

Developing Effective Active Transportation Projects and Programs

Support for Smaller Agencies and Disadvantaged Communities



Source: National Bicycle and Pedestrian Documentation Project

Module 5: Tools and Strategies for Predicting and Documenting Bicycling/Walking Rates



Local
Government
Commission



Overview: Tools and Strategies to Predict and Document Bicycling and Walking Rates

- 1) Why Document the Need for Bicycling and Walking Projects?
- 2) What is the Purpose of Your Project?
- 3) How Can You Estimate the Project's Potential to Increase Biking/Walking?
 - What data is currently available?
 - Where can you find the data?
- 4) Incorporating Evaluation Tools in Your Project Design

This presentation will review different methods of documenting existing and projected rates of bicycling and walking, drawing on examples from applications that were awarded funding in the first rounds of ATP; these applications are all available online if you are interested in getting more detail on the methodologies.

1) Why Document the Need for Bicyclist and Pedestrian Projects?

Identify and Prioritize Projects:

- Quantify demand/potential demand
- Evaluate project impact

Build Support and Secure Funding :

- Raise community awareness of impact of walk/bike projects
- Gain support from elected officials and community stakeholders
- Secure funding (ATP Application Q1)



Material focuses on how to use this information for ATP applications, and also how to enhance bicycle and pedestrian planning and improve your chances to secure other funding

2) What's the Purpose of Your Project?

Does the project...

- enhance an existing facility or connection?
- create a new facility or close gaps?
- promote or encourage bicycling or walking?



Your project type will influence what existing data there may be, your ability to collect data, and how you can go about using this information

3) How Can You Estimate the Project's Potential to Increase Biking/Walking?

- What data is currently available?
- Where can you find the data?
- Do you need to collect new data?
- Choose the right data collection tool
- Use multiple strategies to make a more compelling case for your project

This is an overview slide for the next section of the module.

These strategies apply to:

- infrastructure projects that will enhance existing facilities
- non-infrastructure programs
- gap closure projects, and
- trails

Data to use will vary depending on the type of project (see previous slide)

Applicants may want collect multiple types of data to make a stronger case for their project (counts of users, survey responses, account for other factors such as nearby transit stations or schools, etc.)

3a) What data is currently available?

- Is there readily available data that...
 - Documents the number of bicyclists and pedestrians?
 - Estimates the share of trips made by bicycling or walking?
 - Predicts the number of bicyclists or pedestrians in the future?

3b) Where Can You Find the Data?

- **U.S. Census and American Community Survey (ACS)** – commute trips by mode
- **Metropolitan Planning Organization (MPO)** – regional bicycle/pedestrian plan, regional bike/ped count program, travel forecasting models
- **Congestion Management Agency (CMA)** – bike/ped count program, bicycle/pedestrian plan, transportation corridor studies, travel forecasting models
- **Local jurisdiction** (city or county Public Works, Planning, Recreation and Parks departments) – local bicycle/pedestrian plan, transportation corridor/project, travel forecasting models, environmental impact reports (EIR)

List of agencies that are most likely to have the data and some specific data sources to ask about when you approach them. Studies and data sets may not be available, but these are likely places to find what is out there.

- MPO – regional bicycle or pedestrian plans, count programs
- CMA – often do bicyclist and pedestrian counts at selected locations for their Congestion Management Program, they may also have some kind of count program in place
- Local – Transportation planners and engineers may collect this information as part of their ongoing planning activities. Some jurisdictions bundle bicycle and pedestrian counts into their vehicle traffic data collection programs
- Travel demand models may have data on bicyclists and pedestrians – most valuable at the local level, since biking and walking trips are too short to be accounted for in a regional travel model
- Bicycle/pedestrian plans may have citywide or regional mode shares, also specific counts and projections of how the implementation of a plan will impact biking and walking
- Corridor/project studies and EIRs can focus on different scale projects – possibly a specific site or a much larger area. Best case scenario is that the location of your proposed ATP project matches up closely with the boundaries of a corridor study or EIR. Since biking and walking rates can vary significantly within a city – depending on proximity to commercial areas, schools, transit stations, etc. – more localized data will be more meaningful and will strengthen your application.

3c) Do you need to collect new data?

