedestrian data to facilitate the informed decision-making this process aims to achieve.

Greenhouse Gas Emission (GHG) reduction/modeling

Recent state legislation to reduce greenhouse gas emissions is resulting in the development of new tools to evaluate emissions reduction strategies. ODOT is currently developing a Greenhouse gas Statewide Transportation Emissions Planning model (GreenSTEP) to estimate emissions generated by the transportation sector. With relation to bicycle and pedestrian activity, the work performed by ODOT will likely occur at a broad level. It will aim to identify the effect of shifting modes in metropolitan areas under different transportation investment and policy scenarios on greenhouse gas emissions. As this work continues, additional data will likely be needed to help evaluate the potential of walking and bicycling modes to reduce vehicle miles traveled and transportation-related greenhouse gas emissions.

GreenRoads Rating System

ODOT is exploring the use of the GreenRoads™ rating system (<http://www.greenroads.us/>). GreenRoads is a sustainability rating system for roadway design and construction that is applicable to all roadway and trail projects including new, reconstruction and rehabilitation (including overlays). GreenRoads functions as a collection of sustainability best practices, called "credits," that relate to design and construction. Achieving these credits can earn points toward a total score for the project, and in general, this GreenRoads score can be used as an indicator of sustainability for the project. One of the voluntary credit categories is Access & Equity, which includes several bicycle and pedestrian related measurements. Those include: safety audit, context sensitive solutions, traffic emissions reduction, pedestrian access, and bicycle access.

Initial feedback from ODOT staff using a GreenRoads checklist at the project level is positive. It is thought that this tool can help ODOT assess whether it is spending money as wisely as possible and meeting its sustainability goals.

Multi-Modal Level of Service

The newest edition of the Highway Capacity Manual (2010, HCM) includes a methodology for calculating level of service for multiple modes, including for bicycling and walking. The TPAU Facilities Analysis & Simulation Team reports that it is determining what types of additional bicycle and pedestrian-related inventory data (width of bike lanes, sidewalks, buffers, parking, etc.) will be needed in order to complete multi-modal level of service calculations for ODOT projects.

Regional Differences

In the Agency interview process, responses regarding the value of taking steps to improve the quality and quantity of bicycle and pedestrian data differed to some extent by region. Staff from the more highly populated regions reported a desire for additional data to better understand existing levels of bicycle and pedestrian activity. Staff from less populated regions see value in bicycle and pedestrian data, but some mentioned there are areas where the infrastructure gaps are very clear without the data. Staff cautioned against requirements that could divert funding away from

building projects to document a need that they already understand. Thus, while there is value in collecting more bicycle and pedestrian data, some questioned whether the cost would outweigh the benefit in some communities.

Issues and Opportunities

The following sections describe in detail the issues and opportunities identified by staff throughout ODOT.

Data Accessibility

The utility of bicycle and pedestrian data depends on successful and consistent data collection, a framework for data submission and storage, as well as strategies for accessing the data.

Emerging Trends

- The Colorado Department of Transportation has a traffic count database system for internal use and is in the process of developing a public interface where outside agencies and individuals can access available traffic counts, including 24 hour bicycle and pedestrian counts.
- The California Highway Patrol (CHP) maintains the Statewide Integrated Traffic Records System (SWITRS), a database that serves as a means to collect and process data gathered from a collision scene. The Internet SWITRS application is a tool by which CHP staff and members of its Allied Agencies throughout California can request various types of statistical reports in an electronic format (PDF or as raw data).

