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ABSTRACT

ASSESSMENT OF RECREATION SPACE ALONG THE HUDSON RIVER WATERFRONT IN JERSEY CITY, NJ

by

Darren M. Davidowich

For the past decade Jersey City, New Jersey has worked to redevelop its waterfront. The once highly industrialized waterfront is now the location of residential and commercial uses and more projects are slated for the future. Although many improvements to the physical and built environment occurred along the waterfront, many question whether enough emphasis was placed on outdoor recreation. Site assessments, field observations, and surveys of waterfront users in Jersey City, NJ were conducted to determine what uses are possible, and in the greatest demand on the waterfront. A total of (950) field observations were made of waterfront users. This information was supplemented with data from (35) structured interviews conducted with waterfront users. The results identify recreational opportunities, public perceptions, and waterfront use levels. Waterfront users participate primarily in non-water related activities. There is a high demand for, and participation in, active recreational activities on the waterfront. Waterfront sites offering an unobstructed view of New York City, convenient location, and a high level of safety were the most popular. Waterfront users expressed demand for more activities such as waterfront dining, and shopping. The results provide important baseline data that has value to waterfront planners when evaluating waterfront development proposals.

**ASSESSMENT OF RECREATION SPACE ALONG THE HUDSON
RIVER WATERFRONT IN JERSEY CITY, NJ**

**by
Darren M. Davidowich**

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Obstacles are those frightful things you see when you take your eyes off your goal

- Henry Ford

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CHAPTER 1

INTRODUCTION

Urban waterfronts are the location of many new redevelopment activities. Deteriorated urban waterfront reaches are being transformed to suit the needs of the present. Redevelopment results in more residential and commercial land uses than previously existed on urban waterfronts. With this development the demand for quality recreation space increases. Urban waterfront development is subject to tremendous political and economic pressures due to the high visibility of the land and the value of the real estate. Often these pressures end up constraining land uses that benefit from waterfront locations. One land use that has the potential to be overlooked is the provision of waterfront recreation space. Although there are often regional guidelines for the provision of recreation space the finished product often ends up satisfying the minimum requirements (Breen and Rigby 1990). Data on current use patterns and demand are needed to ensure that future recreation space appeals to the largest number of people possible. Evaluation of use and demand data can be compared to data on site specific features important to waterfront use, resulting in better planning of future waterfront areas.

An urban recreation area receiving attention in recent years is Jersey City, New Jersey. The Hudson River waterfront in Jersey City offers many opportunities for recreation and interaction with nature. The potential is enhanced by the current redevelopment trend taking place along the waterfront. Current plans are directed toward development of a continuous waterfront walkway linking waterfront recreation areas to each other and thus expanding recreational possibilities. The goal of this study is to

assess the quality of the recreation areas created thus far along the waterfront in an attempt to improve areas created in the future. The research focuses on the quality of waterfront recreation areas based on user needs. Data on site features, the built and physical environment, number of users, and use patterns are used to evaluate different areas on the waterfront for recreation. Data from field observations on use of three existing recreation areas and structured interviews with waterfront users were gathered. The data collected were used to answer the following questions.

- Do sites that offer users more natural surroundings, better views of New York City, convenient locations to the central business district show higher use levels than sites that do not offer these amenities?
- Do sites that are isolated from other areas along the waterfront show significantly lower use levels than sites that are physically connected?
- What are the recreation activities that most commonly take place at Jersey City's waterfront, and are they active or passive in nature?
- Are the activities taking place on the waterfront water-related forms of recreation?
- How do female use levels compare to male use levels at each site?
- Is there a demand for any activities not currently available on the Jersey City waterfront?

The goal of this study is to improve our understanding of the attributes of a successful waterfront recreation area. The research is especially valuable because the evaluation of urban waterfront recreation is an unexplored area not only in Jersey City, but also in the United States. Keeping in mind Jersey City's waterfront is confined by existing infrastructure, this study will analyze what recreational facilities work on a

waterfront previously used for industry and commerce. Legislators and developers can use this information to guide future waterfront planning and development efforts. During the planning and approval process existing information is used as the basis for arguments. Unfortunately when viewed in comparison to other planning literature there is little information available on the subject of waterfront recreation. Even less prevalent is information about specific regions, such as the Hudson River. The lack of information often allows waterfront developers to create waterfronts that do not use space as effectively as possible. These areas are then under-utilized by the populations they are intended to serve. The result is an underestimation of recreation demand, due to the association with under utilized sites in the minds of future planners. This results in recreational areas being given less priority in future development.

Considering the limited amount of waterfront slated to become a recreation area along the Hudson this information is needed to ensure the waterfront matches the needs of the population it is intended to serve. Little is known about the day to day recreation behavior of urban residents. This study is a first attempt at revealing use patterns and the factors that influence waterfront use in Jersey City.

CHAPTER 2

LITERATURE SURVEY

2.1 Outdoor Recreation

A vast body of literature exists on what makes a good outdoor recreation site. Their conclusions as well as their methodologies are important background for study of a site such as the Hudson River waterfront. Studies on outdoor recreation are useful in determining the factors that encourage and discourage recreation use. The main factors affecting use levels in urban recreation areas are convenience, comfort, safety, security, beauty, feeling of escape from the urban environment, and usefulness (Gold 1980; McCarthy 1995; Lynch 1981; Francis 1989; Whyte 1979; Evans et al. 1994; Searns 1995; and Ryan 1993). In a waterfront environment, such as Jersey City, shoreline and water quality also affects use levels (Miller 1998; Canter 1996). For clarity and consistency with later sections major areas of interest have been broken into categories that reflect the variables used to study the Jersey City waterfront.

