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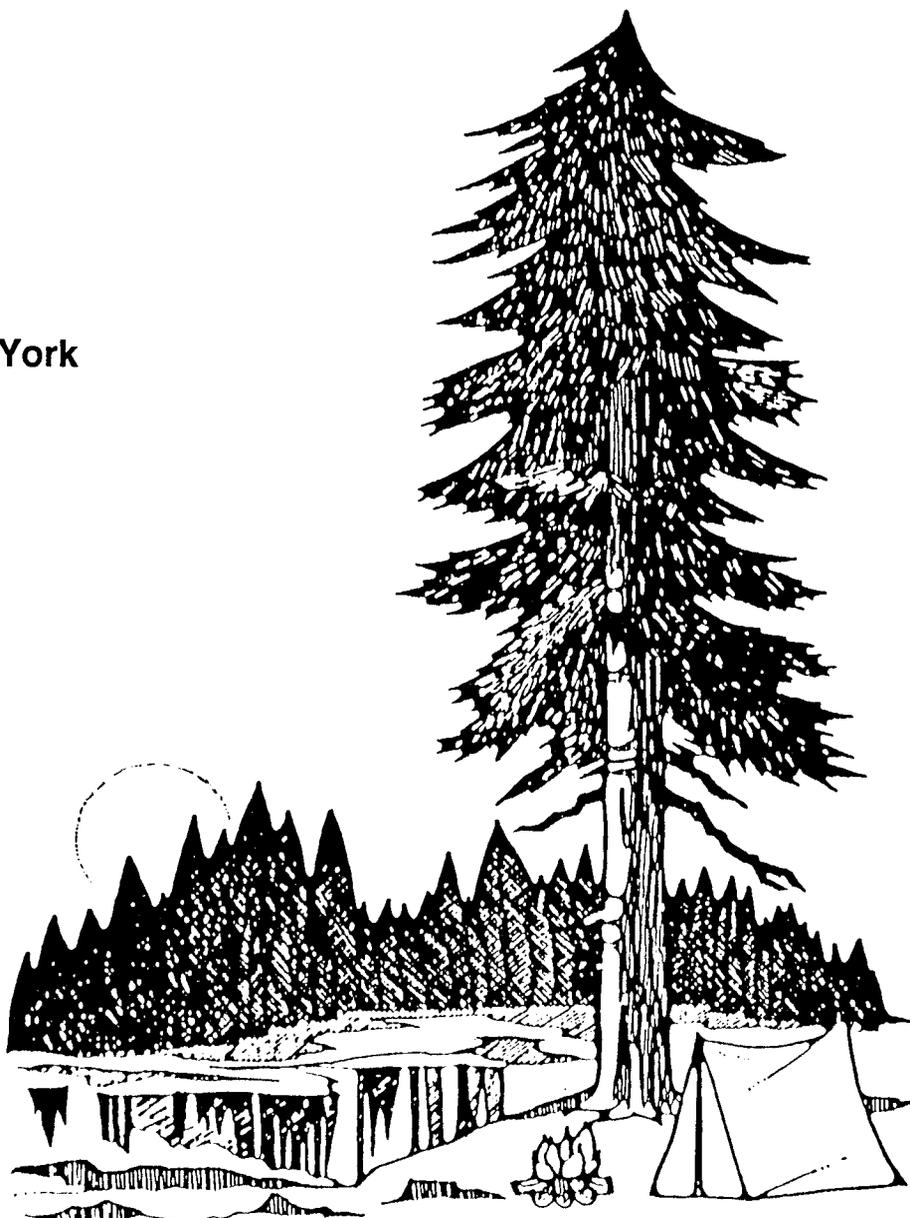
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## URBAN PARK TRAIL USE:

### AN OBSERVATIONAL APPROACH

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An observational study of trail users in an ethnically diverse Chicago neighborhood park showed moderate use levels on warm winter days, with use increasing substantially in spring and summer. The asphalt trail was used mostly by white adult walkers, but also included a diverse mix of age and ethnic groups for many different trail-related activities. Observation is presented as an important tool to use along with other research methods to understand trail use, user characteristics, and user and resource interactions.

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Trails provide important recreation opportunities in urban park and forest settings. Trail use has increased rapidly in recent years, for a variety of recreational activities. State and national studies show high participation rates in such trail-related activities as walking, hiking, running, and bicycling (Van Horne et al. 1985; Illinois Department of Conservation 1988). While these activities often extend beyond trails, the demand for off-street trail facilities that furnish these opportunities has made urban trail development a high recreational priority.