Agency Practices

- Numerous ODOT staff members reported that they do not always know where to find available bicycle and pedestrian data and commented on the need for centralized data storage locations to upload, view and request available traffic count and crash data. Comments were also made regarding the need for standardized data request forms.
- The Transportation Data section has a traffic count database that is licensed to anyone at ODOT. Accessing the database requires the IT department to install an application on individual user machines. However, existence of this database is not widely known across the agency.
- Many traffic and non-motorized counts reside only in individual project folders, which means they are often unknown and unavailable for later projects.
- The Crash Analysis and Reporting (CAR) & Automation Units can provide extensive crash data for use in transportation projects. There is no online interface for making a request for crash data. Requests must be made by contacting the unit directly, although instructions for whom to contact and how to make such requests are not available online.
- Asset Management Integration Section is currently developing Features, Attributes & Conditions Survey – Statewide Transportation Improvement Program (FACS-STIP), which is described in the Emerging ODOT Initiatives section of this memo. The bicycle and pedestrian data sets identified in this process are currently incomplete and the FACS-STIP process is not widely known throughout ODOT.
- Agency staff noted that district and maintenance staff is out on the roadways every day noticing bicycle and pedestrian activity, problem areas, etc. They have empirical and qualitative data but there is no mechanism to collect it from them.

Recommendations for Improved Practices

- Publicize the traffic count database internally to ODOT staff.
- Develop a process for uploading short duration or project-specific counts to the Transportation Data database.
- Develop a standardized process, online instructions and/or online interface to request crash data.
- Provide staff training on FACS-STIP.
- Develop an online interface (i.e., Google maps) for district and maintenance staff to log observations on bicycle and pedestrian activity, problem areas, etc.

Benefits of Improved Practices

- Improved data accessibility would increase the use of existing data within ODOT for current projects.
- Improved data accessibility would prevent duplication of count efforts and thus reduce the costs of data collection.
- More data users would lead to productive feedback for improving data quality and organization.
- Improved accessibility and agency awareness of available data would improve the quality of project analyses.

Data Collection and Usability

This section identifies considerations for collecting and utilizing a variety of bicycle and pedestrian data, including counts, collision, and facilities.

Emerging Trends

- The National Bicycle and Pedestrian Documentation Project (NBPD) is designed to assist communities in the United States in conducting consistent and useful counts and surveys of bicyclists and pedestrians. The NBPD website contains templates for count forms, intercept surveys, and training materials.
- Washington State Department of Transportation (WSDOT) launched the Washington State Bicycle and Pedestrian Documentation Project in 2008 to track growth in bicycling and walking across Washington State and measure progress towards the Washington State Bicycle Facilities and Pedestrian Walkways Plan's goal of doubling the amount of bicycling and walking by 2027. In 2010, non-motorized counts were conducted in 30 communities across Washington at a total of 229 unique locations by over 300 volunteers. The program is administered in partnership with the Cascade Bicycle Club.
- The Colorado Department of Transportation (CDOT) has purchased a number of automatic bicycle and pedestrian counters. Some are installed permanently while others are rotated around the state by request from local agencies. CDOT aims to develop adjustment factors and other typical traffic data calculations.
- Traffic Signal PORTAL study (PSU) - Portland State University will soon begin a research project that aims to begin archiving and developing useful visualization tools from multi-modal data gathered by traffic signals. This will be done as part of a project funded by the Oregon Transportation Research and Education Consortium for 2011 titled Multimodal Data at Signalized Intersections.
- The Pedestrian and Bicycling Information Center developed a Pedestrian and Bicycle Crash Analysis Tool (PBCAT), which is software that assists with collecting, organizing, and analyzing crash data. This freely-available program classifies the data into types of crashes to help planners identify the causes and contributing factors in bicycle and pedestrian crashes. The North Carolina Department of Transportation (NC DOT) has utilized the PBCAT system to develop an online database that includes almost 40,000 bicycle and pedestrian crashes. It is publicly available, and users can create crash reports based on crash year, type, location, or contributing conditions.

Agency Practices

- Bicycle and pedestrian count data are typically collected as part of intersection traffic counts. These counts are usually taken to address issues related to motor vehicle travel and are used to identify conflict points with pedestrians and bicycles. The count locations and timeframes are rarely optimal for ongoing documentation of bicycle and pedestrian activity in a community.
- ODOT has one permanent bike counter (inductive loops) which was recently installed on the I-205 bike path. Data from that one detector is not sufficient to identify trends in volume across state.