2.1.1 Convenience

Popular recreation areas all have one thing in common; they are convenient for a large number of people (Gold 1980). Convenience can be broken down into three components: 1) proximity; 2) accessibility; and 3) availability of amenities. There needs to be a large group of people in close proximity to a site. This may include those who live, work, or pass by the site frequently. Recreation sites tend to be very popular during lunchtime and early evening hours when they are close to where people work. Thus it is important to determine the distance between a recreation area and nearby places of employment

(McCarthy 1995). The site must be accessible; if it is difficult to get to people will not come (Lynch 1981). Three types of access are important in public places; 1) direct physical access to the recreation area; 2) social access (different classes and types of users); and, 3) visual access (the ability to see into a park or plaza) (Whyte 1979). Foot access is most important in urban areas because the majority of users will walk to recreation sites rather than drive (McCarthy 1995). Visual access is also critical if people are to feel safe in a public space. Visual access allows passersby to observe activities at the site and helps to prevent crime (Francis 1989). Lastly there must be amenities such as food, seats, and tables. The availability of food at or near a recreation area has two effects on recreation use. First, if food is sold near a recreation area people will walk to the recreation area and eat there. Second, recreational users will favor sites where food and drink are available, especially if they are engaging in strenuous activities, or if they will be recreating for an extended period of time (McCarthy 1995). Tables and seating add to the comfort of users and add opportunities for different passive activities enhancing the overall experience (Whyte 1979).

The amount of sitting space available is an important factor influencing use levels. This does not necessarily refer strictly to benches or chairs. Steps, walls, and ledges are also considered sitting areas and in many cases prove to be more desirable than benches. It is also important to note that there is no correlation between the height of seating surfaces and use levels, any height appears acceptable (Whyte 1979). The presence of tables in outdoor recreation areas provides opportunities for game playing and facilitates picnicking. While not as important as seating, tables do make a site more versatile, and open up new opportunities for use (Whyte 1979).

2.1.2 Comfort

The use of recreation areas is intended to be an enjoyable experience. The quality of this experience can be improved significantly by the addition or elimination of several factors to enhance personal comfort of the recreationist. Outdoor recreation areas are subject to varying weather conditions such as wind, rain, snow, and sun. In some cases the weather can be a source of enjoyment, in others it can be a nuisance and discourage site usage (Evans and DeSchiller 1994).

Alteration of wind flow, from location and physical dimensions of development, can increase the comfort level of a recreation user. Intensive development of the principal avenues, that run parallel to a river, with high buildings can create a continuous barrier and reduce natural ventilation and the penetration of on-shore breezes which bring relief on warm summer evenings. Sites with the best views show the most serious wind acceleration due to development on the edges of the waterfront. Views that make the areas desirable for recreation also make the areas desirable for development (Evans and DeSchiller 1994).

Material used to construct walkways (asphalt, wood, crushed stone) has an effect on the comfort and usability of an area. Hard smooth surfaces are the most suitable for a wide variety of uses. Examples of good choices for surface materials are cement, brick, asphalt, and wood. If wood is used it is important that boards are arranged perpendicular to the primary direction in which users will be traveling. This will prevent wheels from skates, bicycles, strollers and the like from becoming caught which could possibly cause injury (Ryan 1993). A smooth walkway surface is also useful and allows an area to accommodate many different activities. However there is a drawback to smooth surfaces

(asphalt, cement, hard packed stone, and brick) since they enable bicyclists to reach higher speeds thus increasing the chance of injury to themselves and others (Searns 1995).

2.1.3 Safety

Safety is a factor important to any recreation area regardless of size, location, and the population served (Gold 1980). The term safety in the context of this study will refer to protection from other users, automobiles, and the river.

In urban environments automobiles are a common part of everyday life. They also pose a great danger to pedestrians, bicycles, and the like. Therefore a good recreation area will have some means of shielding those who are engaging in recreational activities from injury by automobiles. Common forms of protection are trees, guard rails, fences, walls, and solid natural features (such as hills or ledges). Recreational users have reported increased enjoyment levels in areas where there is little threat of injury by automobiles (Searns 1995).

The presence of a rail, fence or other barricade, which is capable of protecting users from accidentally falling into the river, is also an important factor in creating a sense of security for waterfront users. This is especially true in urban areas where children will be playing (McCarthy 1995).

2.1.4 Security

Security is different from safety in that it describes a feeling or an emotion on the part of users. A sense of control over a space, an ability to see in, to escape easily, or to escape in times of crisis are examples of how a space can be made to feel more secure (Francis 1989). The main focus of this variable is human threats that are tough to prevent in the planning stages of a project. Although there are measures that can be taken when designing an area, security is more dependent on site management.

The presence of security personnel or police officers (Gold 1980), a lack of graffiti and litter and the ability to see long distances add to the sense of safety in an area (Francis 1989). Users often associate graffiti and litter with crime; this can make potential users feel uncomfortable and unsafe in an area. The presence of adequate lighting affords park users protection from crime, safety from physical injury as a result of unseen obstructions, and thus a feeling of security. Therefore adequate lighting is an important determinant of waterfront usage during early morning and evening hours (Gold, 1980). Areas avoided due to inadequate lighting or presence of graffiti are areas used by undesirables leading to further reductions in use levels (Whyte 1979)

A lack of restricted and/or blind alleys also helps to reduce the number of undesirable activities occurring in an area. Crime rates are lower in wide-open areas, which are clearly visible to users as well as passersby. Additionally a lack of blind alleys also creates a sense of security for users (Whyte 1979).

A reliable way of determining how safe an area is perceived to be is to ask users directly. Interviewees can be asked to rate how safe they felt when using a recreation

area. Furthermore responses will often indicate what factors contribute to feelings of safety or uneasiness in an area (Gold 1980).

2.1.5 Beauty

One of the best ways to make people want something is to make it attractive. The same can be said of a recreation area. If you want people to use the area it must be visually appealing to the majority of people. The appearance of outdoor recreation sites can be greatly improved by adding landscaping and other amenities. The site must also be maintained and repaired when necessary otherwise time, use, and the weather will take their toll making the site appear run down thus less attractive to potential users. In addition to the beauty and maintenance of the site itself characteristics of surrounding areas play a role in the overall perception of a site (Gold 1980). Visually pleasing surrounding land uses are important to the success of the waterfront as a recreational area. Outdoor recreational places are defined by the character of surrounding places. Many sites offer users superior observer positions. Therefore recreation spaces should be designed to capitalize on their unique views (Gold 1980).

