New York City
Bicycle Lane and Trail Inventory
Phase II

New York City Department of City Planning
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Contents

Introduction

Phase I of the Bicycle Lane and Trail Inventory project provided comprehensive information on existing physical conditions of New York City's bicycle facilities. The second phase of the project focuses primarily on the usage component of bicycle facilities. The document features the extensive field data that was collected for this purpose. As further described in the analysis sections, three main factors influence the usage of bicycle facilities:

- ***continuity of the facility,***
- ***proximity to destinations and***
- ***condition of the facility.***

Additionally, the report updates the conditions inventory by recording newly built and reconstructed bicycle facilities.

Data on non-motorized transportation modes, particularly on bicycling and walking, is severely limited. New York City currently lacks comprehensive data of bicycle lane and trail usage. Since 1980, the New York City Department of Transportation (NYCDOT) has been monitoring bicycle travel at selected locations in Manhattan. However, these surveys are not specifically taken where bicycle lanes are located. Little is also known about the amount of bicycling in the remainder of New York City and about the usage of off-street bicycle facilities.

This inventory provides such data to assist and substantiate ongoing and future bicycle planning projects. It can aid in the understanding of cycling habits and trends and therefore allow for more accurate and persuasive recommendations for the improvement of bicycle facilities in New York City. As a predecessor of the New York Metropolitan Transportation Council's (NYMTC) bicycle data collection program for the metropolitan region, which is anticipated to start in 2002, it will set the stage for a continuous and comprehensive data gathering effort.

National Examples for Bicycle Count Programs

To find examples on how bicycle data collections are undertaken in other parts of the country, an informal email survey was sent out to Bicycle Coordinators across the United States. It revealed very few models of comprehensive bicycle count programs. Even factoring in that not every possible source was reached and that not every agency responded, this indicates a lack in bicycle data collection in most cities and communities. Bicycle data collection is a labor intensive task, and as a result, most communities are without or have limited bicycle information.

The City of Portland, Oregon has its Office of Transportation work in collaboration with a local university. The task of an undergraduate class in statistics is to conduct an annual cordon count of Downtown Portland (one day, evening peak hour count in summer) and analyze the recorded data. Additionally, interns are hired to conduct manual hand counts at approximately 80 locations throughout the city, again as one day summer-time, evening peak hour counts. The city also uses pneumatic short hoses on some of their bridge paths to detect bicyclists.

Over the past three years, New York State DOT, Region 10 (Long Island) has attempted to count bikeway users and has had only moderate success. Either human error during manual counts or inherent deficiencies with automatic counters accounted for most inaccuracies. As an alternative method, the usage on the Jones Beach bikeway was recorded by videotaping the location. The camera was set up in a manned bridge tower, which provided security, power, and a person to change the tapes. Eight-hour videotapes covered all daylight hours on weekdays and weekends. The camera was zoomed so that the image was as far away as possible while keeping the user's mode discernable. The wide angle of view gave an adequate crossing time of the user through the camera view, which allowed the video to be played back at faster speed when counting the users. Using these faster playback speeds reduced nearly eighty hours of footage to less than thirty

hours of review with nearly one hundred percent accuracy.

The Pima Association of Governments in Tuscon, Arizona has just started a bicycle counting program. Bicycles will be counted in bicycle lanes and at intersections, for both through and turn movements. The private contractor uses the typical pneumatic hoses utilized for motor vehicles counts, positioned specifically for bicycle locations. Before this program, only manual counts were conducted around the University of Arizona through the use of volunteers.

The San Diego, California Association of Governments has been recording bicycle volumes at selected intersections every few years since the early 1980s. The one-day counts were taken during peak hours at 70 -80 sites. However, they are not satisfied with both the recorded data and the level of effort it takes to collect it, therefore the possibility of using video cameras and time lapse recordings is being examined. The idea is to get full day counts at fewer sites until a better understanding is reached on how bike trips are distributed by time of day and time of year, e.g. twelve-hour counts done in 1981 indicated the peak period for bikes at midday, but counts in other years were taken at traditional work commute peaks. The goal is to collect data more frequently at selected sites and to evaluate the impact of new facilities. A few cameras are already in place, sending images to traffic management centers, but these are at intersections unrelated to bicycle routes.

User Survey along Bicycle Facilities

Since 1980, NYCDOT has been monitoring bicycle travel at selected locations. Bicycle volumes are recorded on the Staten Island Ferry, on three East River bridges on which Class I bicycle paths exist, and across 50th Street in Midtown Manhattan.

In an effort to target user volumes along existing bicycle lanes, the Department of City Planning's Transportation Division conducted manual counts on most of New York City's bicycle lanes during September/October 2000. The majority of the data collected pertained to cyclists, but rollerblade and scooter data was included as well because of their propensity to utilize bicycle facilities and growing popularity as modes of transportation. Additional counts were conducted along the circuits of Central Park and Prospect Park, at three Manhattan/Bronx bridges with pedestrian and bicycle provisions, and along selected greenways, especially where bicycle lanes are scarce. A further survey was taken along the Hudson River Park Trail. This greenway was expected to open towards the end of this project, so before- and after-construction data was collected to analyze impacts of facility improvements.

Overall, user counts were conducted at forty three different locations along thirty three on- and off-street bicycle facilities.

Data Specifics

Along bicycle lanes, for every bicyclist in the corridor the following information was collected:
Whether the bicyclist was traveling

- in the bicycle lane
- in the travel lane adjacent to the bike lane
- in any of the other travel lanes
- counterflow in the bicycle lane
- counterflow out of the bicycle lane
- on the sidewalk

Whether the bicyclist was

- male or female
- wearing a helmet or not
- and/or, a child under 16 years of age

Similarly, for every rollerblader and scooter in the

corridor the following information was collected: Whether the person was traveling

- in the bicycle lane
- out of the bicycle lane
- counterflow anywhere on the road

No information was collected on the rollerblader and scooter user's gender or use of safety equipment. The last item in the survey described observed conditions, for example, vehicles using the bicycle lane as a double parking lane, cyclists encountering conflicts with turning vehicles, truck loading and unloading in the bicycle lane, etc.

Greenway users were placed into four categories:

- bicyclists (plus helmet usage)
- bladers, scooters and skateboarders
- joggers
- walkers

Additionally, gender and direction of travel was recorded for each group.

Manhattan Bicycle Lanes

On October 27th, 1999 counts were conducted by Transportation Division staff along all of Manhattan's bike lanes, excluding the Central Park circuit. These counts, similar to NYCDOT's Manhattan Central Business District counts, were performed for a 12 hour period from 7am to 7pm. This was the first large-scale effort focusing specifically on bike lanes. The survey was repeated on September 27th 2000 and October 3rd 2001.

The survey data was collected at the approximate midpoint of each of the bicycle lanes in Manhattan. However, because of their extreme length, two data collection points were assigned on both the Broadway bicycle lane and on the St. Nicholas Avenue bicycle lane. These two points were chosen by dividing the lane into two equal sections and then finding the approximate midpoints of both sections.

To avoid any possible confusion with turning cyclists entering/exiting the lane, the data was usually collected at mid-block rather than at an intersection. Along the two facilities with lanes in both north- and southbound directions, St. Nicholas Avenue and Adam Clayton Powell Blvd, separate data was taken for each direction.