- The Transportation Data Section reports that collecting bicycle and pedestrian count data for the entire system would be prohibitively expensive. However, there would be value in selecting important corridors (i.e., for biking) and outfitting them with counters to collect trend information, etc.
- ODOT recently developed a Data Collection Users Guide to assist ODOT employees and outside contractors in gathering bicycle/pedestrian facilities, parking, ADA ramps and curb inventory information and to maintain a consistent data collection method for road inventory throughout the state. However, the process of requesting a facilities inventory is not widely understood in the agency.
- Agency staff report that potentially useful data is currently being lost/overwritten (e.g., pedestrian push button detection data is not recorded and downloaded from traffic signals and project level count or facility inventory data are stored in project files instead of being made available within the organization).
- The Transportation Data Section reports the need to develop methodologies that overcome challenges related to the variability of pedestrian and bicycle activity (i.e., weather, time of day, day of week, or seasonal dependencies). A network of continuous bicycle and pedestrian counters would be necessary for the development of adjustment factors (urban/rural, roadway typology, weather, etc.) to adjust short duration (i.e., peak hour) counts.
- TPAU reports that emerging initiatives such as climate change legislation are likely to create a need for mode shift projections, which will require additional data to understand what drives behaviors and demand for non-motorized transportation.
- Bicycle and pedestrian collision data (gathered by outside agencies and coded by ODOT Crash Analysis and Reporting Unit) are generally under-reported. There may also be a need to further refine existing ODOT coding to aid in the analysis of collisions involving bicycles and pedestrians.
- Agency staff mentioned that the ability to access and combine multiple data sources would make the data more valuable.

Recommendations for Improved Practices

- Develop standard data collection practices and procedures, including:
 - Standard data request and collection forms, made available online.
 - Comprehensive methodology for archiving and retrieving bicycle and pedestrian data (including count, collision, and facilities data).
 - Work with the Transportation Data Section and TPAU to develop ODOT guidelines for pedestrian and bicycle data requests including how to select count locations, count period (time of year, day of week, duration of counts) and other strategies to reduce variability in data quality.
 - Create an online resource for ODOT data collection methodologies and guidelines for use by ODOT and local agency staff.
 - Initiate a pilot project to test and validate the guidelines methodology.
 - Guidelines for interpreting the bicycle and pedestrian data (i.e., how to understand the implications of bicycle and pedestrian volumes in different land use contexts).

- Identify key locations and corridors for regular monitoring with bicycle and pedestrian counts.
- Investigate whether it is possible to expand and refine crash data codes to better describe collisions involving bicycles and pedestrians.
- Investigate the utility of archiving traffic signal data with multi-modal content.

Benefits of Improved Practices

- Policy-makers will have faster and more reliable access to bicycle and pedestrian data to gauge progress on benchmarks and performance measures and understand the impact of infrastructure investment choices.
- Development of count guidelines focused on the behavior, routes, and destinations of bicyclists and pedestrians will improve the reliability and usability of count information for transportation systems planning and emerging modeling efforts.
- More comprehensive and accessible crash data will better inform safety-related projects and transportation systems planning. Bicycle and pedestrian activity data can provide valuable contextual information to inform collision data.
- More comprehensive data can be used to develop and improve modeling tools to evaluate potential mode-shift implications of new policies and changing conditions in the economy and land use.

Project Delivery & Transportation Operations

This section reviews trends and practices related to the use of bicycle and pedestrian data in project delivery, transportation operations improvements, and capital improvement projects.