Vegetation serves an important role in attracting users to an area and to facilitate the enjoyment derived from an area. This is especially true in urban areas where there exists a lack of vegetation. Vegetation provides a break in the scenery and can produce visual enjoyment, especially during seasonal changes. Furthermore certain recreation activities are enhanced when done on vegetated surfaces as opposed to paved surfaces. For example picnicking, pet walking, and field games. There are two categories of vegetation normally found in waterfront areas, natural and landscaped. Landscaped areas

should include a variety of trees and shrubs so they do not seem monotonous. Plantings should not hinder use of walkway areas or have the potential to injure users. Foliage should be maintained so that it does not interfere with the viewshed or reduce visibility resulting in a reduction in safety and feelings of security as mentioned earlier (Ryan 1993).

Natural areas can be either native or reconstructed. These areas often have a wild appearance to them and effort needs to be made to ensure that natural vegetation is not too rigidly confined or it may begin to resemble a landscaped area. Natural vegetation helps to emphasize the natural identity of a site, and may attract wild animals further enhancing this feeling (Gold 1980).

The presence of foul odors such as those that may originate at a sewage plant or from runoff in urban areas can have a negative affect on the desirability of an area for recreational uses (Ryan 1993).

2.1.6 Escape from the Urban Environment

Automobiles are one of the biggest hazards and annoyances in urban areas. “With the automobile assuming almost complete domination of North American cities bicyclists and pedestrians need escapes from the noise, fumes, and dangers of automobiles” (Searns 1995). Recreational areas, which offer an escape from the automobile, result in considerably higher user satisfaction levels (Searns 1995). Several physical features can be incorporated into the design of a site to help users escape the dangers and distractions of automobiles. Among these are buffer walls, landscaping, and setbacks from roads (Gold 1980). Related to the lack of automobiles are reduced noise levels. The value of

an area in terms of overall recreational satisfaction is reduced in proportion to the amount of noise found there (Ryan 1993).

A site that provides a sense of nature is also considered an escape from the urban environment and may even offer users opportunities for more spiritual experiences. “When we loose our ability to contact common species... the ordinary everyday species in our common vicinity, they might as well be extinct, in one sense...” (Pyle 1993). This statement by Pyle concerning the lack of nature in urban areas highlights the importance of preserving or returning nature to urban environments.

Cutter et al. (1979) found that demand is greater for recreation areas that are more natural. There is a human desire to interact with nature preserved, restored, or interpreted (Searns 1995). Nature invokes feelings of personal satisfaction among users of recreational parks (Floyd 1997). Thus the presence of natural features such as birds, animals, and varied vegetation can be indicators of natural area (Searns 1995).

The ability of users to physically touch the water is also an important factor to consider when evaluating urban waterfronts. Recreational activities popular in urban areas, such as fishing and crabbing require that users be able to touch the water, or at least get very close (Gordon 1996). Open water bordering a site creates a feeling of spaciousness and can make an area seem much bigger than it actually is (Gold 1980).

2.1.7 Usefulness

When designing or evaluating recreation areas a major issue is how useful the area actually is. According to Ryan (1993) the minimum acceptable width of an urban trail is 3 m. This allows a smooth flow of pedestrian traffic during peak periods and allows the

trail to accommodate a variety of uses simultaneously. Searns (1995) also concluded that a trail width of 3 m is the minimum necessary to accommodate bicyclists, pedestrians, and skaters simultaneously. A longitudinal slope of less than 5° and a cross slope of no more than 2° is acceptable and accessible to most users of a trail or walkway (Ryan 1993).

Humans possess a preoccupation with following a path whether it is a road, a trail, or even a story line (Searns 1995). Therefore the presence of a continuous length of recreation area can add to the appeal and increase the usefulness of an area. Continuous areas provide users with a feeling of connectedness to something greater than the area they are in (Gold 1980). Long areas allow walkers, runners, bicyclists, and skaters to travel for long periods of time without having to turn around. This reduces the monotony and boredom of the activity and gives people a sense of having a destination or a goal which is a good motivational factor, especially for fitness oriented activities (Ryan 1993).

2.1.8 Shoreline

Orientation, shape, composition, and nearshore slope of the shoreline can have an effect on the types of activities that may occur at a particular site. Nearshore slope and sediment composition can influence the activities taking place at a waterfront recreation area. A gradual slope is considered desirable for recreation activities such as wading because it allows users to approach the waters edge with little fear of slipping and falling into the water. However fishermen and crabbers prefer a steeper slope (greater than 30°) because it allows them to reach marine species inhabiting greater water depths (Miller 1998). Offshore depth also has an effect on the species of fish and crustaceans that

inhabit the water (Miller 1998). In areas such as the Hudson River, where fishing and crabbing are popular activities both as a form of recreation and a source of food, accessibility to populations of fish and crustaceans is an important factor.

Sediment composition has an effect on the recreational use of a shoreline. Sand is considered desirable because it is comfortable to sit on and provides adequate traction when walking. Medium-sized rocks and construction debris are generally considered less desirable since the water often makes them smooth and slippery. Large rocks and construction debris are desirable because they provide users a place to sit in close proximity to the water without getting wet. However it should be noted that the rocks could be slippery and often possess sharp angles that might cause injury to a user.

2.1.9 Water Quality

Pollutants in the water, not visible to recreation users, have some influence on recreation use levels in waterfront parks. There is a negative correlation between pollutant levels and fishery populations. There is also a negative correlation between high pollutant levels and participation in waters sports and water-related activities (Miller 1998).

As the level of pollutants increase fish populations decrease. If high pollution levels are detected, warnings and suggested limits for the consumption of fish, crustaceans, and naiads are often issued. These warnings and limits result in public fear of the water and can lead to declines in fishing, crabbing, and overall waterfront park usage. High concentrations of pollutants in the water also have an adverse effect on birds that feed on fish. A decline in bird population, or the presence of dead birds at waterfront recreation sites, will again make the public wary of using these areas. Some pollutants

also emit foul odors, which again make waterfront recreation areas less desirable to potential users (Canter 1996).

A good indicator of pollution levels in rivers and other water bodies is their status as defined by the Clean Water Act. If a water body is termed fishable and swimmable then the water is clean and safe for recreation purposes. However if the water is not deemed fishable and swimmable recreation activities in or near the water may pose a health risk (Miller 1998).