Map 1: Characteristics of Manhattan's Bicycle Lanes

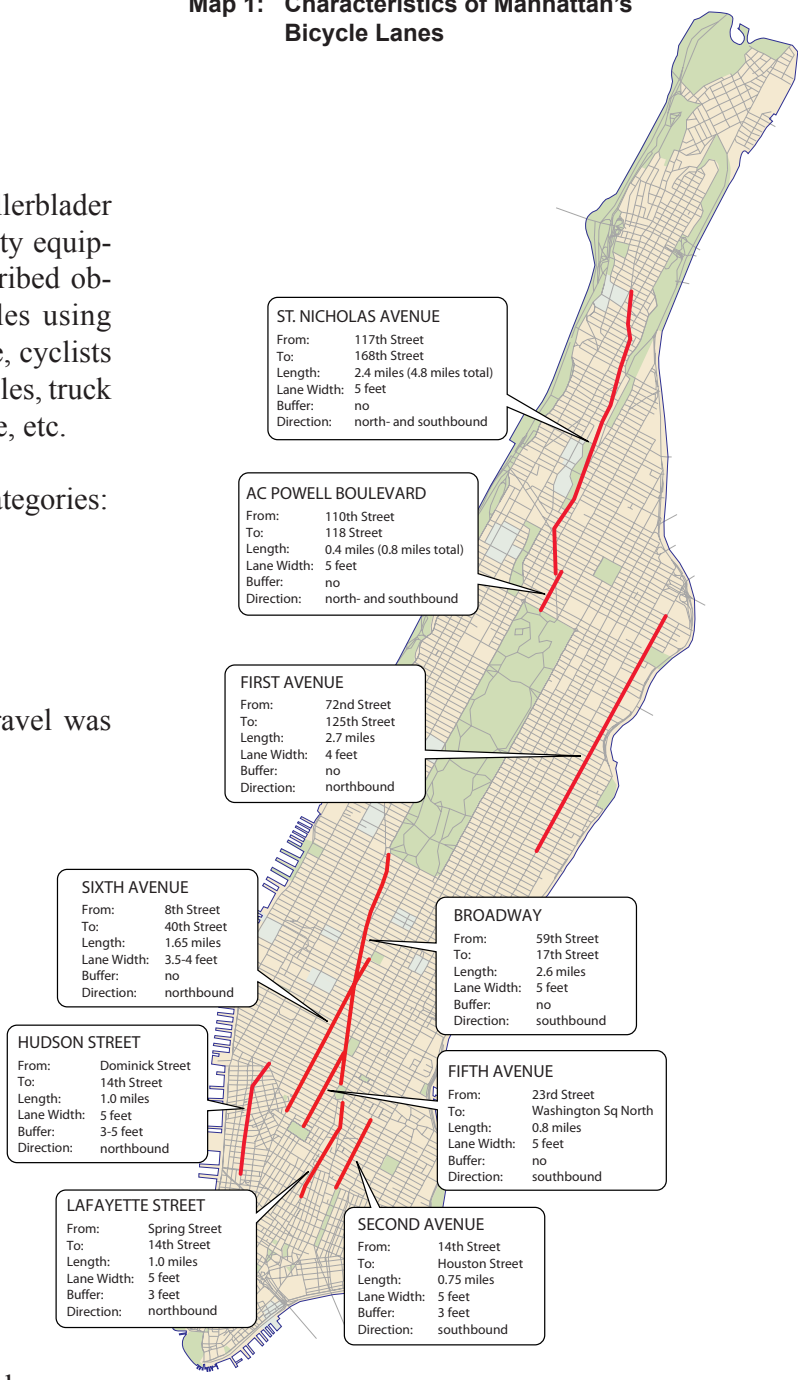


Table 1
1999, 2000 and 2001 Manhattan Bicycle Lane Counts

	1999							2000							2001						
Location	**Cyclist**	**Male**	**Female**	**Male Helmet**	**Female Helmet**	**Total Helmet**	**Blader/ Scooter**	**Cyclist**	**Male**	**Female**	**Male Helmet**	**Female Helmet**	**Total Helmet**	**Blader/ Scooter**	**Cyclist**	**Male**	**Female**	**Male Helmet**	**Female Helmet**	**Total Helmet**	**Blader/ Scooter**
2nd Ave @ 7th St	**741**	83%	17%	17%	25%	18%	48	**815**	81%	19%	14%	26%	16%	60	**981**	81%	19%	14%	25%	16%	47
Hudson St @ Christopher	**666**	88%	12%	20%	32%	22%	41	**704**	87%	13%	22%	30%	23%	63	**809**	83%	17%	19%	30%	21%	83
Lafayette @ Astor Pl	**1268**	87%	13%	20%	28%	21%	57	**1361**	82%	18%	21%	26%	22%	77	**1417**	81%	19%	21%	25%	22%	44
5th Ave @ 14th St	**941**	89%	11%	20%	26%	21%	40	**965**	86%	14%	17%	19%	17%	43	**1031**	85%	15%	16%	31%	18%	77
6th Ave @ 23rd St	**1754**	92%	8%	20%	33%	22%	44	**1953**	92%	8%	17%	35%	19%	105	**1733**	89%	11%	17%	36%	19%	67
Bdwy @ 28th St	**656**	92%	8%	13%	48%	16%	23	**824**	92%	8%	18%	44%	20%	34	**820**	93%	7%	16%	40%	18%	30
Bdwy @ 48th St	**908**	96%	4%	17%	39%	18%	41	**998**	89%	11%	16%	43%	19%	56	**772**	93%	7%	19%	35%	20%	51
1st Ave @ 91st St	**227**	95%	5%	10%	55%	12%	0	**243**	93%	7%	11%	44%	13%	8	**299**	94%	6%	6%	59%	9%	5
AC Powell Blvd @ 113rd	**237**	91%	9%	23%	53%	26%	4	**299**	93%	7%	20%	43%	22%	2	**294**	92%	8%	16%	46%	18%	9
St Nich Ave @ 128th St	**180**	89%	11%	31%	57%	34%	1	**330**	91%	9%	29%	47%	30%	2	**339**	92%	8%	24%	57%	27%	3
St Nich Ave @ 151st St	**148**	93%	7%	25%	90%	29%	4	**211**	90%	10%	35%	73%	39%	3	**131**	82%	18%	33%	70%	40%	2
TOTAL	**7726**	**90%**	**10%**	**19%**	**33%**	**21%**	**303**	**8703**	**88%**	**12%**	**19%**	**32%**	**20%**	**453**	**8626**	**87%**	**13%**	**18%**	**32%**	**19%**	**418**
Data by direction for two-way streets																					
AC Powell Blvd NB	**102**	89%	11%	35%	55%	37%	1	**142**	91%	9%	24%	46%	26%	1	**157**	90%	10%	23%	47%	25%	3
AC Powell Blvd SB	**135**	93%	7%	15%	50%	18%	3	**157**	94%	6%	17%	40%	18%	1	**137**	95%	5%	8%	43%	10%	6
St Nicholas Ave /128 NB	**81**	88%	12%	27%	60%	31%	0	**142**	89%	11%	28%	47%	30%	1	**149**	92%	8%	26%	67%	29%	2
St Nicholas Ave /128 SB	**99**	89%	11%	35%	55%	37%	1	**188**	93%	7%	29%	46%	30%	1	**190**	92%	8%	23%	50%	26%	1
St Nicholas Ave /151 NB	**79**	93%	7%	22%	83%	27%	1	**91**	88%	12%	36%	82%	42%	0	**68**	85%	15%	33%	50%	35%	0
St Nicholas Ave /151 SB	**69**	94%	6%	28%	100%	32%	3	**120**	91%	9%	35%	64%	38%	3	**63**	79%	21%	34%	85%	44%	2

Analysis

Because the last annual counts on October 3rd 2001 were conducted during the final stage of this document, its data will be presented without further analysis. Additionally, circumstances from the September 11th events led to traffic restrictions and different traffic patterns in Manhattan, which makes comparison of the data to previous years problematic. The main restrictions to vehicular traffic were:

- from 6-12 am no single-occupancy private vehicles allowed into Manhattan on crossings below 63rd Street
- Brooklyn Battery Tunnel closed to traffic, Holland Tunnel open for outbound traffic only (no truck)
- no private vehicles permitted to cross south at Canal St.