Employing a variety of research methods, studies of urban trail users have produced some useful information for design, planning, and management. On-site questionnaires have identified the perceptions of trail users and examined their likes and dislikes about the physical, social, and managerial attributes of trails (Gobster 1988, 1990, 1991). Mail questionnaires have examined how people choose among trails with different attributes; models developed from this experimental technique can be used to predict which trails different groups will prefer (e.g., bicyclists vs. cross-country skiers), and how user "market segments" (e.g. racing cyclists vs. cycling families with young children) choose between trail opportunities (Louvriere, et al. 1988, Gobster et al. 1990, Allton and Leiber 1983). Finally, monitoring of forest preserve bicycle trails with traffic counters has helped to explain levels and patterns of use as a function of time, weather, and seasons (Dwyer 1988a).

Although this research has given trail planners and managers needed information upon which to base decisions, gaps in our knowledge prevent a more complete understanding of trail users and how they interact with each other and with the environment. Past research has focused on trail use by bicyclists, but many urban park trails cater to a variety of trail users. We have a good understanding of the attributes of trail preference and choice, but do not know how these attributes actually influence on-site activities, behavior, and interactions. And we have incomplete knowledge of who is using trails, for what purposes, and under what conditions. Answering these and other related questions may require different methods of investigation to complement existing tools.

On-site observation is a little-used technique that holds promise for addressing some of these questions. Behavioral observation can be linked with information about the physical and management characteristics of trails, and can provide insights into planning and management not available through other methods. It also offers unique opportunities to analyze interactions between trail users and between users and the environment. Observation has been used successfully in urban settings to understand the use of parks (Hutchison 1987, More 1985), plazas (Whyte 1980), and street-side public spaces (Nasar and Yurdakul 1990), but has yet to receive much attention in urban trail research.

In this study, observation was used to identify use levels, user characteristics, and user and resource interactions taking place on an urban park trail. The trail in Chicago's Warren Park served as a case study. Specific objectives were to:

- 1) Identify use levels and examine how they vary seasonally, by time of day, and in relation to weather and other environmental conditions;
- 2) Identify user characteristics including age, race, gender, activities, and group size of those using the trail, and examine how important social and environmental factors might influence trail use;
- 3) Examine user-user and user-resource interactions to identify social and environmental determinants of use patterns, user conflicts, and resource degradation.

#### Methods

Observation is particularly well-suited to studying urban trail use. Short trails characteristic of those found in neighborhood parks receive a high proportion of pedestrian use (Gobster 1990); this limits the effectiveness of traffic counters, which are better suited for counting bicycles. On-site questionnaires are valuable for identifying user perceptions and attitudes, but require high participation to ensure a representative picture of who is on the trail, and can be unnecessarily complex for collecting basic user data such as age, gender, activity, and interactions. Furthermore, those who complete self-report behavioral surveys tend not report certain activities, especially those which might be socially unacceptable in nature. Lastly, when park users vary widely in age and racial-ethnic heritage, it is difficult for one survey form to be understood by all.

Observation is not without its disadvantages. There is a potential for error in classifying individuals on social and demographic variables. There may also be problems in interpreting observed behavior and making judgments about what a trail user might actually be doing. These problems can be minimized with training and by developing clear operational definitions for recording behavior. The method does, however, require a very substantial time commitment by the researcher or well-trained assistants.

#### The Study Site

Laurence C. Warren Park is an 82-acre park on Chicago's Far North Side, owned and managed by the Chicago Park District. The park is surrounded by residential and commercial development in an ethnically diverse neighborhood area. The park is recent compared to most of Chicago's parks--development began in 1976 when the State of Illinois purchased the land from a private country club. Today about half of the park is developed with playing fields and courts, while the other half is a 9-hole public golf course. Use is mainly local, and many who drive to the park come to golf. The main park trail is a 1.2-mile asphalt paved loop surrounding the golf course, with

shorter spur trails extending to park facilities and neighborhood streets (Figure 1). The trail is actually two parallel trails, the inner one intended for bicyclists and the outer for pedestrians.

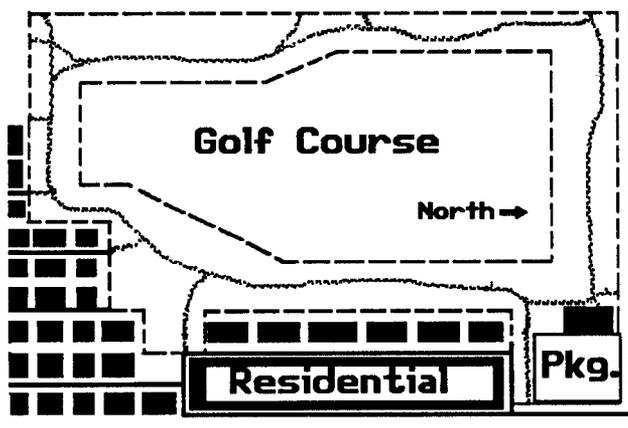


Figure 1. The study site.