2.2 Recreational Use on Waterfronts

While there are many parallels between the use of outdoor areas in general and the recreational use of waterfronts the weight of some factors change in a waterfront-oriented study. The primary variables in a waterfront study are access, view, safety, vegetation, maintenance, and amenities. Waterfronts generally tend to be more linear than inland recreation space. Furthermore there is usually less traffic and noise since waterfront sites are bordered on at least one side by water (Gordon 1996).

Common waterfront activities are affected by the variables outlined in Table 1. The table illustrates the variables and how they relate to common waterfront activities.

Table 1 Recreational Activities Enhanced by Relevant Physical Attributes

	Convenience				Comfort			Safety			Urban Escape			Usefulness				
	Close To Food	Close To Business Dist.	Close To Public Trans	Easy Access	Protection From Elements	Seating	Tables	Adequate Lighting	Fence or Rail	Protection From Autos	Unrestricted City View	Presence of Animals	Natural Vegetation	Able To Touch Water	Trail > 3m Wide	Smooth Surface	Linear > 1km	Longitudinal Slope < 5 degrees
Walking	●	●	●	●	●			●	●	●					●	●	●	●
Bicycling	●			●				●	●	●					●	●	●	●
Running	●	●	●	●	●			●	●	●					●	●	●	
Eating	●	●	●	●	●	●	●	●	●	●	●							
Fishing/Crabbing	●			●		●				●				●				
Board Games						●	●		●	●								
Dog/Pet Walking	●			●				●	●	●			●		●	●	●	●
Bird Feeding											●	●						
Reading	●	●	●		●	●	●	●	●	●								
Stroller (Walking Infants)	●	●	●	●	●			●	●	●					●	●	●	●
Socializing	●	●	●	●	●	●	●	●	●	●	●							
Viewing/ Photography	●	●	●		●	●	●		●	●	●		●	●			●	
Drinking (alcohol)					●	●	●	●	●	●								

The available literature seems to suggest that the factors involved in the selection of waterfront recreation sites be as follows. It is the appeal of the site that mainly attracts users for recreation reasons. The wider the variety of uses the site supports the larger the potential population attracted to the area. The number of activities supported is directly related to site features. Features such as amenities, paving, and vegetation all play a role. Amenities are also important in preventing attrition of users. The features control the types of activities supported by the site. The number of people that would like to participate in these activities is the potential population. However not all of the population will use the site due to two key factors, access and convenience. These two factors serve to limit the population to those who find conditions for actually reaching the

site favorable. Once at a site there are factors that add to user satisfaction and justify whatever obstacle users have had to overcome to reach the site. Figure 1 illustrates the factors that draw users to a site. The higher up on the pyramid the greater the factor is in terms of attracting potential users.

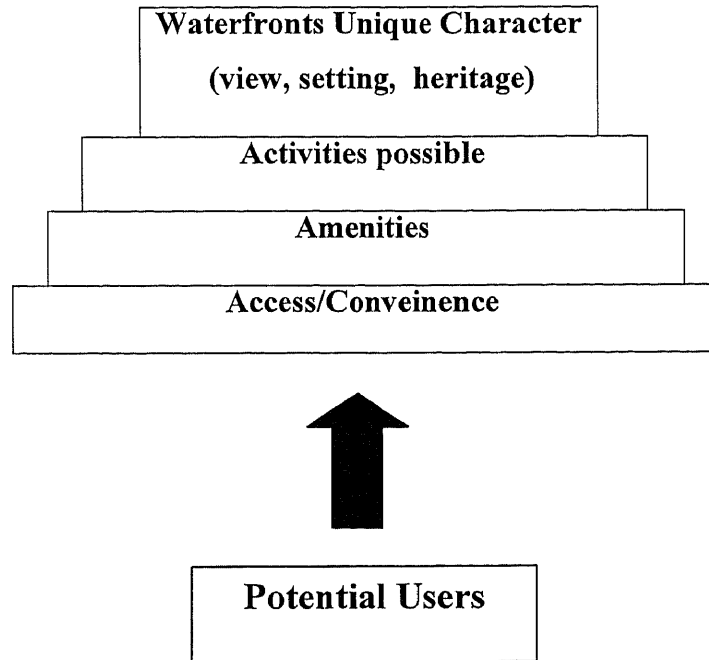


Figure 1 Conceptual Diagram of Factors Involved in Site Usage

CHAPTER 3

STUDY AREA

3.1 Background

3.1.1 Jersey City

Jersey City is located in the heart of the New York/New Jersey Metropolitan region (Figure 2). Access is possible via the New Jersey Turnpike (Exits 14B and 14C), Routes 1 & 9, and Route 78. Jersey City is bound on the west by the Hackensack River and on the east by the Hudson River. The Hudson River begins in the Adirondak Mountains, flows through the Catskill Mountains and the Hudson Highlands and discharges into Upper New York Bay, 507 km from its origin. On its way to the Atlantic Ocean the river passes the Tappan Zee and Palisades regions and finally past New York City, Ellis Island, and the Statue of Liberty. The Hudson River has great commercial importance as a connection to the many cities located on the river in New York and New Jersey. The Hudson River is also joined by the New York State Barge Canal System just north of Albany. This important link allows boat traffic originating on the Hudson to reach as far as Lake Champlain, the Great Lakes, and the Saint Lawrence River (Encarta 1997). The 3.75 km of shoreline on the Hudson River in Jersey City is parallel to New York City (Jersey City Economic Development Commission 1997). The redevelopment of the 2, 050 m² of waterfront on the Hudson River, over the past decade, is changing the economic and social importance of the area.