Generally, locations below 14th Street saw an increase in ridership compare to September 2000, while locations in Midtown Manhattan had the biggest decreases in actual numbers of cyclists.

For the first two annual surveys, user counts along Manhattan's bicycle lanes revealed an average increase of 13 percent for bicyclists and 50 percent for rollerbladers and scooters between 1999 and 2000 (Table 1). Part of that increase might be accounted for by the different dates of the survey, the end of October in the first year as compared to September for the second survey. But the increase at each of the lanes varies enough, from 3 to 83 percent for bicyclists, that at least a portion of the additional numbers may be attributed to overall increased ridership (Chart 2). The analysis focuses mainly on bicyclists, because the low numbers of bladers and scooters may lead to inflated percentual differences between the two years (e.g., a 100 percent

Chart 1: Number of Bicyclists for the years 1999, 2000 and 2001

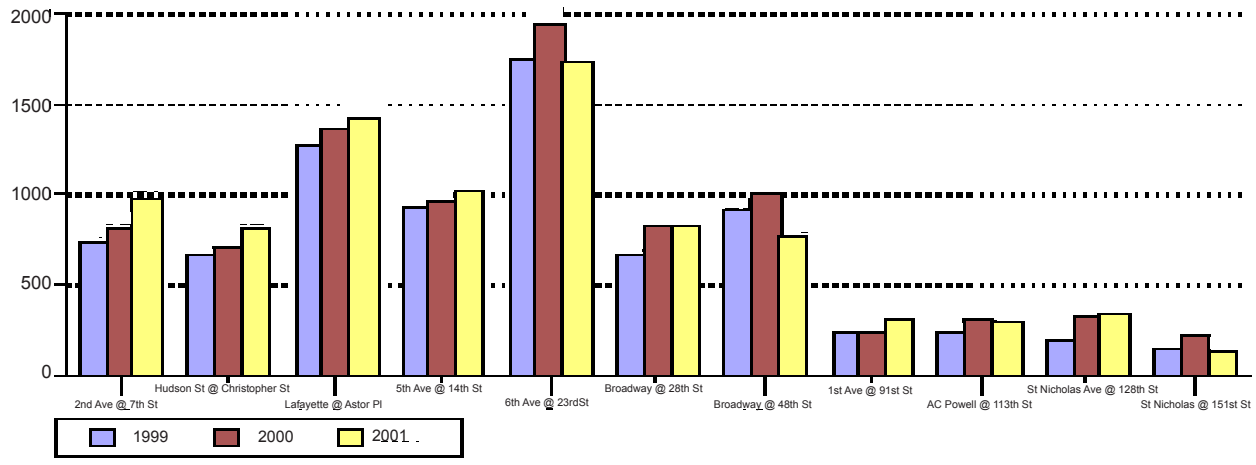


Chart 2: 1999 - 2000 Change in Bicyclist and Blader Volumes and Bicyclist's Helmet Usage

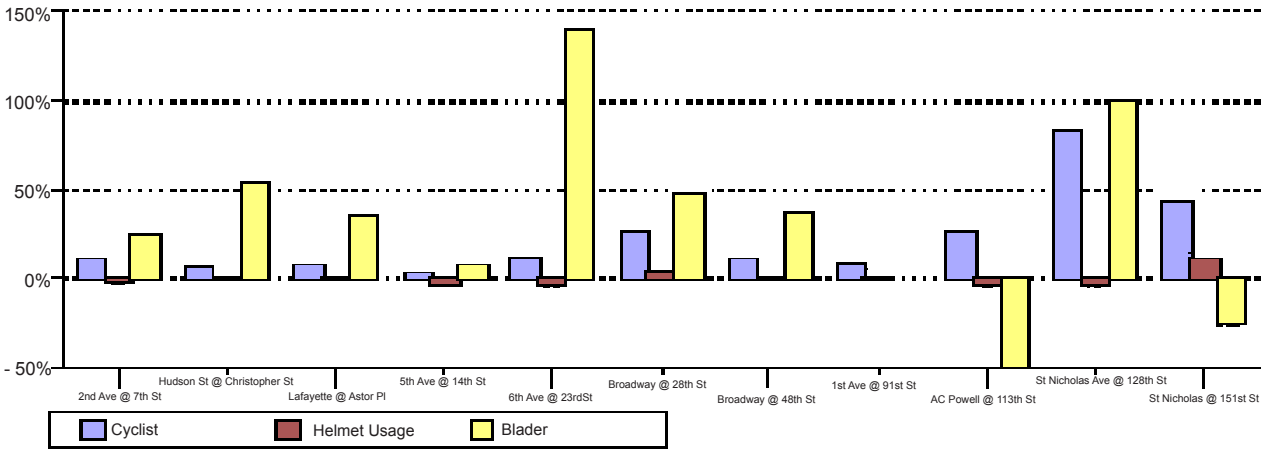
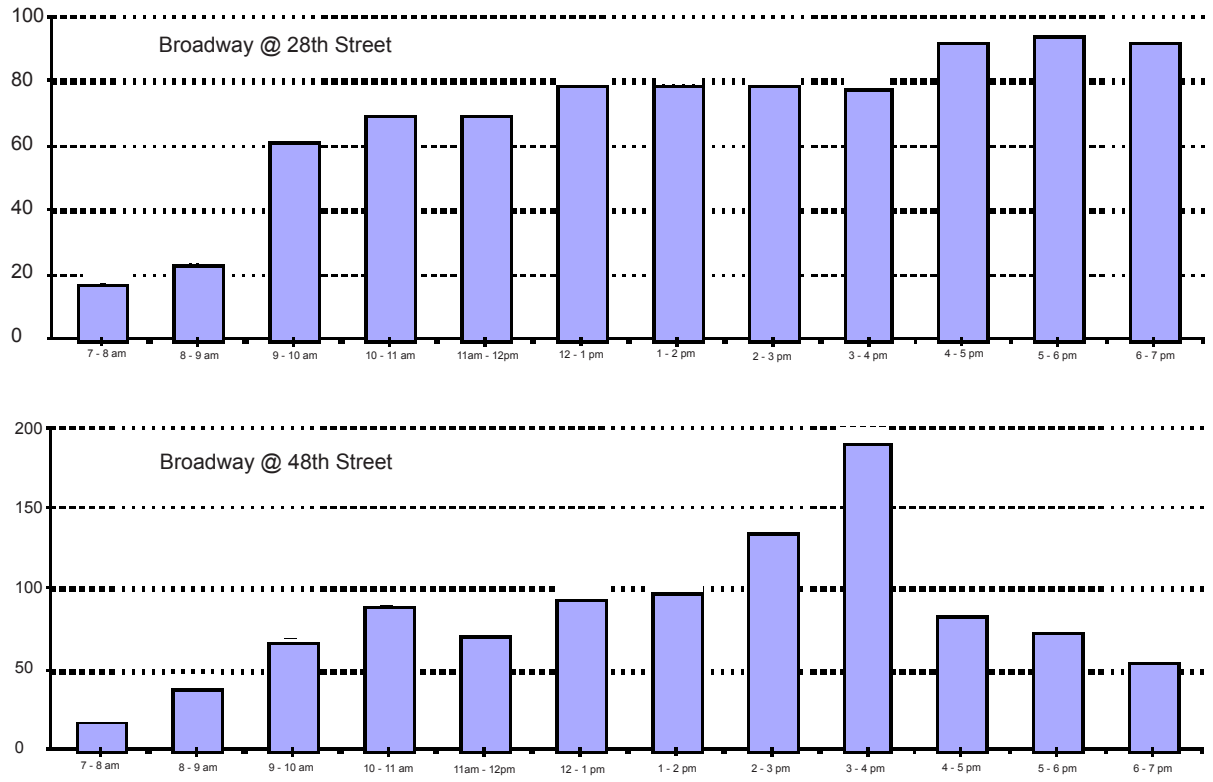


Chart 3: Hourly Bicyclist Volumes at Broadway (2000)



increase on St. Nicholas Avenue refers to only one additional blader during the 12-hour period).