Comparison of Data Collection Methods

	Data Collection Method	Type of Data
Low-Cost  Higher Cost	Web-based Surveys	Bicyclists, Pedestrians (Separate)
	Classroom Surveys	Bicyclists, Pedestrians (Separate)
	Manual Counts	Bicyclists, Pedestrians (Separate)
	Intercept Surveys (along trail or sidewalk)	Bicyclists, Pedestrians (Separate)
	Mobile Automatic Counters	Bicyclists, Pedestrians (Separate)
	Pneumatic Tubes	Bicyclists Only
	Permanent Automatic Counters	Bicyclists, Pedestrians (Some Can Distinguish)

This is a list of the main methods for collecting data on bicyclist and pedestrian use. From top to bottom it indicates the relative cost of these methods.

Alternative Data Sources

- Where direct usage data not available (e.g. new trail projects), base estimates on information from...
 - Surveys of potential users
 - Nearby intersections
 - Similar facility type
 - Facilities located near similar locations – schools, business districts, transit stations, etc.
 - Studies of bicycle/pedestrian usage in other parts of the country

Alternative Data Sources

These sources can be useful to help demonstrate the value of any project, but are especially important for projects such as highway overcrossings and trails developed in corridors where no facilities are currently available and current users cannot be counted. Surveys: potential users to help understand why they don't currently walk or bike and how the proposed project will affect their future willingness to walk or bike (or to let their kids walk or bike)

Estimates of users can also be based on the number of bikes/peds on similar facilities – e.g. trails or bike lanes – in similar environments. One possibility is to compare the increases in usage seen in other projects. Best to find multiple examples, perhaps take an average across several projects to reduce chance or appearance of cherry-picking data. Examples from other parts of the country can also help identify an approximate rate of increase in usage if nothing local is available.

Collecting New Data: Surveying Bicyclists and Pedestrians

■ Community surveys

- Provide insight into reasons why people do **not** currently bike/walk
- Ask how many residents will bike or walk **as a result of the project**
- For Safe Routes to School projects, can quickly disseminate to students and parents at school via email
- Inexpensive to distribute survey and analyze data

Student Survey eff ramp

Please complete this survey about getting to school. In one of your classes, you've already been asked **HOW** you get to school, but this time we need to hear a bit about **WHY** you travel to school the way(s) that you do.

We will hold a draw on _____ at _____. Be sure you've completed and handed this in so it can be entered in the draw for prizes.

name _____ grade _____
home/room _____

Please answer ALL of the following questions.

1. How do you usually get to school?
 walking cycling taking transit by car with another student
 by car on your own (if you are the only student in your car, this is the one to check)

Do you think this is an environmentally friendly way of getting to school? Why or why not? _____

2. Why do you walk to school? (check as many as apply)
 It makes me fit I never walk It's good exercise
 I never walk when it's cold/raining I can walk with a friend It's free
 I like the route I take
 other _____

3. Why do you cycle to school? (check as many as apply)
 It makes me fit I never cycle It's good exercise
 I never cycle when it's cold/raining It's fast and I make my own schedule
 It's inexpensive I like the route I take
 other _____

4. Why do you take public transit to school? (check as many as apply)
 I get time to talk with my friends on the way I don't have to rely on my parents
 It's inexpensive There's a bus stop near my home and the school
 I have a schedule and the bus is usually on time I never take the bus
 I never take the bus when it's cold/raining
 other _____

5. Why do you drive (or get driven) to school? (check as many as apply)

Cost of survey can vary: a) inexpensive – distribute and collect surveys at schools. b) more expensive – “intercept” users along bike/ped facilities to get them to respond; depending on facility, may take considerable time to get sufficient number of completed surveys

Collecting New Data: Surveying Bicyclists & Pedestrians

- Intercept surveys
 - Survey subjects are “intercepted” along an existing facility
 - Can use survey form or interview format
 - Collect more fine-grained data, e.g. trip purpose or dollars spent
 - More time-consuming to collect sufficient data



Source: TX Transportation Institute

Collecting New Data: Manual Bike/Ped Counts

- Surveyors count users along bikeways, sidewalks or at intersections
- Count period typically includes peak travel (e.g. 7-9 AM, 4-6 PM), possibly additional hours
- Times adjusted based on local biking and walking patterns – school hours, heavy weekend traffic, etc.