### Sampling Procedure

A sampling matrix was developed to ensure a representative sample of trail observations (Table 1). Cells were defined as follows: **time of day** ("morning" 6 a.m. - 10:00 a.m., "midday" 10 a.m. - 2:00 p.m., "mid-afternoon" 2 p.m. - 5:00 p.m., and "evening" 5 p.m. - 9 p.m.), **day of week** (weekday, weekend), and **season** ("winter" Jan 1 - March 20, "spring" Mar 21 - June 20, and "summer" June 21 - September 4). Following sampling methods described by More (1985), the plan was to visit the park at least three times within each cell. This goal was exceeded in most cases; summer observations were cut short because large numbers of trail users made data collection and coding very time consuming. Because of this and because by summer the investigation had not yielded new information sufficient to justify its continuance, sampling was discontinued before entering the fall season. The total sample (January 1 - September 4) was thus based on 151 observation periods.

Table 1. Sampling distribution of trail observations (N= 151).

Sample Strata	Winter		Spring		Summer	
	Wk day	Wk end	Wk day	Wk end	Wk day	Wk end
Morning	13	11	9	9	4	3
Midday	7	13	14	3	1	3
Afternoon	13	10	8	7	1	2
Evening	6	0	1	8	5	0

During each observation period, the investigator entered the park at one of five park entrances and made a full reconnaissance of the trail in a randomly chosen direction. The investigator either walked (20 minute period), jogged (15 minute period), or bicycled (10 minute period) the 1.2-mile trail loop around the golf course, and recorded the following information for everyone encountered on or near the trail:

- 1) Location on the trail (53 predetermined locations)
- 2) Number of individuals in the group
- 3) Race, sex, and age (9 categories) of each person

- 4) Primary activity of each person (e.g., walking, biking)
- 5) Secondary activity of each person (e.g., talking, eating)
- 6) What kind of clothes they were wearing
- 7) If they had a dog, size of dog, and if it was leashed
- 8) Direction they were travelling (with or against the investigator, or stationary)
- 9) Interactions between groups, and type of interaction
- 10) Was person seen before in the same observation period
- 11) If the person was seen before in the park

Spur trails near the main trail, grass and seating areas adjacent to the trail, the clubhouse area, and the sledding hill were included along with the trail proper. To minimize interrupting the activities of trail users and to facilitate accurate reporting, observations were recorded discreetly on a microcassette tape recorder.

The decision to record adjacent trail activities as well as those activities that occurred directly on the trail was made for two reasons: 1) in many cases adjacent trail activities occurred in conjunction with using the trail (e.g., doing calisthenics at the "parcourse" stations while jogging around the trail loop); 2) in other cases adjacent activities directly or indirectly affected those who were using the trail (e.g., throwing a ball or frisbee across the trail). A second decision was to record trail activities as "primary" and "secondary." A primary activity was defined as the individual's dominant physical posture or behavior (e.g., walking, sitting, bicycling), while a secondary activity was defined as any other behavioral or situational facet related to the primary activity (e.g., talking, carrying sports equipment, watching, listening to a radio).

In addition to information on each person, the following time, weather, and trail information was also recorded:

- 1) Month, day, date, and time
- 2) Temperature, wind direction, speed, and wind chill
- 3) Sky conditions (sunny, partly cloudy, heavy clouds/rain)
- 4) Light Conditions (dawn/dusk, daylight, darkness)
- 5) Trail Conditions (dry, wet, puddles)

User-user and user-resource interactions were recorded as they occurred (e.g., pedestrian-bicyclist conflict, gatherings of people) or as their traces were observed (e.g., litter, dog waste, vandalism). Other relevant observations or insights gained while on the trail were also recorded when they occurred.

The coding system was developed and refined over a two month period prior to data collection. The investigator practiced assigning individuals to categories of variables (e.g., age, race) until he was confident in making reliable assessments. When in doubt on certain variables, individuals were assigned to more general categories (e.g. "adult," "child") or coded as "not identifiable" (e.g. race). New activity codes were added as data collection progressed through the seasons.