A substantial difference in user volumes can be found between Manhattan's bicycle lanes above and below 59th Street. While bicycling in the Central Business District seems to be a widespread mode of transportation, bicycle lanes in Upper Manhattan are not utilized at the same rate (Chart 2). One reason for this is unquestionably the high number of bicycle messengers observed in central Manhattan.

Examining the peak volumes during the twelve-hour period, no pattern can be found for all locations. Several bicycle lanes register evening peaks between 4:30-6:30 pm and midday peaks around 1 pm. However, a number of lanes do not reveal any significant peak periods, but rather "stand-alone" top-level volumes for fifteen minute intervals. Especially at Midtown locations, this might be caused by a fairly steady flow of bicycle messengers throughout the day. Chart 3 shows volumes for the two Broadway locations that demonstrate the great difference in patterns even at the same facility 20 blocks apart. (for other locations see Appendix A.i)

In spite of being Manhattan's narrowest bicycle lane on a road with high traffic volumes, the **Sixth Avenue** bicycle lane accounts for the most users in all years. An explanation is its location in the center of Midtown Manhattan and reasonable length of 1.65 miles. Between 1999 and 2000 bicyclist volumes increased by 11 percent to almost 2000 riders for the twelve-hour period. With 105 rollerbladers and scooters it has also the highest volumes for this user group, with an increase of 139 percent, due to 61 additional users in the year 2000. Around 60 percent of the bicyclists at this location were actually positioned in the bike lane, the highest percentage in any of the lanes below 110th Street. ***This may be an indication that at locations with heavy traffic volumes*** *(about 2000 vehicles/hour at Sixth Avenue during morning and evening peaks, DCP's Midtown Manhattan Study)* ***bicyclists are more prone to use dedicated facilities, even if they are narrow.***

The next highest bicyclist and rollerblader volumes are found along the **Lafayette Street** bicycle lane. This is a favorite with many bicyclists, a wide lane with an additional buffer, located in the center of Lower Manhattan. It has, like the two other buffered bicycle lanes, a fairly high ratio of counterflow riders. ***During almost half the time of the twelve hour 2000 counts, double parked cars and unloading trucks blocked the bicycle lane, leading to a sharp increase in bicyclists forced to ride outside the lane.*** Additionally, a high number of cyclists at the Astor Place location intend to turn east towards the East Village and therefore position themselves on the side of the roadway opposite the bicycle lane.

With only 0.8 miles , the centrally-located **Fifth Avenue** bicycle lane with its connection to New York University ranks in the top four of user volumes for both years. The construction work / repaving of the roadway just prior to the 2000 counts may have caused some bicyclists to avoid using this lane, where ridership increased only marginally by three percent.

Broadway is the longest bicycle lane in the center of Midtown Manhattan. Its northern survey point at West 48th Street accounted for about 1000 cyclists in the year 2000. The southern location at West 28th Street saw the highest increase in ridership (26 percent) of all bicycle lanes below 59th Street and ranks as number five in bicyclist volumes in 2000. It is probable that bicyclists prefer direct southbound avenues instead of the diagonal running Broadway because it creates irregular intersections which are difficult for bicyclists to negotiate. Additionally, its narrow and often obstructed bike lane may discourage use. However, bicyclists who ride on Broadway, especially at the northern location, are primarily positioned in the lane.

A fair number of bicyclists were also observed along the **Second Avenue** and **Hudson Street** bike lanes. Both are five foot lanes with an additional three foot buffer which attracts many counterflow cyclists, especially when adjacent streets lack bicycle facilities.

The bicycle lanes with the lowest user volumes are **First Avenue**, **Adam Clayton Powell Boulevard** and **Saint Nicholas Avenue**. All of them are located above 59th Street. While First Avenue ridership increased by only 7 percent, the three other locations saw increases of up to 83 percent. As already mentioned, this has to be seen in relation to the actual numbers: while 199 additional bicyclists mean an increase of only 11 percent on Sixth Avenue, 150 bicyclists on Saint Nicholas Avenue account for an 83 percent increase. Nonetheless, the additional riders above 110th Street amount to a significant expansion in ridership along these facilities.

Other Bicycle Facilities

In addition to counts along Manhattan's on-street lanes, user surveys were taken on several other bicycle facilities during September/October 2000. Because there are few on-street bike lanes in boroughs other than Manhattan, off-street greenways were also included in the survey. Additionally, the Central Park and Prospect Park loops and facilities on three Manhattan/Bronx bridges were surveyed.

Table 2
Additional User Counts along Bicycle Facilities

	Bike Lanes	Greenways	Bridges
Brooklyn	5	3	
Bronx	1	2	
Manhattan	1	2	
Queens	2	1	
Staten Island	1	0	

Due to the observed inconsistency of bicycle peak periods at the Manhattan locations and limited resources, remaining counts were conducted during motor vehicle peak hours. Counts were usually taken during two morning and evening peak hours and, if staff availability permitted, during two midday hours (7:30-9:30 am, 12:00-2:00 pm and 4:30-6:30 pm). For greenways used primarily for recreation, weekend, rather than weekday, counts were conducted. In general, bicycle lane counts were taken in the same manner as the Manhattan counts (see page 2). Greenway users were divided

Table 3
Fall 2000 Additional Bicycle Lane Counts

Boro	Bike Lane	Direction	Date	Day	Cyclist 4 / 6 hours	Male	Female	Male Helmet	Female Helmet	Total Helmet	Blader and Scooter 4 / 6 hours
BK	Adams St @ Pierrepont	NB	09/07	weekday	213 / 237	78%	22%	47%	78%	54%	5 / 5
BK	Adams St @ Pierrepont	SB	09/07	weekday	109 / 130	85%	15%	47%	65%	50%	3 / 3
BK	Bedford Ave @ Courtelyou	NB	09/21	weekday	36	92%	11%	0%	25%	3%	1
BK	Bedford Ave @ Courtelyou	SB	09/21	weekday	37	89%	11%	9%	0%	8%	1
BK	Clinton St @ Pierrepont	NB	10/04	weekday	121	74%	26%	48%	32%	44%	1
BK	Henry St @ Joralemon	SB	09/21	weekday	71	87%	13%	24%	44%	27%	3
QN	34th Ave @ 89th St	EB	09/25	weekday	62	97%	3%	12%	50%	13%	3
QN	34th Ave @ 89th St	WB	09/25	weekday	65	91%	9%	8%	0%	8%	5
QN	73rd Ave @ 173rd St	EB	10/12	weekday	9	89%	11%	25%	100%	33%	0
QN	73rd Ave @ 173rd St	WB	10/12	weekday	7	71%	29%	60%	50%	57%	0
BX	Prospect Ave @ 162nd St	NB	10/03	weekday	24	96%	4%	0%	0%	0%	4
BX	Prospect Ave @ 162nd St	SB	10/03	weekday	35	100%	0%	0%	---	0%	2
SI	Capodanno Blvd @ Seaview	NB	09/11	weekday	8	75%	25%	67%	100%	75%	2
SI	Capodanno Blvd @ Seaview	SB	09/11	weekday	22	55%	45%	67%	70%	68%	0
Central Park and Prospect Park loops											
MN	Central Park Drive @ E 86th	NB	10/12	weekday	668 / 1068	78%	22%	62%	78%	65%	122 / 213
MN	Central Park Drive @ E 86th	NB	10/14	weekend	2280 / 3360	72%	28%	50%	62%	54%	948 / 1308
MN	Central Park Drive @ W 86th	SB	10/12	weekday	695 / 1082	79%	21%	62%	74%	65%	110 / 200
MN	Central Park Drive @ W 86th	SB	10/15	weekend	2416 / 3408	72%	28%	55%	59%	56%	943 / 1501
BK	Prospect Park Drive @ Empire	NB	10/11	weekday	429 / 603	80%	20%	52%	67%	55%	23 / 27
BK	Prospect Park Drive @ Empire	NB	10/15	weekend	1476 / 2164	73%	27%	59%	63%	60%	103 / 116