Source: MN DOT

Manual bicycle/pedestrians counts can be conducted in a limited time frame at a particular site (e.g. AM and PM peak hours over several days). May want to adjust count hours – AM and PM peak correspond to work commute, may be different if near a school, a lunchtime destination, or if there is heavy weekend use.

Collecting New Data: Automatic Bike/Ped Counters

- Mobile and permanent counter options
- Enables data collection 24 hours/day, 7 days/week
- Minimal staff time required to retrieve data
- Counter unit costs range from approximately \$500-\$5,000 per counter



Mobile vs. permanent counters – permanent can only be used at one location, but the counters may provide more robust data.

Photo is a combination of inductive loop (in-ground) and infrared beam (from the adjacent post), can differentiate between bicyclists and pedestrians.

Operations costs: some counters equipped with a modem to allow for remote download of data, reducing staff time to go out to site to collect data and to determine if counter is functioning; subscription required for remote data download capability (\$400/yr for Eco Counter), but staff time savings may make this worthwhile. For other counters (e.g. mobile counters like TrafX), there may be a subscription fee for access to data analysis software.

Collecting New Data: Choosing the Right Tool

- **Data needed: Number of existing/potential users**
 - ➔ automatic counters, manual counts, surveys
- **Data needed: User characteristics**
 - Age, sex, bike helmet use
 - ➔ manual counts, intercept surveys
- **Data needed: Usage pattern**
 - Time of day, day of week, time of year, commute trips
 - ➔ automatic counters, intercept surveys

Depending on the kind of data you want to collect, some data collection approaches are better than others. This slide features examples of which tools can best be used to collect specific types of data.

Low-Cost Strategies for Data Collection: Utilize Partnerships and Volunteers

- Partners frequently used to help...
 - Distribute surveys
 - Conduct manual user counts
- Potential partners include:
 - Schools
 - Bicycling or walking advocacy groups
 - Community-based organizations – PTA's, Kiwanis or Rotary Club, neighborhood associations, churches

Use of volunteers – such as PTA's and community-based organizations such as bike coalitions – can be a great way to collect data on a small budget, and help build support for projects in the community. While this saves staff time, will require volunteers to be trained to maintain quality control.

Best Practice

Manual Bike/Ped Counts and Surveys – National Bicycle and Pedestrian Documentation Project

- Effort to standardize counting practices
- National data collection effort
 - 2nd week in September
 - At least 1 day during week (Tues, Wed, or Thurs) and a Saturday
 - Weekdays 5-7 PM, Saturday 12-2 PM
- Downloadable data collection instructions, forms, and data entry spreadsheet. Survey forms in English and Spanish.
- Information available at: www.bikepeddocumentation.org

Best practice:

This project is being used across the country by many agencies – an effort to develop a standardized method for conducting manual counts. Agencies may want to participate in the annual national count but can also use this methodology for other data collection. Downloadable information (data collection sheets, methodology, etc.) makes it relatively easy to use this approach. Includes factors for estimating annual usage based on limited data – accounts for changes in weather throughout the year.

Case Study

Mobile Automatic Counters – East Bay Regional Parks District

- 1,250 mile trail network across 2 counties
- 55 counters, cost is \$500/counter
- Peak use during commute hours demonstrated trails as transportation route
- Data used to help **secure \$10 million TIGER grant** for Green Transportation Initiative



Case Study:

East Bay Regional Parks District (EBRPD) currently uses primarily mobile counters, though they are gradually purchasing permanent counters. One factor which has helped them make this work is that they have field staff who are in the general area and are able to retrieve data.

The image on the slide is an example of one of the mobile counters (TrafX) used by EBRPD and the dock that is used to retrieve the data from the counter in the field.

Case Study

Public Health Partnerships (LA County)

- LA County Department of Public Health purchased automated equipment for counting bicyclists and pedestrians
- Equipment currently being tested in a pilot project by partners participating in the Healthy Eating Active Living (HEAL) Initiative and Healthy Policies Initiative (HPI)
- DPH may make the equipment available to other cities depending on need and availability.
- Please contact Louisa Franco at lfranco@ph.lacounty.gov for more information.