### Use Levels

The investigator encountered a total of 5,496 individuals during the 151 observations periods. Use level variations were examined in terms of time of day, seasons, and environmental factors. When temperatures were below freezing there were seldom more than 25 people encountered on the trail within an observation period (Figure 2). Use increased with temperature, sometimes dramatically. For example, on a sunny Tuesday afternoon in January when the temperature hit an unusually high 65 degrees, 66 people were observed on the trail at one time, while on a sunny Monday afternoon the week before with the temperature at 33 degrees there were only 38 people. Use levels

peaked when temperatures were in the 70's, then dropped as the temperature rose into the 80's. Data on high temperature days (6 observation periods) is sketchy, however, and more information is needed to substantiate this pattern.

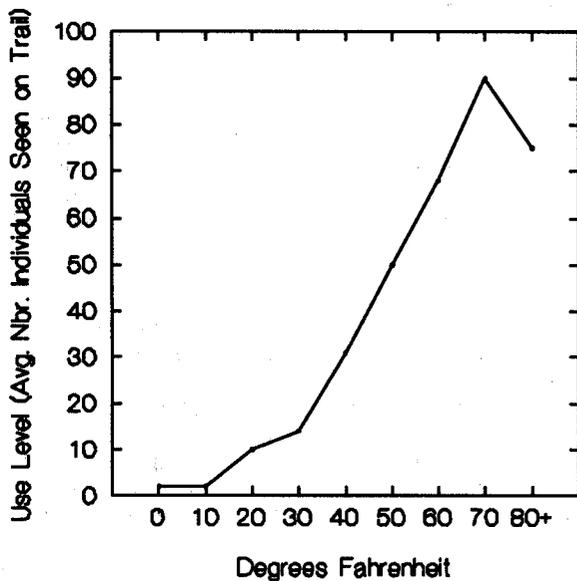


Figure 2. Trail use levels as a function of temperature.

Weekday use was highest in the evening, with smaller peaks in the early morning and around noon (Figure 3). Mid-morning and mid-afternoon were low points in weekday use. This pattern changed for weekends, when use climbed gradually throughout the day before dropping off sharply around sunset.

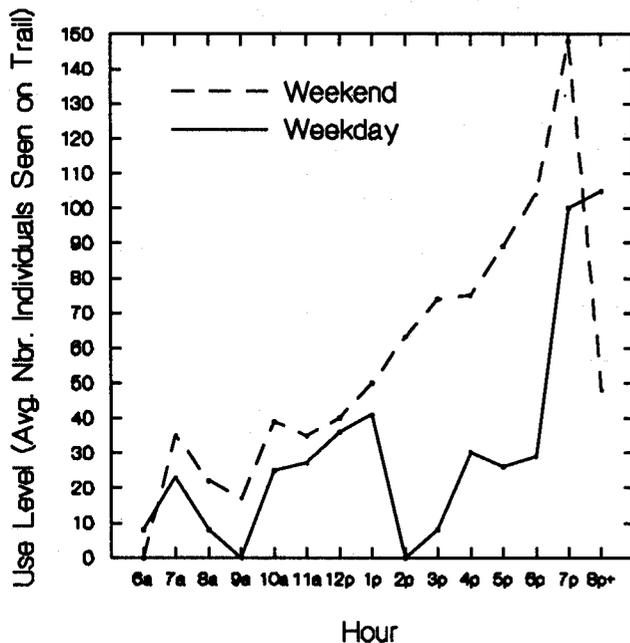


Figure 3. Hourly trail use levels, by weekday and weekend.

There were significant weekend and weekday use variations. To examine these more closely, a simple predictive model was constructed, patterned after Dwyer's (1988b) daily use model of auto traffic in urban forest preserve sites. The initial model for

the Warren Park trail included variables for temperature, season (winter, spring, summer), time of day (morning, midday, midafternoon, evening), day of week (weekday, weekend), and cloud cover (sunny, partly cloudy, heavy clouds or rain). Temperature correlated  $r = .54$  with use level but was intercorrelated with season so it was left out of the final model. In the final model, season (winter) accounted for the highest variance of any term, with  $R^2 = .37$ . The other variables explained only slightly more of the variance, for a total  $R^2$  of .43. The model estimates that use is highest on spring and summer weekend evenings, when skies are sunny or partly cloudy. While not approaching the  $R^2$  of .90 estimated by Dwyer's forest preserve use model, the Warren Park trail model does show the combined importance of temporal and environmental factors in affecting trail use.

## User Characteristics

### Demographics

The typical Warren Park trail user is a white male adult age 26-39. "Typical" is somewhat misleading, for though "whites," "males," and "adults 26-39" were the categories with the highest frequencies, there was a broad range of trail users. The sample was 55 percent male and 38 percent female (7 percent unidentified). Whites accounted for 62 percent of the sample, Hispanics 20 percent, Asians 6 percent, African-Americans 5 percent, and Indian-Pakistanis 4 percent (4 percent unidentified).