4 hours - weekday: 7:30-9:30 and 4:30-6:30, weekend: 11:00-3:00
6 hours - weekday: plus 12:00-2:00pm, weekend:10:00-4:00

Table 4
Fall 2000 Greenway Counts

Boro	Greenway	Date	Day	Hours	Cyclist	Blader	Jogger	Walker	Total
BK	Eastern Pkwy @ Franklin	09/07	weekday	4h	50	6	8	564	628
BK	Ocean Pkwy @ Ave F	09/12	weekday	4h	133	2	9	167	311
BX	Pelham Pkwy @ Williamsbridge	10/04	weekday	4h	62	0	35	178	275
BX	Mosholu Pkwy @ Hull	10/04	weekday	4h	32	0	4	93	129
BK	Shore Pkwy @ 4th Ave	09/09	weekend	6h	928	106	157	467	1658
QN	Joe Michaels Mile @ 28th Ave	9/16	weekend	6h	568	227	232	300	1327
MN	East River East Side @ Houston	10/28	weekend	6h	220	57	637	249	1163
MN	East River West Side @ Houston	10/28	weekend	6h	108	29	139	402	678
Manhattan-Bronx Bridges									
	Broadway Bridge	10/12	weekday	4h / 6h	55 / 76	3 / 3	8 / 8	634 / 924	700 / 1011
	145th Bridge	10/11	weekday	4h / 6h	66 / 93	3 / 4	0 / 0	311 / 435	380 / 532
	Willis Bridge	10/12	weekday	4h / 6h	111 / 168	3 / 4	4 / 4	104 / 169	222 / 345

4 hours - weekday: 7:30-9:30 and 4:30-6:30, weekend: 11:00-3:00
6 hours - weekday: plus 12:00-2:00pm, weekend:10:00-4:00

into four groups: bicyclists, bladers/ scooters, joggers, and walkers.
The one-time survey of bicycle lanes and greenways primarily in boroughs other than Manhattan permits only a general comparison of the facilities. However, all these locations will be part of a future bicycle data collection program, initiated by NYMTC. Further conclusions may be drawn after follow-up counts have been conducted under this program.

Also, low volumes at some of the surveyed facilities should not be mistaken for low overall bicycle volumes in these boroughs. Designated facilities are very limited and many are not centrally located, so bicyclists might be found in much higher numbers along major connectors without bicycle facilities.

Analysis

Bicycle lanes in the Downtown Brooklyn area account for the most cyclists during weekdays in the four boroughs other than Manhattan. These volumes may be attributed to a concentration of destinations and the proximity to East River bridges. In particular, **Adams Street**, which serves as a connector to the Brooklyn Bridge path, can easily compete with bicycle volumes on most Manhattan lanes during the same peak hour periods (see Table 5). Unfortunately, it is also one of the locations with the lowest ratio of riders in the bicycle lane, because the lane is almost constantly blocked by illegally parked vehicles.

Table 5

Reference Volumes at Manhattan's Bicycle Lanes

Manhattan Bicycle Lanes	7:30-9:30am plus 4:30-6:30pm volumes
2nd Ave @ 7th St	259
Hudson St @ Christopher	210
Lafayette @ Astor Pl	368
5th Ave @ 14th St	274
6th Ave @ 23rd St	597
Bdwy @ 28th St	240
Bdwy @ 48th St	239
1st Ave @ 91st St	92
AC Powell NB	58
AC Powell SB	60
St Nicholas/128 NB	62
St Nicholas/128 SB	70
St Nicholas/151 NB	49
St Nicholas/151 SB	54

The off-street path along **Ocean Parkway** ranks second highest with 133 bicyclists in both directions during the four hour weekday period. The on-street bicycle lane on **Bedford Avenue**, which parallels Ocean Parkway in fairly close distance, accounts for only about half the number of cyclists in the same time period. ***Bicyclists appear to prefer the additional safety that an off-street facility offers.*** Also **Clinton Street** records high volumes with 121 bicyclists. The bicycle lane with the lowest volumes is **73rd Avenue** in Queens, followed by **Father Capodanno Boulevard** in Staten Island.

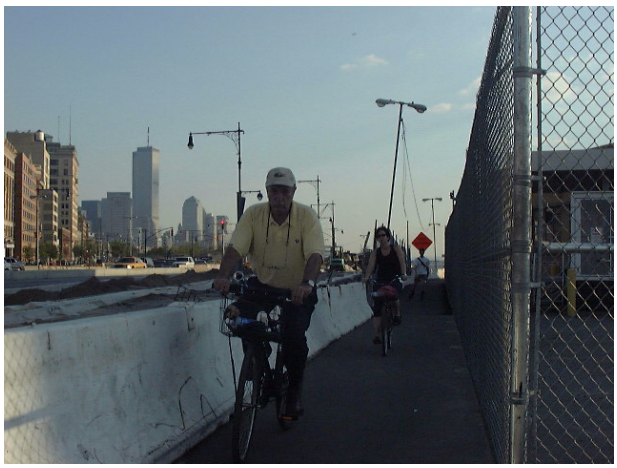
It is hard to compare weekday counts along the circuits in Prospect Park and Central Park with other bicycle lanes, because recreational usage contributes to their high volumes.

During the weekend, **Central Park** draws by far the highest number of bicyclists of all count locations. ***New Yorkers use its spacious car-free loop for recreation and exercise and tourists may also enjoy a ride by renting bicycles in the park.*** About 3,400 riders were recorded during the six hour period. **Prospect Park** accounted for 2,164 bicyclists during the weekend, a volume that was exceeded along the Hudson River Trail during the follow-up counts (see Hudson River Greenway section). **Shore Parkway** in Brooklyn and **Joe Michaels Mile** in Queens recorded volumes of 1,658 and 1,327 greenway users, almost half of them bicyclists. This ratio was much lower in **East River Park**, with its ball fields, where most users are pedestrians.

The three surveyed bridges connect Manhattan and the Bronx. **Broadway Bridge** at the tip of Manhattan recorded the most users with 1,011 persons during six-hour weekday counts. However, the vast majority of these were walkers. **Willis Bridge** with the lowest overall user volumes accounts, on the other hand, for the highest bicycle volume of all three bridges. ***It appears to be a fairly desolate location, which is probably the reason for the very small number of female users.***