Emerging Trends

- Arlington County Virginia had ‘before’ counts on a bridge location that crossed a freeway. After opening a trail with an underpass below the same freeway, Arlington found that bridge use dropped from a few hundred cyclists a day to near zero while trail activity has reached several thousand users per day. This demonstrated a shift in facility use as well as an apparent potential but previously unmet demand that the facility served.
- Agencies have used automatic counters to document use along a corridor before and after the installation of a new facility to measure benefits of and justify the project to the public.
- California Department of Transportation (Caltrans) is working to make sure project purpose and need statements include all modes, as this statement determines the scope of the project. The goal is to have more projects consider bicycle and pedestrian accommodation from the onset rather than as an afterthought, which avoids the significant cost of retrofitting facilities.
- Washington Department of Transportation is conducting extensive statewide bicycle and pedestrian counts. One goal of this effort is to obtain sufficient data to identify relationships between bicycle and pedestrian activity levels and external factors such as adjacent land uses, facility characteristics, etc. which can be used to inform future project delivery.

Agency Practices

- Several agency staff noted that ODOT policy requires provision of bicycle and pedestrian facilities in many ODOT projects. Thus, even in absence of comprehensive data, bicycle and pedestrian facilities are still provided at the project level.
- Staff report that the impacts of motor-vehicle-focused projects on non-motorized users are secondary or may not be evaluated in project delivery. For example, adding lanes to a road or intersection can make it more difficult for pedestrian crossings.
- Staff report that in areas where auto-oriented design leads to low pedestrian and bicycle usage, the needs of non-motorized users are often disregarded instead of considering improvements to draw out the potential bicycle and pedestrian demand.
- Transportation Data section reports that some bicycle and pedestrian intersection counts are done for project development and signal timing studies.
- ODOT follows MUTCD-prescribed signal warrants based on pedestrian volume data.
- The new Highway Capacity Manual includes information on multi-modal level of service (MMLOS), which is something the TPAU plans to investigate. This may reveal different data needs.
- While data are often unavailable, staff do report various examples where data were collected and used to inform project delivery. For example, pedestrian counts performed by the City of Woodburn at a very busy highway intersection justified a signal installation. ODOT staff also learn of high bicycle or pedestrian activity at an intersection as a result of a crash analysis.

- Collision or complaint data may identify the need for bicycle/pedestrian projects. As part of addressing these needs, ODOT traffic engineers report that they may perform observations of bicycle/pedestrian activity to guide preliminary design of a project.
- Staff report that Safety Priority Index System (SPIS) improvements are more focused on motor vehicles. The process for reporting non-motorized crashes is less formal and there is no mechanism for an immediate response.
- ODOT does not have a decision-making tool to assist project managers in identifying important bicycle and pedestrian facilities, connections or investments.
- Staff report that the lack of bicycle accommodation in work zones is a state-wide issue.

Recommendations for Improved Practices

- Expand the use of automatic and manual counts to document the before and after effects of installing bicycle and pedestrian facilities and document shifts towards non-motorized transportation.
- Identify the bicycle and pedestrian data that should be collected as a part of project delivery.
- Develop methodologies for evaluating the potential for bicycle and pedestrian activity at a project location based on demographic, land use and other factors.
- When making project decisions, ensure that findings and project recommendations from the bicycle and pedestrian elements of a community's TSP are considered.
- Develop a process to formally consider the impacts of motor vehicle-related improvements to bicycling and walking.
- Integrate pedestrian and bicyclist data collection into traffic operations and roadway projects (e.g., require bicycle/pedestrian data for traffic signal and crosswalk approvals).
- Develop a decision-making tool to aid project managers in identifying important bicycle and pedestrian projects.
- Evaluate bicycle accommodation in work zones for ODOT projects and develop actions to improve practices.
- Ensure that bicycle and pedestrian activity and needs are considered when developing project purpose and need statements.

Benefits of Improved Practices

- Many staff members indicated they would use count data for before and after studies to justify project delivery, if it were readily available.
- Improved bicycle and pedestrian count data, including both before and after counts, would strengthen grant applications and demonstrate the value added by an improvement. This would apply to local governments applying for ODOT grants as well as ODOT applications for federal grants.
- User characteristic and count information would provide factual support of the value or need for capital improvement projects and traffic operations changes.
- For a roadway project primarily focused on vehicles, the availability of bicycle and pedestrian activity data could allow project managers to leverage additional funds for bicycle and pedestrian facilities.
- Better data would better inform project scopes of work.