Case Study

Public Health Partnerships (San Diego County)

- Established a network of automated bicycle and pedestrian count stations along proposed regional bicycle network
- Collaboration between the County of San Diego Health and Human Services Agency (HHS), San Diego State University (SDSU) public health and city planning researchers, and active transportation planning professionals at the San Diego Association of Governments (SANDAG)
- HHS provided \$350,000 through a CDC grant, funding the purchase and installation of 35 counters at 26 sites.

Case Study:

San Diego: Example of use of permanently installed automatic counters

Collaboration between public health professionals (County of San Diego Health and Human Services Agency (HHS)), academic researchers (San Diego State University (SDSU)), and transportation planning professionals (SANDAG).

Grant was provided by the Centers for Disease Control and Prevention (Communities Putting Prevention to Work) ultimate goal is to have counters installed at 170 locations

3d) Forecasting Tools to Estimate Future Users

- Low-cost options
 - Surveys of potential users
 - “Sketch planning” methods
 - Modify methodology with localized data
 - Customized method using relevant local data
 - Rely on alternative data sources
- Technical Tools
 - Seamless Travel Model
 - Travel demand models
 - Consultants may be able to run models

Forecasting Future Bicycle Travel Benefit-Cost Analysis of Bicycle Facilities On-Line Tool

■ Key features:

- Easy to use
- Customizable: can substitute detailed local data for Census data for greater accuracy
- Can estimate facility costs and economic benefits

■ Major data inputs:

- Location
- Year of construction
- Facility type
- Bike commute share
- Residential density
- Facility length



Important: The tool's web site is somewhat unreliable, and Cycle 1 applicants have noted that it was not available when they attempted to use it. It is highly recommended that if you choose to use this tool that you do this well in advance of the application deadline to avoid such problems.

The four case studies that follow are examples of ATP Cycle 1 projects that were awarded funding. All applications from funded projects are available for review on the CTC web site.

Forecasting Future Bicycle Travel

Benefit-Cost Analysis of Bicycle Facilities On-Line Tool (cont.)

- **Outputs:**
 - Total new bicyclists
 - New adult bicyclists
 - New bicycle commuters
 - New child bicyclists
- Also estimates mobility, health, and economic benefits
- Based on research completed for National Highway Cooperative Research Program (NCHRP) Report 552
- Model available at Pedestrian Bicycle Information Center: <http://www.pedbikeinfo.org/bikecost/index.cfm>

Case Study: East Bay Greenway

Alameda County Transportation Commission

- Funded ATP Project Cycle 1: Trail Planning and Design
- Estimated bicyclists and pedestrians
- Linear regression of counts from existing Alameda County trails. Accounted for:
 - Population and job density
 - Part of inter-jurisdictional trail
- Intercept surveys from other trails used to estimate:
 - Bicyclist and pedestrian users
 - Recreational and utilitarian trips
- Analysis also included estimates of VMT reduction, health benefits, and other variables

This examples requires some sophisticated calculations, but this type of data is available to agencies looking to adopt a similar approach

Case Study: Downtown Bicycle and Pedestrian Improvements City of Pomona

- Funded ATP Project Cycle 1 (disadvantaged community): bikeway and pedestrian crossing improvements
- Methodology based on NCHRP 552 (*Benefit-Cost Analysis of Bicycle Facilities*)
- Data collection by volunteers from L.A. County Bicycle Coalition
- Key Data Inputs – current and future bike/ped trips
 - Census and ACS – commute trips and population for travel shed
 - Increase bicycle/pedestrian trips based on location in higher density areas
 - Adjustment for non-commute trips
 - Future bike/ped travel based on population projections
- Data Outputs
 - Commute share, total bikes/peds, total bike/ped trips

Case Study:

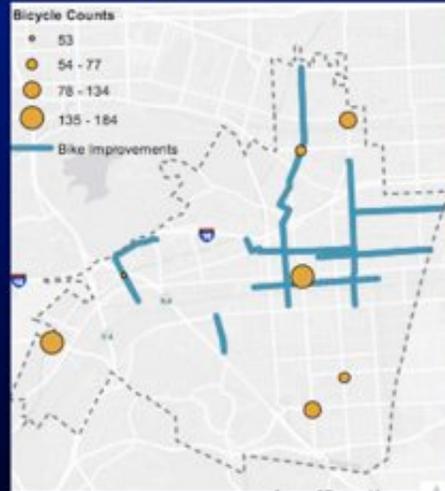
Similar to the on-line tool highlighted 2 slides earlier, but adjusted the method to incorporate local data – one key adjustment was to increase the number of bike/ped trips for higher density areas