Hudson River Greenway

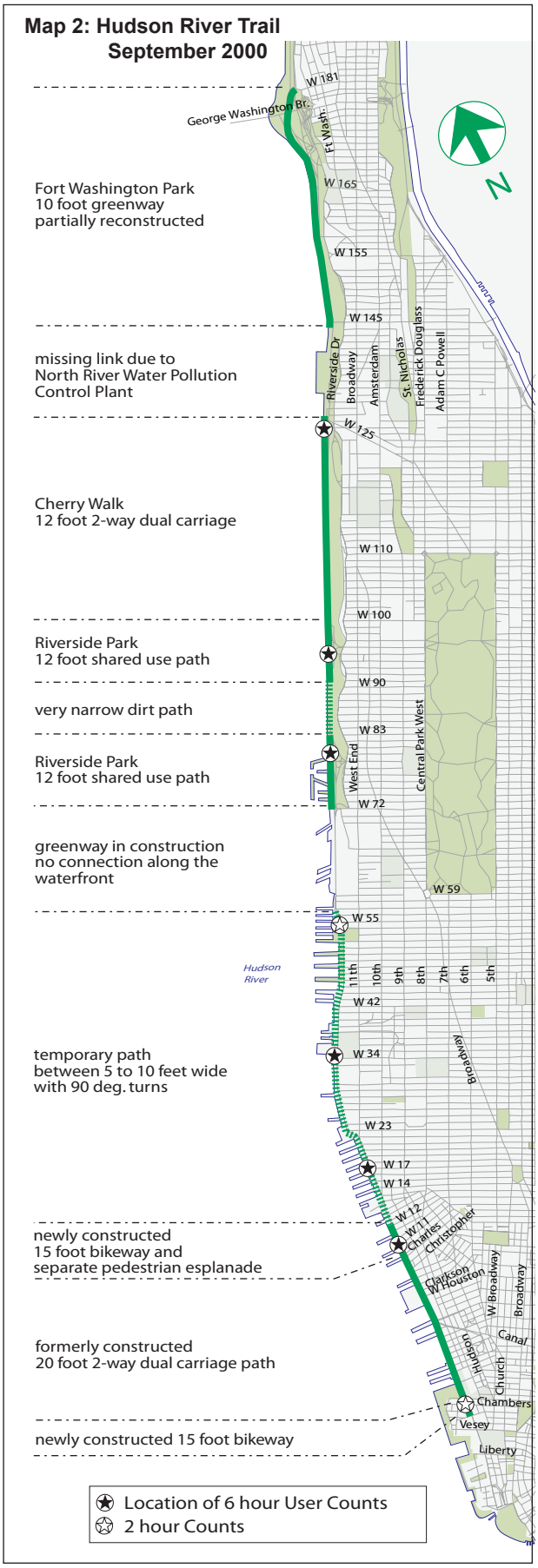
The Hudson River Park Master Plan proposes a multi-use greenway with landscaped and mostly separated bicycle and pedestrian pathways along the river front from Battery Place to West 55th Street. In the year 2000, construction on the adjacent Route 9A highway moved forward and with it, construction on the bikeway/walkway. In September, at the time of the first set of counts, a two-block segment below Chambers Street and a segment between Charles Street and West 12th Street had been newly constructed. The segment between Chambers Street and Charles Street, though not the final design, was previously constructed as a wide mixed use path of 12 feet or more. Sections north of West 12th Street were narrow interim pathways with many odd turns, lined with concrete barriers and chainlink fences, some segments being not more than five feet wide (Map 2).

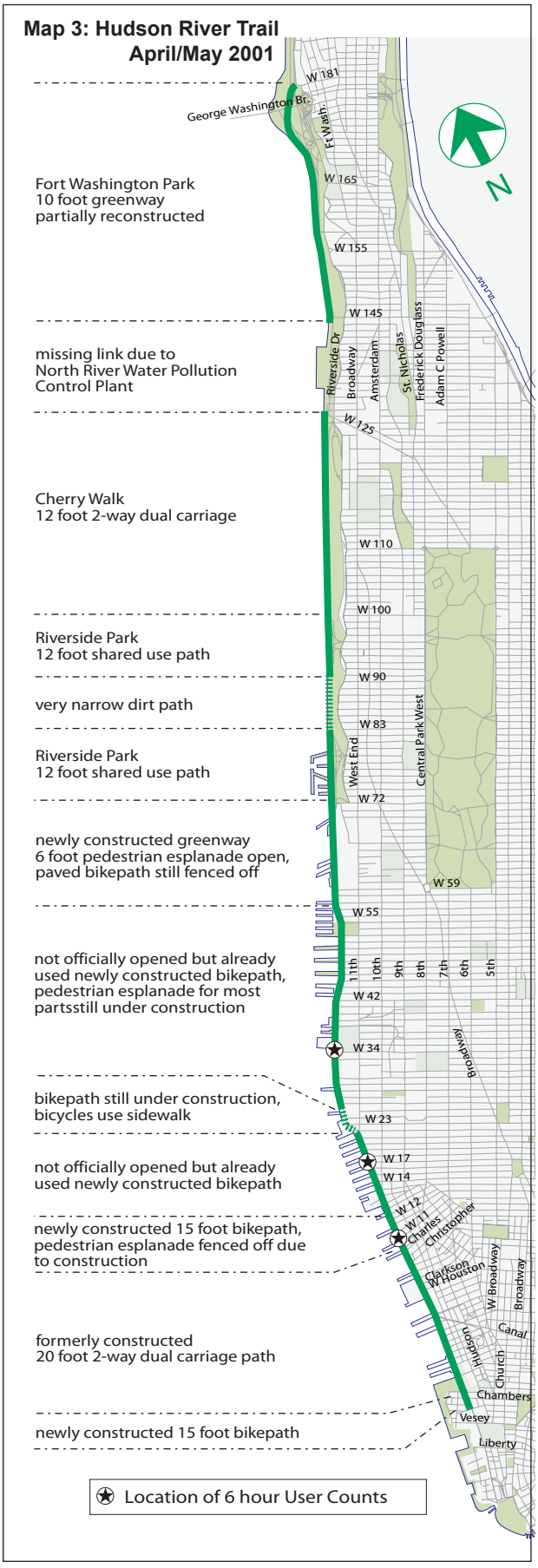


Narrow width and 90 degree turn at temporary section September, 2000

The follow-up counts were scheduled for the end of April. Though not officially open, the sections from West 12th Street up to West 59th Street had been completed as wide landscaped greenway (see Map 3). Separate pedestrian esplanades were mostly still under construction. During the week, construction crews and vehicles could still be found along the path, but on the weekends the new facility was already completely taken over by recreational New Yorkers and tourists.

While not part of the Hudson River Park, other greenway sections exist north of West 55th Street.





The Riverside Park Trail leads from West 72nd Street to West 100th Street, with a very narrow segment between West 83rd and West 90th Street. The path continues as Cherry Walk up to West 125th, a segment completed in Spring 2000. Another section runs in Ft. Washington Park from West 145th Street to West 181st Street, parts of it reconstructed in Fall 2000.

A crucial link to a continuous greenway along the waterfront was opened in April, 2001 between West 55th and 72nd streets. This improvement creates connectivity for most of Manhattan's Hudson River waterfront and enables greenway users to travel on a continuous path from the Battery up to West 125th Street. A missing section that still existed in May 2001 between West 125th and West 145th Street is now accessible by opening a service road to greenway users.

User Counts

User counts focused on the proposed path in Hudson River Park between Battery Park and West 59th Street. With the ongoing construction, locations in this area gave the opportunity of before- and after-construction counts. Three locations were chosen for the before-counts. At West 11th Street the only finished section of the greenway existed at the time, with a wide bicycle/blader path divided from a pedestrian esplanade by a landscaped area. At West 17th and 34th streets the greenway existed only as 6 to 8 foot wide interim paths.
Counts were taken simultaneously for three two-hour peak times during a September weekday and for six hours during the following weekend, both

Greenway at W 11th Street with bicycle/blader path, landscaped area and pedestrian esplanade to the right, September 2000

sunny days with temperatures ranging from 65 to 80EF. Two additional locations were covered during the midday peak. Weekday reference counts were conducted at three locations along the northern greenway sections. Greenway users were recorded in four different categories: Cyclists, Bladers/Scooters, Walkers and Joggers. Each group was further classified by gender and travel direction. (The very first set of counts specified gender only as a total for all users.)