Development Review

This section identifies trends and agency practices with regard to the use of bicycle and pedestrian data when considering applications for development from private individuals or entities.

Emerging Trends

- New private development projects that include design and land use characteristics that create fewer automobile generated trips than traditional projects are eligible for trip reduction credits that allow for reduced parking and traffic mitigation requirements.
- Portland State University is working to develop multi-modal trip generation factors.

Agency Practices

- Staff reports that provision of bicycle and pedestrian facilities such as bike lanes and sidewalks is required according to policy, with surrounding land uses determining facility widths. Historically data has not come into play.
- The Transportation Planning Rule allows for a 10% reduction in vehicle trips for mixed use developments. A staff member noted that not all mixed use situations are the same, but that ODOT does not have good information regarding trip generation so ODOT cannot offer more nuanced reductions for different features that support multi-modal trips.
- Staff report that the impacts on non-motorized users may not be considered in the development review process. For example, mitigations adding lanes to a road or intersection to improve automobile level of service can make it more difficult for pedestrian crossings.
- Staff suggests the need for a mechanism in the mitigation process that allows for reduced level of service on a state highway if the development promotes alternative modes of transportation.

Recommendations for Improved Practices

- Develop or research a methodology to estimate reasonable trip generation rates for bicycles and pedestrians in order to refine the vehicle trip reduction allowed for in the Transportation Planning Rule.
- Require developer submission of existing and projected bicycle and walking volumes for development review projects.
- Develop a Development Review process to formally consider the impacts to bicycling and walking when determining mitigation measures.

Benefits of Improved Practices

- Trip generation data could be used by developers to create projects that are more supportive of multi-modal trips in exchange for reduced parking or other requirements.
- Project mitigation measures that include consideration of non-motorized travel are less likely to create unintentional barriers to bicycle and pedestrian activity.

Systems Planning

Emerging Trends

Systems planning for bicycles and pedestrians varies, but is typically performed as part of developing bicycle and pedestrian master plans or general transportation plans. Typical elements of these plans making use of bicycle and pedestrian data include:

- Needs analysis – based on collision analysis, public input, facilities inventory (including sidewalks, curb ramps, bike lanes, multi-use paths, etc.), count data (if available), etc.
- Project prioritization – factors may include safety benefit (based on collision data), public input, deficiency analysis, and measures of bicycling/walking potential (based on land use and demographic data)

Agency Practices

ODOT's Transportation System Planning Guidelines provide local agencies with guidance for completing TSPs as required in the Transportation Planning Rule. Key elements include:

- Develop goals, objectives and evaluation criteria
- Inventory the transportation system (including bicycle and pedestrian facilities)
- Define current conditions and identify existing deficiencies (including bicycle and pedestrian facilities)
- Determine future travel demand (including bicycle and pedestrian demand)
- Develop/evaluate alternatives – various factors are recommended for consideration, including measures that avoid reliance on any single mode of transportation

ODOT staff report that there is some variation in how systems planning for the needs of pedestrians and bicyclists occurs. The TSP guidelines recommend using a methodology based on the existing local comprehensive plan land use designations (i.e. trip attractors and generators) and considering future population growth and other demographic information informed by public involvement. In practice, motor vehicle, bicycle, and pedestrian elements may be developed to some extent independent of each other which can lead to conflicting improvement recommendations. Some ODOT staff report a need for a more comprehensive multi-modal approach for understanding bicycle and pedestrian needs and prioritizing projects in a region.