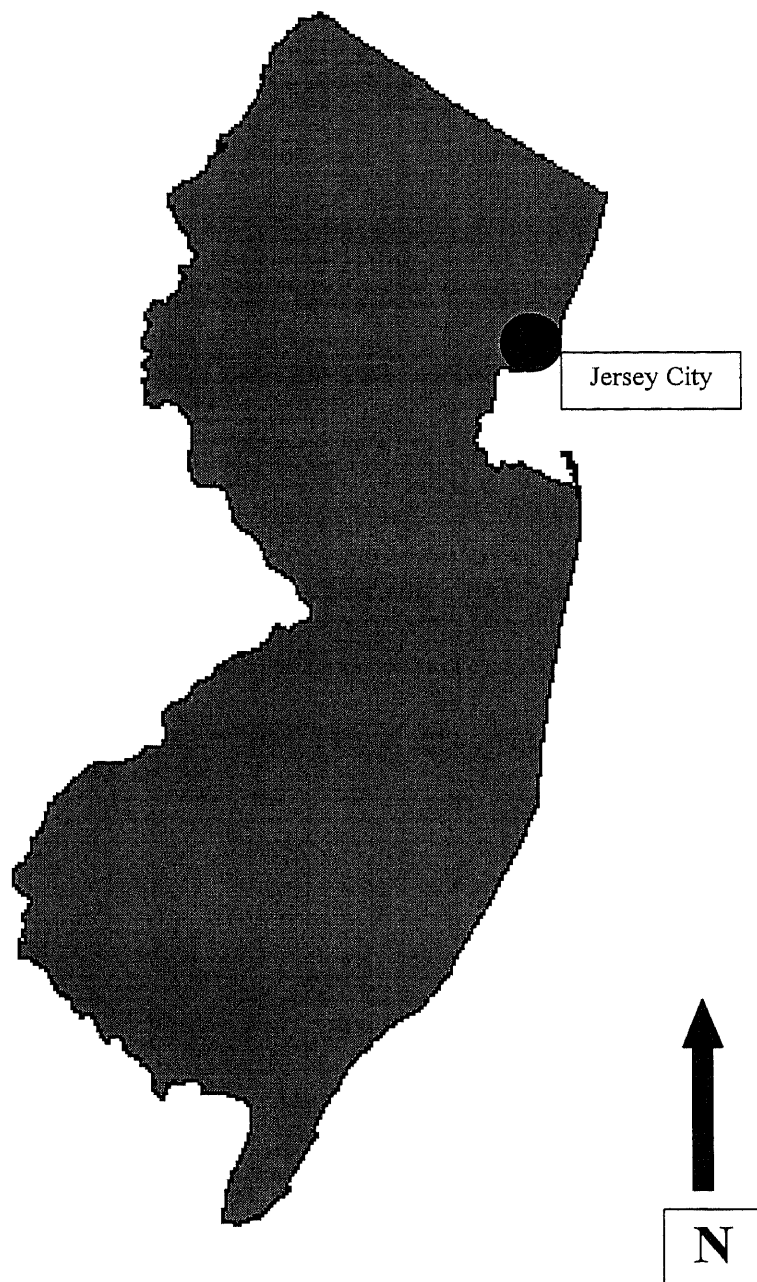


Figure 2 Map of New Jersey Showing the Location of Jersey City

3.1.2 History of Waterfront Development

The Jersey City waterfront, like many of its counterparts in the United States, experienced economic decline beginning in the 1960s. The city was a busy port and rail terminal used primarily to transfer goods from rail to barges for movement to Manhattan (Harvey et al. 1980). Jersey City was the end point of all freight movement in the northeast. Large rail terminals were used to transfer freight to barges for movement across the Hudson to New York City, or loaded into cargo ships for transport over-seas. The waterfront experienced economic decline when trucks replaced barges as the least expensive and fastest means of transporting goods to Manhattan (Nierstedt 1997). Manufacturing activities, common along the waterfront, left soon after the decline of the rail terminals, as flexibility of truck transport allowed factories to move to cheaper inland sites. The Jersey City waterfront deteriorated due to age, under-utilization, and a lack of investment (Harvey et al. 1980). The heavy industrial uses that once occupied the waterfront had left a significant mark on the natural environment by 1980. Like other industrial waterfronts fishing wastes, railroad activities, exhaust fumes, runoff, spills, bottom paints and other factors had left the area severely depleted (Fitzgerald 1986). This was amplified by the lack of investment in the waterfront that occurred after the decline of Jersey City's shipping industry. The vacant waterfront experienced a fair amount of illegal dumping, again adding to the environmental problems (Nierstedt 1997).

High rents and low vacancy rates in New York City created a demand for residential and commercial space in Jersey City in the early 1980s. Development activity slowed in the late 1980s and early 1990s due to an economic recession that was especially hard on the real estate market (Hoff 1987). Development activities have

resumed along the waterfront, and a number of projects are underway or slated to begin in the near future (Carter 1997). Development initiatives include three distinct activities: 1) existing structures with historical value, that can be converted to serve the needs of the present, are rehabilitated; 2) existing structures, that can not be rehabilitated, are demolished and the site is redeveloped; and 3) new structures are constructed on vacant lots. Rehabilitation and redevelopment has changed waterfront use from heavy industrial to residential and commercial use (Lane 1997).

Changes in public perception of the waterfront as well as public recreation activities that are now associated with the area, have accompanied development activities. The waterfront was once a place many avoided due to poor environmental quality, unsafe conditions, physical barriers, and fear of illegal activities. Recent redevelopment projects have improved the environmental quality of the waterfront. Past contamination has been removed, and areas have begun to rebound. This can be witnessed in the rise of fish populations, and the return of wildlife and natural vegetation to the area (Colgate 1994). A significant by-product of the development is the opening of the waterfront to the public (Harborside Financial Center 1988). The area is attracting people from Jersey City as well as nearby municipalities. People come to the waterfront not only to live and work but for recreational purposes as well (Garbarine 1996).

3.2 Hudson River Waterfront Planning

Waterfronts entered the national spotlight in the late 1960s with one of the first acknowledgments coming from the 1969 conference *Our Nation and the Sea*. At this conference the presidentially appointed Stratton Commission recommended that “increased amounts of shoreline be made available to the public for recreational activities, furthermore priority should be given to those areas near metropolitan centers where public spaces are most urgently needed” (Harvey et al. 1980). At about the same time The New York/New Jersey Regional Planning Association (RPA) recognized the potential of the Hudson River waterfront. The agency was one of the first to appraise the lower Hudson River in terms of natural beauty and potential for recreation. The RPA released a report titled *The Lower Hudson* (1966) that outlined a future vision of the river and the role of open space in the lives of New York and New Jersey residents. The report concluded that “planned uses for the waterfront should be those that bring people to the river” (RPA 1966).