Adults were the primary trail users, with those 26-69 years accounting for nearly 60 percent of total trail use (Figure 4). Adolescents (7-12 years) and teenagers (13-17 years) made up another 20 percent of the trail sample. There was a relatively high proportion of young children using the trail, with babies (0-2) and tots (3-6) accounting for almost 10 percent of the sample. The elderly (70+ years) were the age group seen least on the trail.

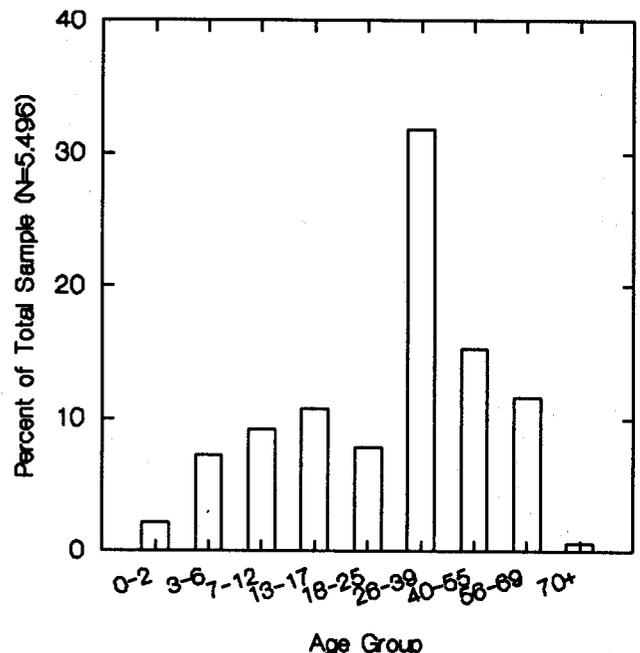


Figure 4. Frequency of trail users, by age group.

## User Activities

Table 2 lists the frequency of primary and secondary activities observed on the trail, ordered by major activity type. For primary activities, casual walking or "strolling" far outweighed any other trail activity, with more than half of all individuals engaged in this activity. Other important activities included sitting, bicycling, standing, and jogging.

Secondary activities varied widely. They were difficult to group: "carrying things" was the only major category used to group activities. Nearly three-quarters of the sample was not observed in a secondary activity; of those who were, talking and dog walking were the most common. Other top ranked secondary trail activities included carrying golf equipment, pushing a baby stroller, listening to "Walkman" radios, and carrying groceries.

About a third of those who were talking when observed were speaking a foreign language. Often the language was Spanish, but there were also quite a few whites speaking Eastern European languages. Although most trail users were white, they also seemed to be from a variety of ethnic groups.

## Social Groups

The 5,496 individuals were in 3,186 separate groups that ranged in size up to 16. Individuals accounted for 58 percent of all groups; 24 percent were on the trail in groups of two, 9 percent in groups of 3, and 7 percent in groups of 4 or more.

As might be expected, larger groups tended to be more demographically diverse than smaller ones. Individual trail users were more often males (69 percent), while groups of two were more likely to be male-female couples (43 percent) than all male (29 percent) or all female (20 percent). Groups of three or more averaged 40 percent mixed gender, 24 percent all male, and 13 percent all female (the remaining groups included young children who could not be identified by gender).

Table 2. Primary and secondary trail activities.

PRIMARY (N=5,496)	SECONDARY (N=5,496)
<b>Walking:</b>	<b>No 2nd Activity:</b> 73.3
• Strolling 51.3	<b>Carrying Things:</b>
• Fast Walking 1.4	• Groceries 1.6
• Walking Slow .2	• Books .3
• Jogging 5.2	• Newspapers 1.0
• In a Wheelchair .2	• Golf Equipment 4.3
• In a Stroller 1.9	• Sleds .3
<b>Mechanized:</b>	• Bicycle .8
• Bicycling 9.2	<b>Other Activities:</b>
• Rollerblading .3	• Pushing Stroller 1.7
• Skiing .1	• Push Wheelchair .1
• Skateboarding .2	• Talking 6.5
• Police/Maint. .4	• Talk Foreign Language 3.0
<b>Stationary:</b>	• Walking Dog 8.0
• Standing 7.0	• Reading .5
• Sitting 13.9	• Eating/drinking 1.2
• Calisthenics 1.0	• Alcohol .2
• Picnicing 1.0	• Smoking .3
• Laying Down .7	• Affection .2
<b>Playing:</b>	• Sunning .6
• Free Play 2.3	• Watching .8
• Ball 1.1	• Radio Listening 1.7
• Sledding Hill .9	• Collecting Cans .2
• Swinging 1.1	• Telephoning .5
• Toy Airplane .1	• Problem Behavior .1
• Frisbee .1	