Recommendations for Improved Practices

- Increase the availability of count, survey and collision data to inform bicycle and pedestrian project prioritization to ensure systems planning practice more closely resembles recommended processes.
- Incorporate bicycle and pedestrian data collection requirements as part of TGM and other system planning projects in order to quickly increase the amount of standardized data available throughout the state.
- Update the Transportation Systems Planning Guidelines to incorporate recommended methodologies for bicycle and pedestrian data collection and analysis.

Benefits of Improved Practices

- Improved bicycle and pedestrian data regarding facilities and use will enable systematic and comprehensive development of bicycle and pedestrian goals and alternatives.
- Improved data collection could create a more robust and systematic approach to funding projects. This would result in project delivery in areas with the highest safety needs and in areas with the highest amount of actual and potential bicycle and pedestrian demand.

Forecasting

Historically, travel demand models have not been designed to predict bicycle and pedestrian activity. While this remains typical, there are efforts underway to develop models incorporating bicycling and walking as transport modes.

Emerging Trends

- San Francisco has developed a bicycle model.
- Portland Metro is on the leading edge of non-motorized transportation model development. The planning agency has made particular progress with its bicycle model.
- The route choice algorithms developed by Metro and its partners for the bicycle model are likely applicable for other Oregon communities and are currently being provided to the MPOs in the Eugene and Salem areas.
- Portland Metro's efforts at developing pedestrian modeling capability are in an earlier stage of development.

Agency Practices

- The three small MPO travel demand models developed and applied by TPAU do not currently treat bicycle and pedestrian activity as distinct travel modes.
- TPAU anticipates needing additional data to better understand the fundamental behaviors and characteristics related to potential mode shift as they enhance tools aimed at forecasting the effects of developing public policies and incentives.

Recommendations for Improved Practices

- Work with Portland Metro modeling team to identify the data needed to model bicycle and pedestrian activity.
- Evaluate the costs² and benefits of modeling these modes in communities of different sizes in Oregon.

Benefits of Improved Practices

- Improved ability to forecast the effects of different investment strategies to encourage non-motorized forms of transportation.
- Improved data can be used to forecast bicycle and pedestrian activity to support informed policy decisions with respect to greenhouse gas emissions, Least Cost Planning and sustainability plans.

² While the Metro model algorithms can be shared, the network will need to be built for each community that hopes to model bicycle activity. ODOT may be able to assist communities with this, although it can be a significant effort that depends on the size of the community and the availability of network data.

Goals, Measurement and Reporting

Use of performance measures to document progress towards achieving agency goals has become common-place nationally in recent years. There are many examples of data collection and reporting methods.

Emerging Trends

- The *Washington State Bicycle Facilities and Pedestrian Walkways Plan* established the goal of doubling the amount of bicycling and walking by 2027. Bicycle and pedestrian counts were identified in the Plan as performance metrics for determining the State's progress toward this goal. In 2008, the Washington State Department of Transportation (WSDOT) launched the Washington State Bicycle and Pedestrian Documentation Project which coordinates annual bicycle and pedestrian counts across the state.
- The metropolitan Chicago area recently launched the Regional Indicators Project's "MetroPulse" web system (www.metropulsechicago.org). MetroPulse gives the public a simple but powerful interface to access a vast warehouse containing data on the factors that shape quality of life in the seven-county region. There are at present no indicators specifically related to bicycle and pedestrian activity or facilities, though there are indicators related to mass transit.
- Portland Metro and Portland State University are currently developing the Greater Portland-Vancouver Indicators (GPVI) project, which will provide an online interface using data from nine categories to tell the story of the region.
- Some jurisdictions develop regular reports to monitor bicycle and pedestrian facility investment and usage. The best examples bring together various metrics into a single report, including usage, collision rates, facilities investment, progress towards plan goals, perceptions of facilities, etc.