Key points:

- Counts were collected in partnership with LA County Bicycle Coalition
- Used a simplified version of Pedestrian and Bicycle Information (PBIC) tool based on NCHRP 552
- Used data from the 2010 US Census and the 2012 American Communities Survey (ACS) (5-Year Estimates).
- Multiplying the mode-share from the ACS by the total population given in the Census produces an estimate for the total number of pedestrians and bicyclists.
- Scaled estimates down to proportion of city's square mileage contained within the project area
- Forecasted estimates into the future using population growth rate (identified in General Plan)
- Adjusted estimates to account for projects' locations (denser areas more likely to contain more than an exact proportional number of pedestrians and bicyclists, particularly under future conditions where the improvements built).
- For the bicycle estimates, adjustment is based on studies that show an increase in mode-share once an entire downtown network is built out

Case Study: Downtown Bicycle and Pedestrian Improvements City of Pomona

- Data collection by volunteers from L.A. County Bicycle Coalition



Case Study: Downtown Bicycle and Pedestrian Improvements City of Pomona

Table 1-8: Estimated Number of Future Pedestrians in Pomona

Current Population (2010 US Census) (A)	2030 Population (1% annual increase) (B)	Commute Share (C)	Total Future Pedestrians (B)*(C)=(D)
149,058	181,879	0.6%	10,913

Table 1-9: Estimated Number of Future Pedestrians in Project Area

Baseline 2030 Pedestrians (A)	Percent of "high activity" area within Project Area (B)	Percent of all pedestrian activity occurring within "high activity" area (C)	Total Future Pedestrians in Project Area (A)*(B)*(C)=(D)
10,913	75%	60%	4,911

Table 1-10: Estimated Number of Future Pedestrian Trips and Future Pedestrian Miles Traveled

Pedestrians in Project Area (A)	Average Daily Trips Per Pedestrian[1] (B)	Annual Average Daily Pedestrian Trips (A)*(B)*365=(C)	Average Trip Length[2] (D)	Annual Pedestrian Miles Traveled (C)*(D)=(E)
4,911	1.6 trips	2,868,024	0.5 miles	1,434,012

[1] Ibid. The same average number of trips has been applied to pedestrians as well as bicyclists.

[2] The average trip length for pedestrians is assumed to be the same as the walk shed for transit facilities, 0.5 miles.

Case Study: Florence-Firestone SRTS

Los Angeles County Department of Public Works

- Funded ATP Project: SRTS Infrastructure/Non-infrastructure
- Utilize county bike and ped count program data and counters
- Future bike/ped usage based on federal Non-motorized Transportation Pilot Program (NTPP) results
- In-class survey (for students) and take-home survey (for parents)

County staff will be able to use existing counters from the county's bike/ped count program. Will work with community members to conduct automatic and manual counts. Based their estimates of bike/ped travel on mode share increases demonstrated in the National Transportation Pilot Project (NTPP) results from the 4 funded communities that completed the projects funded through the program

Case Study: Maryland Elementary Pedestrian Mobility Improvement City of Vista

- Funded ATP Project Cycle 1 (disadvantaged community):
New sidewalks and crossing enhancements
- Used health tools to forecast future pedestrian use:
 - World Health Org. Health Economic Assessment Tool (HEAT)
 - 2007 California Health Interview Survey (CHIS) for the San Diego County Health North Coastal Region
- Key data inputs:
 - Pedestrian counts
 - Field observations
 - In-class student survey results

Case Study:

City of Vista, CA.