The follow-up counts along the Hudson River Park section took place on Sunday, April 29 and Wednesday May 2, 2001, both sunny days with temperatures from 60 to 90EF. Besides having just had some of the first warm spring weeks and weekends, several newspaper articles had made New Yorkers aware of the new opportunities along the Hudson River. User volumes were recorded during the same six hour periods as the prior counts. To make it easier to keep track of the expected increase in user numbers, information on gender was omitted. ***Unlike the conditions found in September, the West 11th Street location was less complete with the esplanade and lawn fenced off due to construction***

Narrow temporary path along the waterfront at West 34th Street. The unfinished bikeway can be seen to the right. September 2000

on the bulkhead. Though not officially open, a wide bike/walk path was now in place along the West 17th and 35th Streets locations. A separate pedestrian esplanade was still under construction.

Analysis

Along the three locations in Hudson River Park (at West 11th, 17th and 34th Street), user numbers decrease by about sixfold from south to north in Fall 2000. They are higher again where the greenway

Table 6
Fall 2000 and Spring 2001 Hudson River Greenway Counts

Location	Date	Hours	Cyclist	Blader/ Scooter	Jogger	Walker	Total	North bound	South bound
Weekday Counts September/October 2000									
W 11	09/12	6h	541	268	586	508	1903	48%	52%
W 17	09/12	6h	282	72	162	215	731	49%	50%
W 34	09/12	6h	157	11	24	127	319	50%	50%
Chambers	09/12	2h	91	55	228	262	636	51%	49%
W 55	09/12	2h	14	0	2	27	43	47%	53%
W 80	10/04	6h	143	22	212	350	727	56%	46%
W 95	10/04	6h	149	49	206	268	672	48%	52%
W 125	10/04	6h	95	20	51	43	209	55%	45%
Weekend Counts September 2000									
W 11	09/17	6h	1621	1026	1056	1823	5526	46%	54%
W 17	09/17	6h	758	355	277	596	1986	49%	51%
W 34	09/17	6h	456	57	87	268	868	51%	49%
Follow-up Weekday Counts May 2001									
W 11	05/02	6h	1151	530	875	696	3252	49%	51%
W 17	05/02	6h	948	331	292	485	2056	51%	49%
W 34	05/02	6h	777	118	111	242	1248	49%	51%
Follow-up Weekend Counts April 2001									
W 11	04/29	6h	2616	1647	1060	2011	7334	47%	53%
W 17	04/29	6h	2249	1020	410	819	4498	48%	52%
W 34	04/29	6h	2114	635	188	537	3474	53%	47%

starts above West 72nd Street. From there, volumes drop towards the most northern count location at West 125th Street (Chart 4). ***A clear correlation can be found between condition of the path and number of users.*** At West 11th Street with its wide bikeway, river esplanade and landscaped areas, the high volume is due to plenty of recreational users even during the week. ***Conditions are additionally amplified by the high density residential area next to this location.***

Locations with the lowest user numbers are West 34th Street and West 125th Street during weekdays. These locations register the highest percentage of bicyclists. ***This is explicable with the adjacent non-residential land uses which translate into greater distances that most users have to travel to these locations and therefore a lower share of slower modes like jogging and walking.*** Cyclists at these locations also tended to wear helmets at a higher than average rate. This may be credited to a higher share of long distance commuter cyclists.

Overall, walkers and cyclists made up the largest groups of greenway users in 2000 with 33 percent and 32 percent, followed by joggers with 21 percent and bladers with 14 percent. Sixty-two percent of all path users are male. With 33 percent, cyclists have the lowest female ratio of any user group, while women account for 46 percent of all walkers. These proportions do not change significantly for the three southern locations in Hudson River Park (see Appendix A.iv.).

Chart 4: User Volumes along Hudson River Trail, September 2000

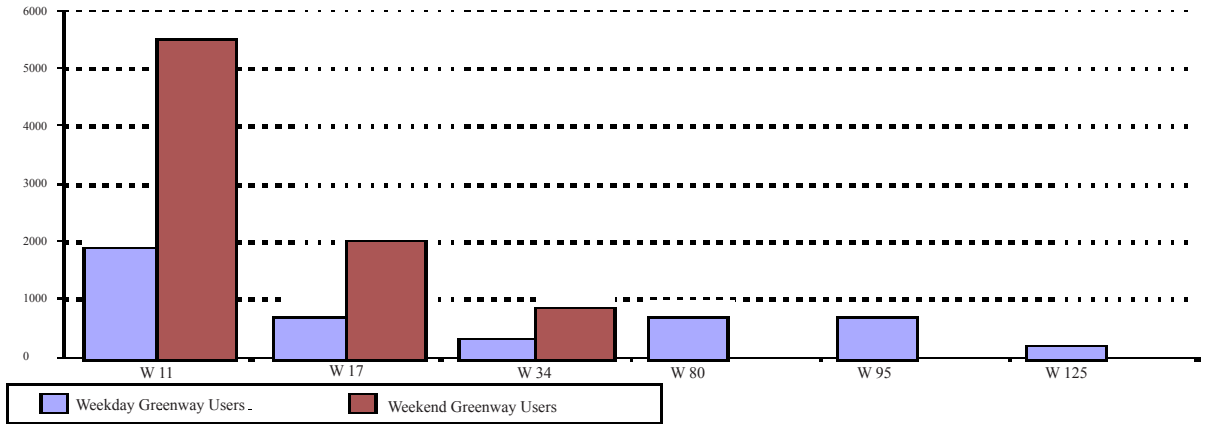
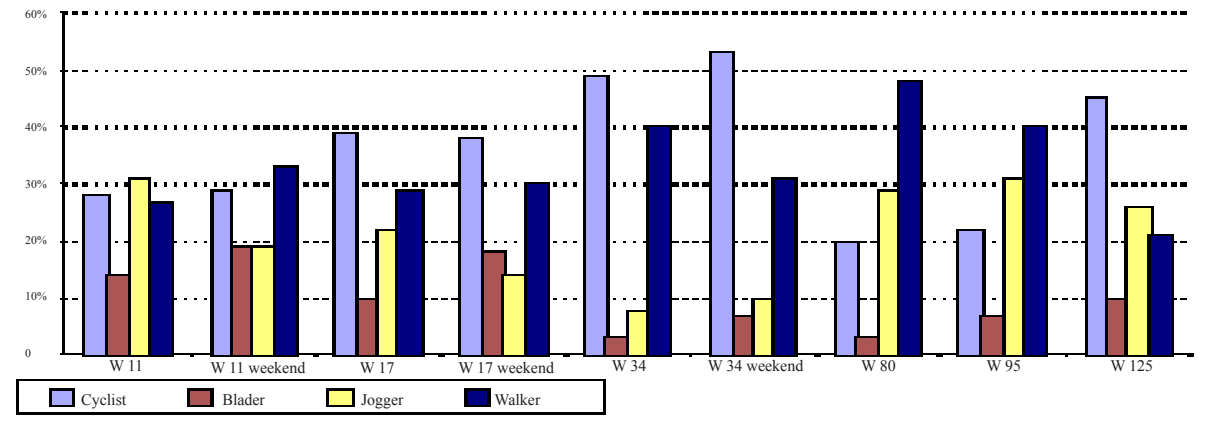


Chart 5: User Ratio along Hudson River Trail, September 2000



A very significant increase in user volumes within the Hudson River Park was registered during the follow-up counts in Spring 2001. The northern locations, where user numbers were the lowest in the year 2000, saw growth of up to 300 percent in additional users for both weekday and weekend counts. ***This change can be attributed to the improved greenway conditions along the Hudson River Park sections and the creation of the link between West 55th and 72nd Street.*** Both these changes also helped to balance the user numbers along the path, which now decrease only by a little more than half from south to north (Chart 7). Bicyclists account for the majority of the overall increase and make up 45 percent of all greenway users in Spring 2001 (Chart 6). They are the user group most equally represented at the three locations. Rollerblading rose at the second highest rate, up to eleven-fold at the West 34th Street location (Chart 8).