Agency Practices

- Agency staff cited agency-level goals for improving bicycle and pedestrian accommodation, but generally reported that their section or division did not have separate goals for improving bicycle and pedestrian data, with a few exceptions (see following bullets)
- The Transportation Safety Division identifies problem areas for both bicyclist and pedestrian safety and sets performance measures for the Oregon Traffic Safety Performance Plan.
- ODOT's 2010 Performance Report identifies 25 approved agency performance measures, many of which are listed on the ODOT Performance Dashboard online interface, a few of which feed into the state benchmarks of the Oregon Progress Board.
- The ODOT Performance Dashboard contains one metric related to Bicycle Lanes and Sidewalks (Percent of urban state highway miles with bike lanes and pedestrian facilities in "fair" or better condition), which is identified as a performance measure towards achieving Goal #4 (Sustainability/Environment) of the Oregon Transportation Plan. ODOT set a target to complete the sidewalk and bikeway system at 2% per year, based on the Oregon Transportation Plan. In 2010, 45% of urban state highways had bike lanes and pedestrian facilities in "fair" or better condition.

- Staff members suggest that the Oregon Transportation Plan identifies goals towards becoming more multi-modal but strategies for achieving these goals are still emerging.

Recommendations for Improved Practices

- Expand the number of goals and objectives related to bicycling and walking in ODOT plans (such as the Oregon Highway Plan, Oregon Bicycle and Pedestrian Plan, etc.) that can be measured, even if data do not yet exist.
- Consider adopting a performance measure based on count data (to complement current metrics based on facility availability) to gauge how well facility and other investments are contributing to increases in walking and bicycling.
- Consider adopting performance measures related to the frequency and quality of user, facility and count data collection.
- Develop specific strategies to meet OTP goals related to bicycle and walking.
- Consider adopting a performance measure related to the quality of bicyclist and pedestrian user experiences within the transportation network.

Benefits of Improved Practices

- Enhanced monitoring of bicycle and pedestrian goals would allow ODOT to better evaluate the performance of its investment strategies.
- Enhanced monitoring of bicycle and pedestrian goals would allow ODOT to understand how well its practices align with the Transportation Planning Rule mandate that transportation planning reduce reliance on any one mode of transportation
- Enhanced monitoring of bicycle and pedestrian goals would allow ODOT to gauge how well it is transforming into a truly multi-modal agency.

The Role of State DOTs in Data Collection and Utilization

This section reviews the role of the Statewide Department of Transportation in facilitating the collection, use and utilization of bicycle and pedestrian data.

Emerging Trends

- The Colorado Department of Transportation (CDOT) has purchased a number of automatic bicycle and pedestrian counters which are rotated around the state by request from local agencies.
- CDOT is currently developing an online traffic count data system called AVID. CDOT accepts traffic data from outside agencies and makes them available for retrieval on AVID. The agency accepts 24 hour data into its system and already has several bicycle and pedestrian counts.
- The Washington State Department of Transportation (WSDOT) has taken a lead role in documenting bicycle and pedestrian activity across the state through its Washington State Bicycle and Pedestrian Documentation Project which coordinates annual bicycle and pedestrian counts.
- Several state Departments of Transportation, including Florida and Minnesota, consistently fund bicycle and pedestrian research. These research efforts are often carried out in partnership with local universities.

Agency Practices

- ODOT's Transportation System Planning Guidelines 2008 provides guidance for local agencies to develop and update TSPs as required under the Transportation Planning Rule. From a data perspective, the TSP guidelines identify items to be included as part of the bicycle and pedestrian inventory.
- The TSP guidelines mention performing traffic counts (if budgeted for) to determine Average Daily Traffic as part of describing current conditions and existing deficiencies. The counts, when performed, are typically taken at key intersections for vehicular movements, with bicycle and pedestrian data collected as secondary information to identify potential conflict points.
- ODOT's Pedestrian and Bicycle Grant Program distributes approximately \$5 million every two years. The grant evaluation criteria include the question 'What is the potential daily usage (relative to projects in similar locations)?' Data is not required, but would strengthen grant applications.
- Agency staff identified that ODOT, as a distributor of a large amount of transportation dollars, has an opportunity to take a leadership role and influence bicycle and pedestrian facility development around the state.
- The ODOT Transportation Development – Research Section oversees the state's federally funded research, development and technology transfer program. A recent research project carried out by Oregon State University was entitled 'Evaluation of Pedestrian Traffic Control Devices.'