The range in ages among group members also diversified with group size. Age categories were collapsed to "children" (12 years and under), "teens and young adults" (13-25 years), and "adults" (26 years+). All-adult groups were the most prevalent combination for two-person groups (58 percent), followed by all teens and young adults (17 percent) and children and adults (15 percent). This pattern changed for groups of three or more, with children and adults taking over as the most prevalent combination (39 percent), followed by all adult (25 percent) and all teens and young adults (13 percent). Along with the considerable number of single adult users, this information appears to show that the other principal trail groups include adult couples and families with young children.

The racial composition of groups stayed quite homogeneous with changes in group size. Groups of two, three, and four or more were all the same race more than 90 percent of the time.

## Variations by Ethnic Group

Use levels on the trail varied by ethnic groups on a seasonal basis. Whites were most often seen on the trail during the winter season, with other ethnic groups beginning to show in greater numbers as the temperatures reached the 50's (Figure 5). As temperatures hit the 80's the only groups whose numbers tended to increase were blacks and Indian-Pakistanis.

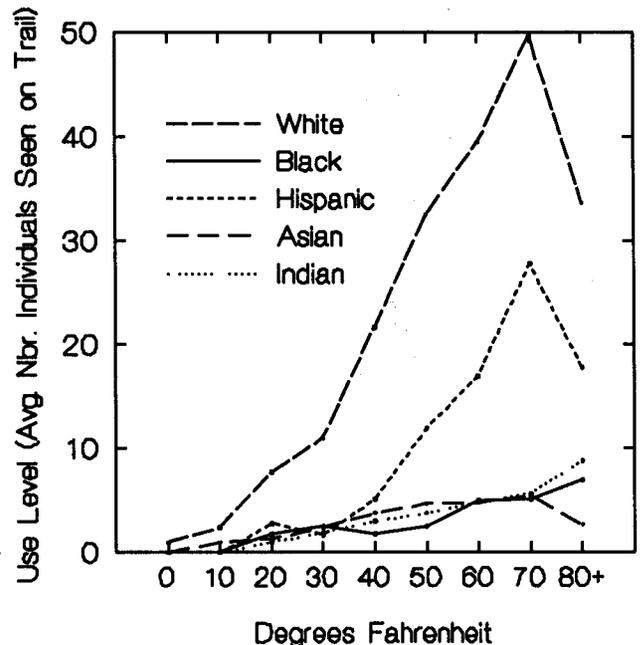


Figure 5. Trail use levels of ethnic groups, by temperature.

Walking, sitting, standing, and bicycling were among the five most frequent primary trail activities common to all ethnic groups. Among other top-ranked primary activities, whites jogged more and Hispanics picnicked more than other groups, while more Indian-Pakistanis were observed in free play and more Asians were seen playing ball than other groups. Top-ranked secondary activities common to all groups included talking and listening to radios. Whites and Asians were more often seen carrying golf equipment and blacks were more often seen carrying balls and other sports equipment than other groups. Hispanics watched others more (especially weekend soccer matches), and Asians did more calisthenics (including Tai Chi) than other groups. Group size also varied by ethnicity, with average group size highest for Indian-Pakistanis (2.6 persons per group) and Hispanics (2.5) and lowest for whites (1.5).

Some ethnic groups tended to concentrate at particular locations along the trail (Figure 6). Hispanics were often seen along the northwest section of the trail; they tended to be in large groups of mixed ages and were most often present on weekends picnicking and watching soccer games. They tended to use this section of the trail to bicycle and stroll along. The other was a concentration of white ethnics who were distinguished by their foreign language. This group concentrated on the southeast end of the trail and tended to be older adults who sat in the shade on benches along the trail and talked or read. They tended to come on weekdays and weekends in smaller, more homogeneous age groups, but were sometimes with small children who bicycled or played near the trail.