Chart 6: User Breakdown at Hudson River Location

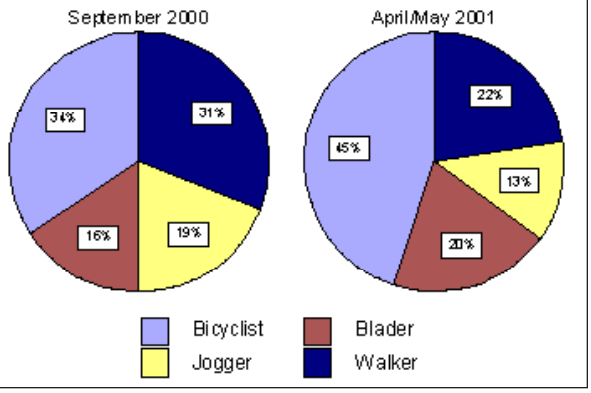


Chart 7: 2000/2001 Increase by User Numbers

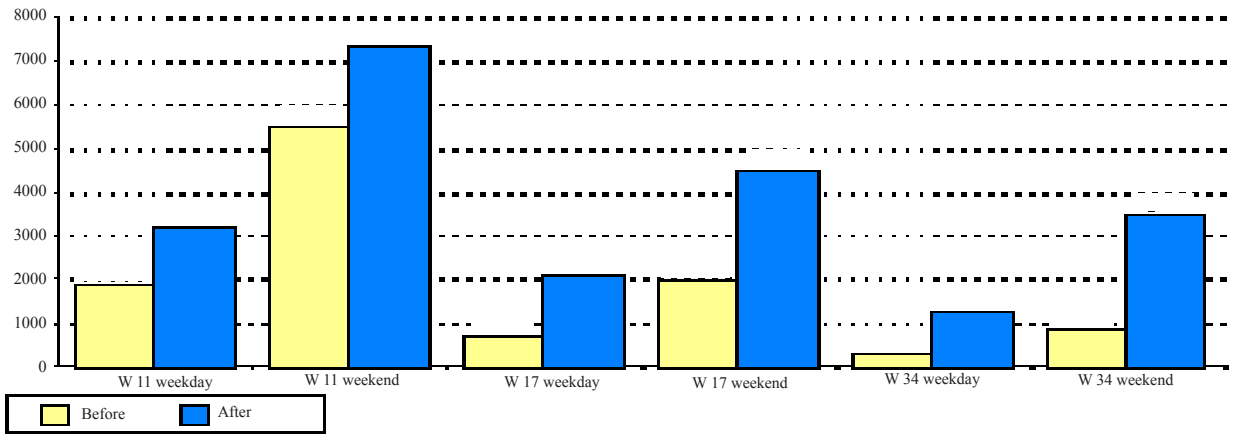
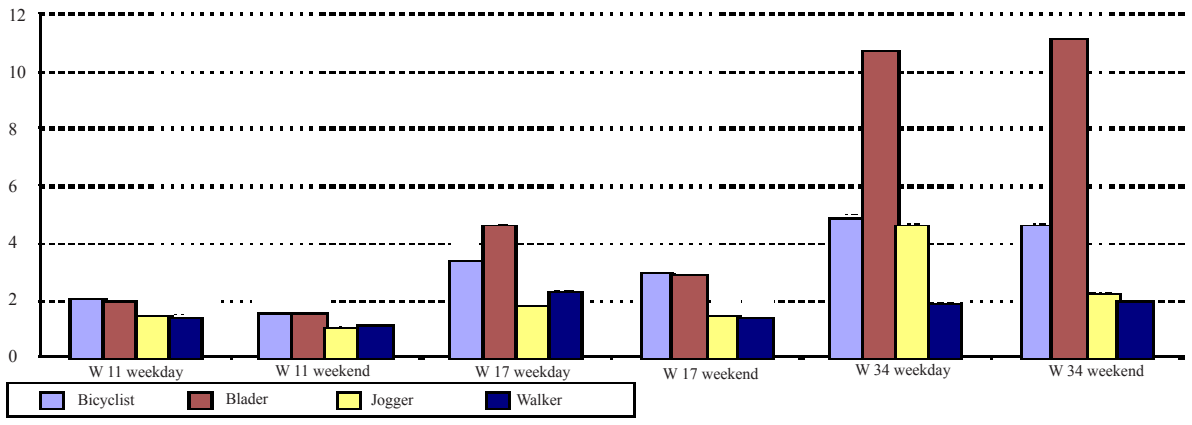


Chart 8: 2000/2001 Increase by User Group (x-times increased)



Summary of Survey Data

The span of data collected along the city's bicycle facilities reveals many different usage patterns but also magnifies relations between user volumes and certain fundamental factors. For example, even though no common peak volume patterns could be found along Manhattan's bicycle lanes, other factors apply for all facilities. The most critical components for the influence of usage are continuity of the lanes and trails, proximity to destinations and the condition of the pathways. Following is a summary of elements that were found when analyzing the data:

- Bicycle lanes, which connect to desired destinations see the highest usage, even if they are relatively short and/or not in perfect condition.

- In areas with a very limited number of designated facilities, bicyclists tend to disperse on available roadways, especially if other roadways offer more direct connections.

- The highest percentage of bicyclists located in bike lanes (opposed to other traffic lanes) can be found along facilities with wide dimensions and/or heavy vehicular traffic. Wider bike lanes in areas with heavy traffic attract a high number of illegally double-parked vehicles. Traffic law enforcement in such lanes is critical for their use.

- Because off-street bicycle trails draw recreational users, they are often the destination themselves and therefore proximity to residential and commercial areas is of less importance.

- When offered facilities of comparable convenience, bicyclists prefer the additional safety of off-street trails to on-street lanes, as usage on paralleling Brooklyn facilities show.

- Even if the route does not offer the most direct connection, cyclists will go out of their way for a continuous facility in very good condition, as the rising volumes during weekday counts on Route 9A indicate.

Bicycle Lane and Trail Condition Update

The following chapter is an update of Phase One of the Bicycle Lane and Trail Inventory. It contains condition information on bicycle facilities that were newly built or reconstructed in the past year (no changes occured in the boroughs of Staten Island and Brooklyn, which are therfore not part of this report).

Conditions were evaluated for four components: pavement, lane striping, signs and stencils on the pavement. The information is provided in the same manner as in the prior document and will be

Borough	Bike Lane	Bike Trail
Bronx	none	Bronx River Greenway Mosholu Parkway Greenway Pelham Parkway Greenway
Brooklyn	Bedford Avenue Clinton Street Henry Street Prospect Park Drive Second Street Third Street Third Avenue Union Street Tompkins Avenue	Eastern Parkway Ocean Parkway Shore Parkway
Manhattan	Adam Clayton Powell Jr. Boulevard Broadway Central Park Drives Fifth Avenue First Avenue Hudson Street/Eighth Avenue Lafayette Street/Fourth Avenue Second Avenue Sixth Avenue St. Nicholas Avenue	East River, 126th - 63rd Street East River, 20th - Montgomery St. East River, Rutgers Slip - Dover St. Battery Park City Bicycle Trail Hudson River Greenway River Park Bicycle Trail Ft. Washington Park Bicycle Trail
Queens	Cross Bay Boulevard Jewel Avenue Park Drive East Seventy-Third Avenue Thirty-Fourth Avenue Rockaway Point Boulevard	Flushing Meadows/Corona Park Trail Forest Park Bicycle Trail Joe Michael's Mile Vanderbilt Motor Parkway
Staten Island	Father Capodanno Boulevard Lily Pond Avenue Midland Avenue School Road	none