Recommendations for Improved Practices

- Develop a comprehensive count program (manual and/or automatic counts) to increase the amount of bicycle and pedestrian activity data systematically available for state and local roads.
- Develop standard methodologies for performing bicycle and pedestrian counts and for data storage templates.
- The ODOT Transportation Development – Research Section could commit to funding at least one bicycle and pedestrian research project each year to ensure systematic progress in the field.
- Consider having ODOT serve a clearinghouse role for gathering and making available bicycle and pedestrian research and data from state and local sources.
- Develop standard grant contract language requiring before and after use data for ODOT-administered grant programs.

Benefits of Improved Practices

- Increased documentation of bicycle and pedestrian activity levels should result in more effective strategic investments in facilities to support these modes.
- Many local jurisdictions have limited resources to develop methodologies for measuring bicycle and pedestrian activity, yet collect data to suit their immediate needs. Standardization would allow greater collaboration and data sharing efforts across jurisdictions, saving time and money for both the state and partnering agencies.
- Consistent research will allow ODOT to make important contributions that advance the practice of planning for and implementing bicycle and pedestrian facilities.

Conclusion

This report has identified a wide variety of examples of how agencies around the country are planning for and measuring non-motorized activity, including extensive count programs, applications of data in decision-making processes, and systems for archiving and accessing existing sources of data. The report has also identified how ODOT staff would envision applying improved bicycle and pedestrian data to increase the effectiveness of ODOT in carrying out its mission to serve as a truly multi modal agency.

ODOT currently collects a wide variety of data that relate to bicycle and pedestrian activity, but data sets are often incomplete and processes and methodologies are not always widely known. In addition to inefficiencies in existing data practices, the need to look towards future data needs has also come into focus as policy drivers create demand for new systems to project and evaluate the results of transportation investments.

As discussed at the onset of this report, ODOT bicycle and pedestrian data collection and analyses methods are less developed than practices for motor vehicles. Standard practices do not yet exist within the agency with respect to the types and locations for data collection, the accepted methodologies, and how data analysis can best meet the variety of existing and emerging needs. For relatively little investment, ODOT can enhance existing processes to improve the quality, completeness and accessibility of the current data, while planning for expected increases in data needs.

Opportunity Costs

While there are costs associated with carrying out the recommendations contained in this report, a lack of data and methods pertaining to the non-motorized travel modes is also costly. For example:

- Costly retrofit projects can result from lack of planning for bicycle and pedestrian modes during project scoping and design.
- Projects overlooking bicycle and pedestrian needs due to a lack of data may unintentionally create barriers to walking and bicycling that can be financially or politically difficult to undo following construction.
- A lack of standardized and accepted data collection and analysis methods for non-motorized modes may create a lag in staff ability to respond to policy directives and strategies that require consideration of all modes (such as Least-Cost Planning or greenhouse gas emission reduction modeling).
- Because staff cannot easily review and access existing data, duplication of effort and suboptimal use of data will continue to occur.

Next Steps

There is great opportunity to build upon existing ODOT data collection and integration efforts, including the Asset Management Integration Section's FACS-STIP initiative which is developing standards to improve accessibility and integration of ODOT data practices.

Important immediate bicycle and pedestrian data needs include the development of:

- Standard data collection methodologies;
- A database framework for archiving and accessing data; and
- Standard processes for utilizing bicycle and pedestrian data.

To achieve these and related goals, ODOT should:

- Create and implement a strategy for moving forward with the recommendations contained in this report.
- Build on the efforts of the Asset Management Integration Section.
- Convene a working group to meet regularly for the purposes of improving internal communication across ODOT regarding existing bicycle and pedestrian data practices and determining how to respond to current and future needs.