Used health data in addition to counts and surveys

Key points:

- City conducted manual pedestrian counts in April 2014 prior to submitting application
- Also conducted a student travel tally in May 2014: reached 13 classes, or roughly 51-75% of all students; determined that an average of 35% of students currently walk to school
- Conducted traffic speed surveys in December 2013
- Used a simple calculation that was provided in the application based on these recent data collection efforts, as well as outputs from the WHO HEAT tool
- Final estimate was rounded down to be conservative: recognized that their methodology is not the most complex, so this was a smart strategy to not overstate the estimated increases

*Case Study: Maryland Elementary Pedestrian Mobility Improvement
City of Vista*

Calculations for % Shifted to Walking/Biking

$$\text{Shift} = (\text{Enrolled Students})(\% \text{ Don't Walk})(\% \text{ Could Who Don't})(\% \text{Benefit})$$

$$\text{Shift} = (589)(73.5\%)(46.9\%)(18\%) = 37$$

$$\% \text{ Shift} = \frac{\text{Shift}}{589 \text{ enrolled Students}} = \frac{37}{589}$$

$$\% \text{ Shift} = 6.28\% \approx 5\% \text{ to be conservative}$$

Forecasting Future Bicycle and Pedestrian Travel

Seamless Travel Model

- Developed for Caltrans, includes bicycle and pedestrian models
- Key inputs:
 - AM peak bicycle/pedestrian count
 - Employment and population density
 - Presence of retail
 - Length of nearby Class I bikeway
- Requires technical expertise, such as GIS
- Methodology available at
<http://www.path.berkeley.edu/sites/default/files/publications/PRR-2010-12.pdf>

A more technical approach:

Not something where you can just plug in a few numbers and have it generate the numbers. It requires the ability to use GIS and make additional refinements to the data. Many agencies may not have the capabilities to implement this or the resources to hire a consultant.

Model developed for Caltrans, it is available for use by anyone

Coming Soon from Rails-to-Trails Conservancy: Trail Modeling and Assessment Platform (T-MAP)

- Includes:
 - GIS-based method for measuring trail connectivity
 - Trail use demand factoring and forecasting model
 - Impact assessment tools that translate trail use into dollars related to health and transportation impacts

■ Initial tools to be available by late 2015

■ Information available at:

<http://www.railstotrails.org/our-work/research-and-information/trail-modeling-and-assessment-platform/>

The Trail Modeling & Assessment Platform

T-MAP

The Trail Modeling and Assessment Platform (T-MAP) is a \$1.2 million, three-year initiative to create the next generation of trail planning, data collection, instrument, methodologies and analysis tools.

In partnership, transportation and health agencies will have access to sophisticated analytical tools similar to those that have traditionally been used in the development of road projects. T-MAP will engage our movement with a powerful suite of tools that will permit us to demonstrate convincingly how trail investment can create healthier places for healthier people.

There are more than 25,000 miles of rail trails-to-road, adventure and urban communities. We are now on the verge of finding many of these trails in their respective networks, which will connect people and destinations across the country.

Decision makers give considerable credence to quantitative methods for planning and prioritizing transportation investments. Such forecasting tools have been used in the highway planning process for decades, but have only recently begun to be developed for trail, health and pedestrian investments. As a result, trail projects are difficult to match, while rail projects are often considered automatic.

The three components of the proposed platform on-line collection, on-line model, and measurement of outcomes, for ultimate outcomes comprised of leading indicators and performance-based transportation, health, and economic will require T-MAP's development to ensure that each platform component is both secure and usable.

The use of the platform is a suite of general analytical models that can be used independently for a specific purpose or in concert, depending upon the needs of a community. There are three core needs:

- A GIS-based method for measuring trail system connectivity
- A trail use demand forecasting and forecasting model
- A set of impact assessment tools that translate trail use into dollars related to health and transportation impacts.

rails to trails
CONSERVANCY

Trail Modeling and Assessment Platform (TMAP) currently under development by Rails-to-Trails Conservancy, supported by national team of university researchers and other experts

- First 3 bullets describe the types of tools that will be developed through this project.
- Data currently being collected at 12 sites around the country (San Diego is the site in CA), sites were selected from different climatic zones, since trail use patterns vary significantly across the country.
- This can be accounted for when developing usage estimates for trails in different parts of the country (note: the fact sheet pictured on the slide is available at the link indicated)

Incorporating Evaluation Tools in Your Project Design

- Evaluation required by ATP
- Build measures into project design – Quantitative and qualitative
- Counters and counting programs are eligible for ATP funds, but final project evaluation activities (post-project) cannot be part of project cost
- Utilize partnerships – cost effective, build community support

Build measures into project design – Quantitative and qualitative

- Install counters to monitor use
- Conduct periodic manual counts
- Surveys – reference previous survey discussion

Questions/Comments?