New Jersey Governor Byrne appointed a State commission in 1979 to examine the development potential of the Hudson River waterfront. This group was known as the Governor’s Hudson River Study and Planning and Development Commission. The thirty-nine-member commission was comprised of mayors, officials, and regulators of municipalities located along the waterfront. In 1981 the New Jersey Department of Environmental Protection (DEP), prompted by the recommendations of the committee, established regulations for the development of a waterfront walkway extending from the George Washington bridge south to Bayonne. The regulations were purposely limited because planners were careful to not supersede the power of the local planning boards

(Weingart 1998). Waterfront parks and walkways along the Hudson River are expected to provide neighborhood identities to areas of residential development. Pedestrian walkways and parks will link residential, transit, office, and retail elements of Jersey City. Linear parks, or greenways, will carry the unique character of the Hudson River and the Manhattan skyline through the development and make the river an accessible and enjoyable area (Newport 1985).

To date there are three sets of regulations written by the State of New Jersey Department of Environmental Protection, Division of Coastal Resources (DCR) for the waterfront walkway including:

- *Hudson Waterfront Walkway: Existing Conditions and Preliminary Walkway Delineation* (1982)
- *Hudson River Waterfront Walkway Plan and Design Guidelines* (1984)
- *Hudson River Waterfront Walkway: Design Standards Addendum to Plan and Design Guidelines* (1988)

These regulations are important because they establish guidelines for the development of the waterfront walkway. Walkway design attributes, such as materials, dimensions, landscaping, and amenities, are covered by the guidelines. The guidelines ensure consistency in character of the walkway as it crosses municipal boundaries on the Hudson River waterfront. After satisfying these requirements, proposals, for development begin a lengthy review process.

The Waterfront Walkway Commission reviews plans and makes recommendations for improvement of the appropriate section of waterfront walkway. These recommendations are then forwarded to the New Jersey Department of

Environmental Protection, and to the relevant municipal committees and the county planning agency. The U.S. Army Corps of Engineers and the United States Department of Environmental Protection also review the plans to ensure compliance with all applicable environmental legislation and coastal zone management programs. The primary pieces of legislation involved in waterfront development projects are:

- The Rivers and Harbors Act 1899
- The Clean Water Act 1972, 1987
- Marine Protection Research and Sanctuaries Act 1972
- The Public Trust Doctrine
- Coastal Zone Management Act 1972
- National Environmental Policy Act 1990
- Intermodal Surface Transportation and Efficiency Act 1991
- State Land Use Law (NJ Municipal Land Use Law)
- County Land Use Law
- Local Zoning Regulations
- Historic and Archeological Legislation
- Superfund Amendments and Reauthorization Act

Municipal requirements play a major role in the development process. Developers must prove they can meet strict zoning regulations before a project is approved. Changes in Jersey City's zoning laws have enabled many of the changes to the waterfront. These changes include increased open space requirements, and requirements for landscaping and other amenities. Zoning changes in Jersey City have come in response to: socio-economic trends, the New Jersey Municipal Land Use Law (MLUL), and local growth

management efforts. In Jersey City redevelopment has focused mainly on non-water dependent uses of the waterfront in an attempt to maximize real estate value. Thus to protect the environment and the interests of the public there have been new requirements for open-space, landscaping, lot coverage restrictions, floor area requirements, parking, availability of public transit, and the designation of land immediately bordering the river for a waterfront walkway.

Not forgotten in the planning process are the views of the local communities and interest groups. In fact, citizen involvement plays an important role in the planning process. Public hearings throughout the planning process provide citizens and interest groups with a number of opportunities to ask questions and voice opinions about proposed development.

At the start of this study (1997) redevelopment of Jersey City's waterfront was 50% completed. However the creation of the waterfront walkway is less than twenty-five percent completed (Lane 1997). Thus the findings of this study can be used to make decisions about future waterfront development.

CHAPTER 4

METHODOLOGY

A research strategy was designed to obtain information about waterfront use, community opinion, and recreational interests. Two complimentary research methods were selected to collect the necessary data. Field observations, using behavioral mapping, and interviews of a selected sample of representatives of community organizations active in Jersey City.

