Who's on the Trail: Genesee Valley Greenway 2021-2023 Methodology Report

Since 2005, Parks & Trails New York has conducted observational and electronic trail counts at dozens of locations along greenway trails around New York State. In 2021, an effort to count trail use along the 90-mile Genesee Valley Greenway State Park was undertaken as part of the Genesee Valley Trail Town initiative. This report describes the methodology used to conduct the counts and to analyze the data gathered. The methodology report is intended to be a companion to the Who's on the Trail: Genesee Valley Greenway 2021-2023 Trail Count Report issued by Parks & Trails New York in January 2024.

Electronic Count Protocol

PTNY's electronic count process relies on the PYRO-Box counter manufactured by Eco-Counter, a French company that sells a range of pedestrian and bicycle counting products. PTNY currently uses the PYRO-Box counters, Eco-Counter's most popular counter.

The PYRO-Box counter is a simple gray plastic box that can be installed on a sign or fence post or other vertical surface. The counter uses infrared pyroelectric technology to count the people passing within range of the sensor by detecting body temperature. Counters are installed for a minimum of one month, although PTNY prefers to install counters for one year or longer so as to use actual counts rather than samples of data to estimate full-year counts.

Counter locations are selected by PTNY staff in consultation with NYS Canal Corporation. A site visit is required to ensure that a suitable location can be found for installing the counter, although in some cases this visit occurrs at the same time that the counter is installed. Counters are installed by PTNY staff, with notification to the state or municipal entity responsible for maintenance on that stretch of the Canalway Trail. Once installed, counters collect data continuously without manual interference or coordination.

To collect recorded data from the counter, PTNY staff visits the counter and uses Bluetooth technology to connect the counter to a mobile phone application or laptop program and sync the data. Data is uploaded to Eco-Counter's Eco-Visio software, from which staff can download and analyze the data at 15-minute, one hour, one day, or one-month intervals for each counter.

National Bicycle and Pedestrian Documentation Project Methodology

The calculations used to extrapolate partial year count figures into full year use estimates were based on the methodology published by the National Bicycle and Pedestrian Documentation Project (NBPD). More information is available on the NBPD website at https://www.bikepeddocumentation.org/.

The NBPD extrapolation figures allow for the conversion of hourly, daily, or monthly count data into daily, weekly, or yearly figures, respectively. The instructions to the NBPD extrapolation spreadsheet, which is publicly available at http://bikepeddocumentation.org/, are based on the use of manual counts. The directions recommend that estimates are based on the average of at least two and preferably three two-hour counts during the same period and week or during consecutive weeks. Weekday counts are directed to occur on Tuesdays through Thursday and not on holidays, and weekend counts can be completed on either Saturday or Sunday.

The extrapolation spreadsheet calls for five input variables - count dates, count times, type (multi-use path or street/sidewalk), climate region, and two-hour count volume. Count dates provide the spreadsheet with information on the day of week and month of the count, and count time provides the inputs on what times were observed. The "type" factor allows the extrapolation methodology to be used for multi-use pathways or for users cycling on the street or walking on sidewalks in medium- to high-density areas. All electronic counts, and most of the manual counts, included in this analysis were done on paths and use the "path"

extrapolation factors; one of the manual counts was done on a sidewalk and as a result uses the “street/sidewalk” factors. Climate region gives users one of three choices: “Long Winter-Short Summer,” “Moderate Climate,” or “Very Hot Summer-Mild Winter.” All of the counts in New York were categorized in the “Long Winter-Short Summer” climate region. Finally, the input calls for the two-hour count total. Based on these five variables, the NBPD spreadsheet is set up to return the daily, weekly, monthly, and annual count figures based on a two-hour count total.

The NBPD structure is based on three tables. Table One calculates daily use based on hour-long periods as a percentage of total daily use. These figures differ based on path or street/sidewalk, on weekday or weekend, and on whether the counts are done between April and September or between October and March. For each of these circumstances, each hour of time between 6:00 a.m. and 10:00 p.m. is estimated to be a set percentage of total daily use. For example, from 5:00 p.m. to 6:00 p.m. on a path on a June weekday is considered 7% of daily use at that location. An observed two-hour count is first multiplied by 1.05 to account for the fact that 6:00 a.m. to 10:00 p.m. is assumed to be 95% of all trail usage, and then the resulting figure is divided by the two-hour count proportion to come up with a daily estimate.

Table 1: Hour to Day

(6AM - 10PM = 95% OF ALL USAGE)

	APR-SEP 6am - 9pm				OCT-MAR 6am - 9pm			
	---- Path------		-Street/Sidewalk-		---- Path------		-Street/Sidewalk-	
	wkdy	wkend	wkdy	wkend	wkdy	wkend	wkdy	wkend
600	2%	1%	1%	1%	2%	0%	1%	0%
700	4%	3%	2%	1%	4%	2%	2%	1%
800	7%	6%	4%	3%	6%	6%	3%	2%
900	9%	9%	5%	3%	7%	10%	5%	4%
1000	9%	9%	6%	5%	9%	10%	6%	5%
1100	9%	11%	7%	6%	9%	11%	8%	8%
1200	8%	10%	9%	7%	9%	11%	9%	10%
1300	7%	9%	9%	7%	9%	10%	10%	13%
1400	7%	8%	8%	9%	9%	10%	9%	11%
1500	7%	8%	8%	9%	8%	10%	8%	8%
1600	7%	7%	7%	9%	8%	8%	7%	7%
1700	7%	6%	7%	8%	7%	5%	6%	6%
1800	7%	5%	7%	8%	6%	3%	7%	6%
1900	5%	4%	7%	8%	4%	2%	7%	6%
2000	4%	3%	7%	8%	2%	1%	6%	6%
2100	2%	2%	6%	8%	2%	1%	5%	5%