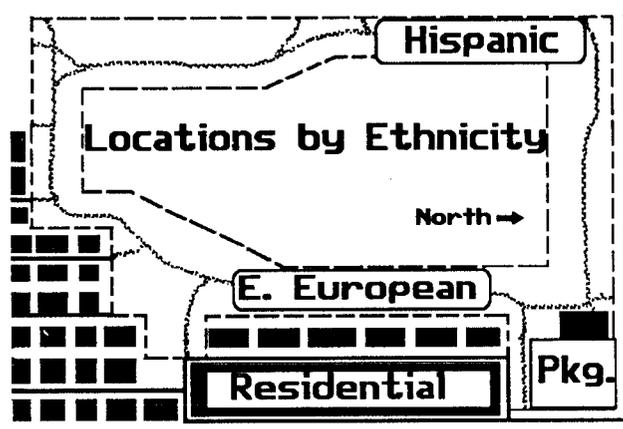


Figure 6. Trail use areas of different ethnic groups.

#### Variations by Season

During the winter months walking was the primary activity, engaged in by 63 percent of all trail users. Walking remained the top-ranked activity throughout the year, but dropped in relative importance to around 50 percent of total primary use in spring and summer. Jogging also dropped in importance, from 11 percent during the winter to 5 percent in the spring and 3 percent in the summer. These drops were accompanied by increases in other activities more suited to warm weather; sitting rose from 2 percent in winter to 15 percent in spring and 19 percent in summer, bicycling increased from 4 percent in winter to 11 percent in spring and 8 percent in summer, and free play rose from 1 percent in winter and 2 percent in spring to 3 percent in summer.

The most dramatic change in secondary activities by season was for dog walking. During the winter months a full 20 percent of trail users were accompanied by dogs. This percentage dropped to 6 percent in the spring and 4 percent in the summer. These statistics suggest that many winter trail users were in the park for reasons that extended beyond their own recreation. Most other changes in secondary activities were in terms of seasonal sports; youths in winter were seen carrying sleds while in summer they carried balls, and adults exchanged winter skis for golf clubs in spring and summer.

Winter groups also tended to be smaller in size, more often male than female, and more often adult, while spring and summer groups were larger and more mixed with respect to gender and age.

It is important to note that the changes noted are relative to total use, and may not reflect absolute numbers of users. For example, the number of groups encountered walking dogs during the winter averaged 3.1; in spring the average was 2.8 and in

summer in was 2.9. When looked at in absolute terms, these figures suggest that for some activities there is a steady group of park users who are not affected by seasonal changes.

## User and Resource Interactions

### User-User Interactions

User-user interactions occurred both within and between groups. Compared to other common park activities like game playing and picnicking, major trail activities like walking, bicycling, and jogging do not generate much within-group interaction. This is in part a characteristic of the activity-- when you are jogging it is hard to carry on a conversation --but is also a function of average group size in which main trail activities takes place. For instance, the average group size for jogging was 1.1 persons, and group sizes averaged 1.6 for walking and 1.7 for bicycling. In contrast, group sizes for picnicking averaged 3.7, 4.3 for free play, and 3.7 for ball playing.

Perhaps more relevant to trail planning and management were the interactions that took place between groups. Between-group interactions were difficult to document because of their short duration; only 2 percent of the groups on the trail were observed interacting with other groups. More than half of these interactions were initiated because of dogs. In some cases, dogs from both groups brought the groups together; most of the time these interactions were amiable and resulted in conversations between the dog owners. At other times a dog (usually unleashed) came up to a group without a dog; this often seemed to be an annoyance to the dogless group.

The other major type of interaction was between-group conversation. Most conversations seemed to be short greetings or polite chatting between groups.

Finally, user interactions were looked at in a spatial context. Use was heaviest in front of the clubhouse and at intersections between the main loop trail and spur trails (Figure 7). These nodes were often congested during busy periods, to the point where they posed safety problems. This was especially troublesome where bicyclists and pedestrians mixed. Pedestrians strolling along or stopped in conversation were often unaware of bicyclists trying to move through the area. There are separate trails for each group, but users rarely paid attention to signs indicating which trail they should be on.

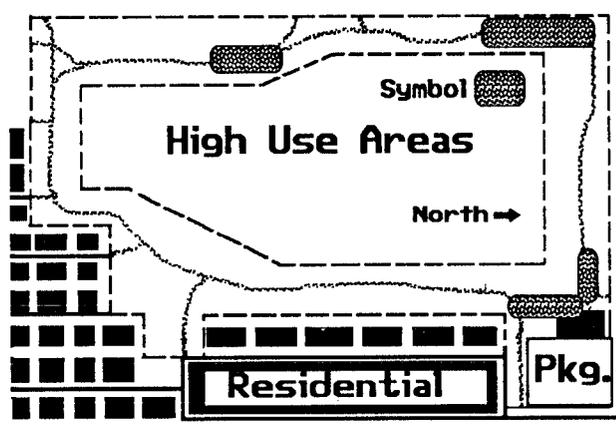


Figure 7. Areas of high use and high social interaction.