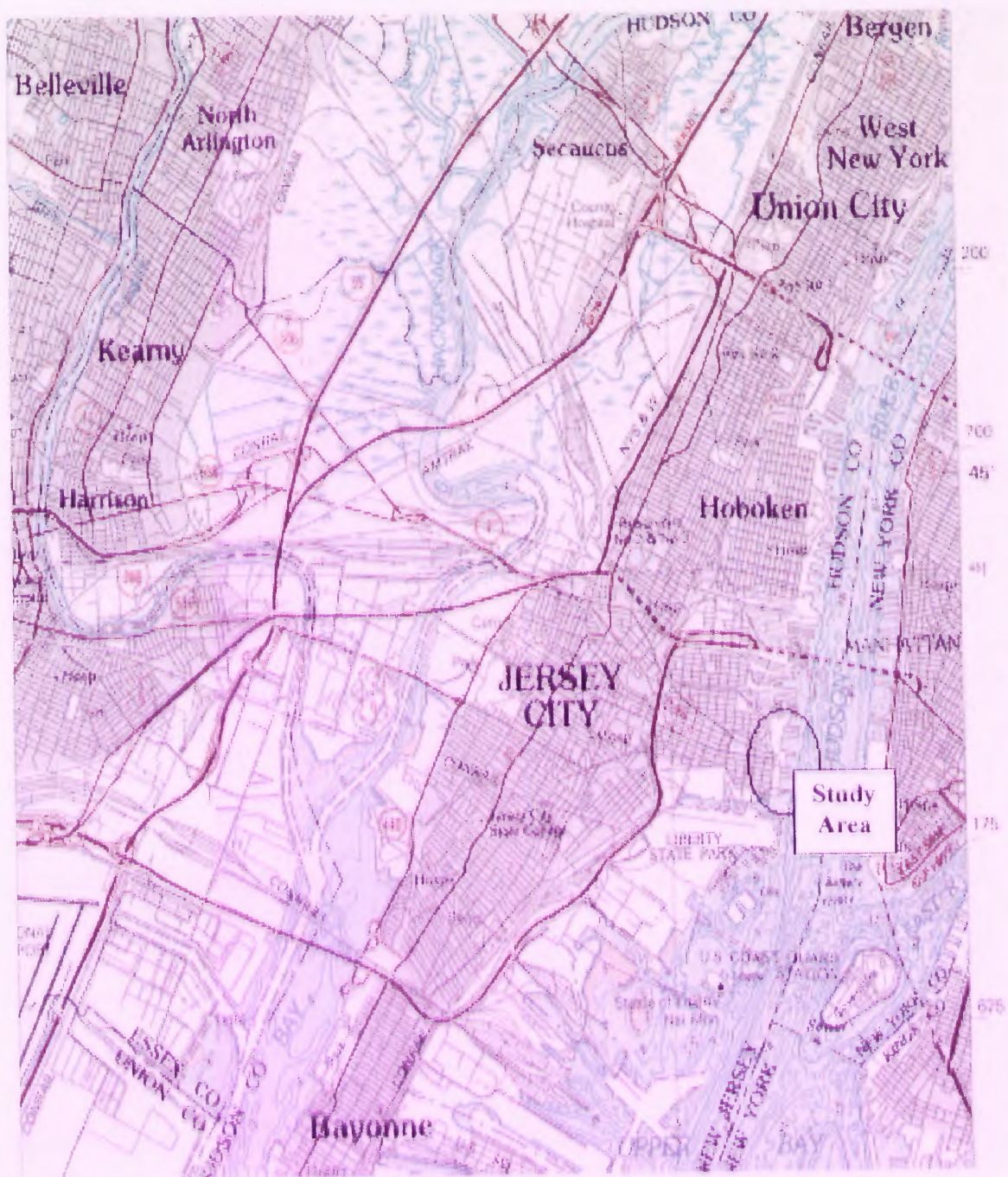
4.1 Study Sites

Three sites, located at the southern end of Jersey City, NJ were selected for detailed assessment. The sites are all within a mile of one another, however they were chosen due to differences in their physical characteristics (Figure 3).

Site 1 (Peninsula Park), lies directly east of the Portside Condominiums at the corner of Washington Street and Dudley Street at the southern end of the waterfront. The site lies between Big Basin and Little Basin and is adjacent to Liberty State Park. The site was chosen because it represents a natural, undeveloped area of the waterfront.

Users of Site 1 are expected to participate in activities such as fishing, sunbathing, pet walking, photography, nature interpretation, and viewing. The isolation of the site makes it a good place to read or spend some quiet time but will reduce the total numbers of users. Furthermore the use of the site during meal times is not expected to increase due to its distance from food locations.

Site 2 is located approximately two blocks to the north of Site 1. Located at the site are the New York City Ferry and the historic Colgate Clock. The site runs parallel to the



Scale = 1:100 000

1 cm on map represents 1 km on the ground

Figure 3 Map of Jersey City and Surrounding Municipalities, Showing Study Area

Hudson River and Hudson Street. The site can be accessed from Morris, Sussex, Essex, Grand, and York Streets. A bulkhead and chain-link fence separates the river from an asphalt walkway. There is limited seating to accommodate ferry riders. The walkway is backed by a large parking lot. By the end of the study in 1998 redevelopment of this area began. Nonetheless the site was chosen due to its lack of amenities and the feeling of separation from the Hudson River it conveys. Although the site is only temporary the lessons learned from study of this area are still relevant.

Users of this site are expected to participate in activities such as socialization and eating. While waiting for the ferry participants can use the site to read or catch up on some work. Non-ferry riders are not expected to visit the site for recreation purposes due to the lack of nature and restricted view.

Site 3, Owen Van Grundy Park, is located at the northern end of Site 2. The park is adjacent to Exchange Place Plaza, at the end of Montgomery Street. Owen Van Grundy Park is a P-shaped pier suspended over the Hudson River. The Exchange Place PATH Station is located in the park. The site was chosen because it represents a highly developed waterfront recreation area. Furthermore the site experiences high use levels, the reasons for which are important to determine.

Considering the location of Site 3 it is expected that there would be many users at all times of the day, especially mealtimes. Likely activities for participants include socializing, eating, game playing, fishing, and viewing. Due to the high volume of users, bicyclists, runners, and pet walkers are likely to be discouraged from using the area. Overall Site 3 is expected to have the greatest numbers of users due to its location.

4.2 Field Observations

Some variables important to a study of waterfront use measure characteristics of the physical and built environment. Field measurements for this study were made using common tools such as a compass, tape measure, hand-held level, and surveying equipment. The physical and built characteristics of the waterfront that have the potential to affect recreation activities are presented in Table 2.

Convenience is measured by the distance users of the waterfront must travel to reach a particular site and by the sites overall accessibility. For purposes of this study three distances are important: distance from residential development, distance from food, and distance from the business district.

Within the study area there are two residential regions. One located at the north end of the study area, and one at the south end. The distance, in meters, from each site to the closest residential center was measured in the field. Similar measurements were made from each site to food locations and the business district on Hudson Street beginning at Montgomery Street and extending north for several blocks.

Table 2 defines site access. Data on the number of access points, and the size of each access point was obtained in the field. Site access is a function of size and number of the points. Visual access is also important and recorded for each of the sites (Lynch, 1981).

The level of comfort in outdoor recreation areas is dependent on two factors, amenities and paving. Common amenities in waterfront recreation areas include seating, tables, and a smooth walkway surface that can accommodate a wide variety of uses. Another important amenity, as mentioned earlier, is an unrestricted view of Manhattan.