Table 2: Day to Week

DAILY ADJUSTMENT FACTORS

SUN	18%
MON	14%
TUES	13%
WED	12%
THURS	12%
FRI	14%
SAT	18%

Note: Holidays use weekend rates

Table 3: Region and Month

MONTHLY ADJUSTMENT FACTORS

CLIMATE REGION	Long Winter Short Summer
JAN	3%
FEB	3%
MAR	7%
APR	11%
MAY	11%
JUN	12%
JUL	13%
AUG	14%
SEP	11%
OCT	6%
NOV	6%
DEC	3%

The second table converts the daily total to a weekly total using a similar estimation factor, where each day of the week is given a percentage of total weekly use. This figure is used to generate the monthly estimate (without using a separate table) by multiplying the weekly estimate by the number of weeks in the month (accounting for partial weeks). While the notes in the table include a correction that holidays should be accounted for weekend usage rates, it does not appear that the formulas account for that correction.

The final table adjusts the monthly estimate to an annual estimate and is based on the climate regions. For each of the three climate regions, each month of the year is considered to be a set portion of total annual use. The three tables as they appear in NBPD are listed below (with the categories that don't apply to the upstate region removed).

The underlying assumptions used by the NBPD factors is that any given two-hour period of time represents a set percentage of total annual bicycle and pedestrian use at that location. With additional data collected, those assumptions can be calculated more precisely, and be less reliant on formulas to "fill in the gaps" in collected data.

PTNY Extrapolation Methodology

For PTNY's electronic count sites, the observed usage was extrapolated to calculate a full-year estimate for that site. The raw data was downloaded for the entirety of the time the counters were installed at each location. Data was downloaded at an hour-level granularity to ensure that it was available for hour-by-hour analysis. The data was checked for any anomalies, and any data excluded that may have been downloaded from outside the period of time when the counter was installed.

Once the data was cleaned, the process of extrapolating up to a full year began. Typically, only partial data was available for the day the counters were installed, and for the day that data was downloaded from the counter. When only a portion of the full day's use was available, PTNY disregarded any data from the hour stretch in which the counter was installed or when data was retrieved, as staff passing in front of the counter would skew the data. Using the remaining hours, and the appropriate NBPD factors for that day, the partial day use was extrapolated to a full day use estimate for that day.

The data was then aggregated by day, using observed data for all days and the calculated estimate for the beginning and end day. With this data, a similar process was undertaken for partial month data. However, it was done slightly differently from the NBPD calculations. NBPD extrapolation calculates an estimated weekly use figure, using the day of the week as a percentage of weekly use, with a note that holidays use weekend rates. This weekly estimate is then multiplied by the number of weeks in the count month (number of days in the month divided by seven). However, this process ignores the different weekdays that may be found in any given month, and the formulas don't appear to actually account for holiday use. To adjust for those factors, each day of the year was assigned a "daily use" adjustment factor. These factors were the daily adjustment factor for each regular weekday, and the "holiday rate" of 18% for each New York State observed holiday. Using these factors, it was possible to calculate a "daily use" rate for each day as a percentage of total monthly use. This was calculated by summing all of the "daily use" adjustment factors and dividing each day's factor by the total monthly aggregate use percentage.

Once "daily use" rates were calculated, total estimated monthly use could be determined. This was only done for months for which less than the full month's use was collected. Total estimated monthly use was calculated by dividing the total observed data for that month by the percentage of total estimated monthly use that those days represent.

The monthly use factors represent the final piece of the calculation used by PTNY to determine annual use. This process followed a similar format to the above calculations, with full month data used where available, and the "calculated" full month data used following the process shown above. The NBPD calculations provide monthly extrapolation factors - based on the climate region (all counts were considered to have taken place in the "Long Winter Short Summer" region). Based on these figures, a similar formula could be calculated to that shown above, dividing the total available data (including full month observed data and

calculated partial month data), and dividing that by the percentage of total estimated monthly use that those days represent.

A slightly different procedure was followed for locations where multiple two-hour observational counts volumes were collected. For these locations, each two-hour volume was entered into a sheet that determined each time frame's estimated proportion of total annual use. As multiple two-hour stretches were added to the sheet, the total observed figure represented a greater proportion of the total estimated annual use. The total observed data was divided by that estimated percentage of annual use figure to determine the total estimated annual use at those locations.

This year's Who's on the Trail report does not claim to identify total use for any given year. Rather, Who's on the Trail calculates an overall "Estimated Annual Use" figure, based on calculating the total annual use using all available data from the period of time counters were installed. This formula works for locations that had counters installed for more than one year as well, determining an estimated "12 month" figure for locations with more than 12 months of data.