## User-Resource Interactions

There were many kinds of interactions between users and the resource. Interactions were "bi-directional--" conditions in the environment affecting trail user behavior, and user behavior affecting the environment. The effects could be seen as positive: a sunny winter day bringing people out of their houses, or negative: a heavy snowstorm preventing all but the die-hards (and skiers) from using the trail. The following are a few examples of the kinds of user-resource interactions observed during the course of the study:

**Shade and Park Benches.** Because Warren Park is relatively new compared to most urban parks, large trees and the shade they provide are at a premium along the trail. Consequently, the demand for park benches in these areas is high, and on warm spring and summer days they are consistently occupied.

**Trail Width and Vehicle Use.** Police and maintenance vehicles were seen infrequently but regularly along the trail. The presence of these vehicles did not appear to conflict with recreational use of the trail, and might have added a dimension of perceived safety. However, trail width can barely accommodate full sized vehicles (especially utility and garbage trucks), and when the ground was wet they made ruts and muddy areas along the trail.

**Seasonal Change and Dog Litter.** As noted, winter use of the park by dogs is heavy. With spring snow melt and increased park use, the considerable amount of fecal material deposited by dogs near (and sometime on) the trail is visually offensive and could pose health hazards. This was particularly the case around major park entrance points, where in March the density of dog litter approached one pile per square foot.

**Trail Maintenance and Problem Behavior.** Incidents of littering, vandalism, and other behavior which could be considered dangerous or inappropriate were rarely observed directly in the course of data collection (.1 percent of all individuals). Signs of littering were apparent, but not as serious as in nearby commercial areas, and park management was generally diligent on cleaning up the trail proper. This was not always the case with gang graffiti, which was apparent on several of the benches and parcourse fitness stations. Damaged facilities were also noted.

## Management Implications and Further Study Needs

Observations conducted over the three season period showed that trail use levels were tied closely to the time of day, weather conditions, and the season itself. This information will help park managers understand use flows and enable them to anticipate when to expect use peaks. When compared to data collected on other trails and forest preserve sites, these patterns will also help to understand how use levels vary among different kinds of sites. Additional use level data needs to be collected on the Warren Park trail and other urban park trails before further progress can be made.

The leisure and social characteristics of trail users can help park managers better understand their clientele. The Warren Park trail is used directly and indirectly for a wide variety of activities, and by a diverse mix of age, group sizes, and ethnic groups. Information of the type presented in this paper can be used as a basis for determining priorities for facilities development, for promoting trails to current and potential users, and for documenting trail usership for budgetary reasons. This information could also be compared to the 1990 U.S.

Census data for neighborhoods surrounding Warren Park, to get an idea of how well the park serves its nearby clientele.

Recreational activities, age, and group size of trail users vary by season and in some cases by ethnic group, and information from this study can be used to plan for the specific needs of these market segments. For example, in winter there is a demand for cleared trails for walking and jogging but also a demand for snow-covered ski trails. This entails different management strategies that may include special winter signage to direct use. Golfing establishments in some cities have opened their courses for cross-country skiing, and both the course and clubhouse in Warren Park could be looked at for expanding winter park recreation opportunities.

Observing user-user interactions can help define management problems and solutions. For example, park managers could facilitate greater social interaction in places where it is desirable by placing park benches facing each other. In other locations it might be desirable to minimize interactions, such as at high use nodes along the trail. In these areas larger signs might help direct users to the bicycling or pedestrian trails, and park benches could be located further away from the trail. Considering the ethnic diversity of Warren Park's users, multilingual or pictorial signs could also help, and could highlight the multicultural diversity of the trail's users.

Observation of user-resource interactions can also identify management problems and solution. The high use of park benches indicates that park managers may wish to increase seating to accommodate additional trail users, especially along shady stretches. With regard to trail maintenance, future trail development should either plan for large utility vehicles or trail managers should restrict patrol and maintenance operations to smaller vehicles. Greater owner responsibility in policing dogs should be advertised and enforced where possible. Evidence of vandalism and gang graffiti can encourage more of the same, and for this reason it is important for park management to keep trail facilities in good appearance and working condition. At the same time it may be a good idea to post signs notifying trail users about penalties for littering and vandalism, and provide those who see others damaging trail facilities with a phone number they can call to alert park authorities.

Trail user observation, when used in conjunction with other research methods, is a valuable tool for identifying use patterns, user characteristics, and user and resource interactions. Based on this case study, observation appears particularly well-adapted for use on urban trails. Further use of this technique should be extended to other urban trail settings to increase its utility for management and research.

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