Table 2 Research Variables

Variable	Definition	Method Of Determination
Convenience		
Distance from residential development	Travel distance (m) from site to first residential building	Field observations
Distance from business district	Travel distance (m) from site to first commercial building	Field observations
Distance from food	Travel distance (m) to closest area where both food and drinks may be obtained	Field observations
Number of access points	Number	Field observations
Distance from public transportation	Travel distance m from rail station or bus stop	Field observations
Comfort		
Protection from the elements	Number of structures that block wind or reduce its speed	Field observations
Seating	Number	Field observations
Type of seating	Bench, back support	Field observations
Tables	Number of tables at the site	Field observations
Walkway surface	Surface of walkway (wood, cement, brick, asphalt or crushed stone)	Field observations

Table 2 (continued)

Variable	Definition	Method Of Determination
Safety		
Security	Presence or absence of a uniformed security official during periods of peak usage	Field observations
Lighting	Visual inventory	Field observations
Restricted or blind alleys	Areas at a site that are visually isolated from the rest of the site (m2)	Field observations
Protection from automobiles	Presence or absence of a rail, fence, natural formation of other physical barricade that separates users from	Field observations
Rail for protection from river	A fence or railing separating users from the river	Field observations
Vandalism	Visual inventory	Field observations
Beauty		
Vegetation	Percentage of interviewees rating vegetation as visually pleasing/ coverage	Interviews/Field observations
View of Manhattan	Presence or absence obstructions blocking view from a seated position	Interviews/Field observations
Odors	Percentage of interviewees indicating they normally do not observe unpleasant odors when visiting a site	Interviews/Field observations
Maintenance	Percentage of interviewees rating site maintenance as satisfactory	Interviews/Field observations

Table 2 (continued)

Variable	Definition	Method Of Determination
Escape from the urban environment		
Automobiles	Presence or absence of moving automobiles visible from site	Interviews/Field observations
Noise levels	Percentage of interviewees rating noise levels as satisfactory	Interviews/Field observations
Ability to physically touch the water	Access to the high waterline and beyond from land	Field observations
Usefulness		
Trail dimensions	Trails/Paths > 2.5 m wide	Field observations
Continuos length of recreation area	Unbroken and unobstructed linear area greater than 1km	Field observations
Shoreline		
Sediment composition	Type of base material covering the shoreline from the low waterline to the high waterline (sand, pebble,	Field observations
Size		
Usable waterfront area	Measure of area suitable for recreation (m2)	Field observations

This is so important because places obtain their unique identities from linkages with their surroundings (Searns 1995). In the case of Jersey City it is impossible to ignore the presence of Manhattan across the river and the draw this has for waterfront users. To determine if the view was restricted from the study sites survey equipment was used. The height of benches was compared to the height of any obstructions lying in the line of site, which may potentially restrict views. The results of these measurements were classified in one of three ways: “observer inferior” – viewer below bulkhead; “observer normal” – viewer on level of bulkhead; or “observer superior” – viewer above bulkhead (Canter 1996). For purposes of this study either viewer normal or viewer superior is satisfactory. The presence of any semi-transparent obstacles such as a railing or chain-link fence, while not a true obstruction, was also recorded because these objects have an effect on viewing.

Paving materials permitted on the waterfront include cement, brick, wood, and stone all of which have their advantages and disadvantages functionally, and to users. Data on each of these variables is measured in the field as described in Table 2.

Safety is directly related to several factors including the presence of security personnel, lighting, graffiti, restricted/blind areas, protection from automobiles, and protection from the river. These factors are measured in the field (Table 2). Attributes that positively and negatively influence safety are recorded for each site.

One of the main reasons people visit a recreation area is to escape their daily environment (Gold 1980). In the case of those who live and work in Jersey City the daily environment is an urban area complete with traffic, noise, and congestion. Therefore an ideal recreation area in Jersey City will provide relief from these ills of urbanization.

The variables that measure the level of escape from the urban environment are illustrated in Table 2. The variables important in allowing users to escape from the ills of urban life are low noise levels, a lack of automobiles, and vegetation. The presence or absence of automobiles is determined by field observation. To determine the acceptability of the landscaping at the study sites, field measurements are used. Distances from the trail, height, size, variety, and foliage levels were recorded. Since all of the sites being studied in Jersey City were inventoried as part of the National Environmental Policy Act (NEPA) requirements for adjacent development projects there is no need to reinvent the wheel. The existing biological inventories will serve as an indicator of the number of species that can commonly be found at each of the sites. A large variety of species (bio-diversity) and high populations of species at a site is an indicator of a natural area (Canter 1996).

Trail/walkway width and the elevation of the site in centimeters above the high waterline are indicators of usefulness. The continuous length of recreation area available to users also plays an important role in enhancing or limiting waterfront activities. Field measurements are used to determine the usefulness of each of the sites in the study (Table 2). Site width is measured from the inland boundary towards the river to the high waterline or the point where users are forced to stop by a physical barrier. Unlike other variables the measurements of continuous length of recreation area extend beyond site boundaries. Measurements are made from north to south starting at the northernmost point connected to the site. The distance is then measured southward until a point is reached when users must turn around or navigate a physical obstacle to continue their recreation activities.

The variables measured to assess physical constraints of the shoreline are: orientation, shape, slope, and composition (Table 2). The variables were measured and observed in the field. At sites where the shoreline is not accessible to users these measurements and observations were still made, however it is noted that access was restricted to the shore and a description of the obstruction was made.

Size refers to the amount of usable waterfront area measured in square meters (Table 2). Unlike the measurements made of the continuous length of recreation area, size, measurement, are strictly limited to the site boundaries. This will allow a comparison of the sites in terms of waterfront area and will aid in the analysis of other variables.

Water quality can be described by the analysis of a number of different factors including, but not limited to: sediment load, clarity, and organic and inorganic pollutants. However for purposes of this study an overall assessment of water quality is most useful. Data on water quality is readily available and does not need to be measured. Data available from the US Environmental Protection Agency and the New Jersey Department of Environmental Protection was used as an indicator of the overall quality of Hudson River water near the study area. Results are given in terms of 1987 Clean Water Act rankings (Table 2). The data are the same for the entire study area and therefore are not used to compare sites. The distance from each of the sites to residential development, business district, and food were determined by pacing the distance from the site to the first building.

In the context of this study it is not necessary to determine either the offshore depth or channel location since an inventory of marine species and a count of average

population levels is underway. Large populations of species in the vicinity of the parks being studied serve as an indicator of a desirable channel location and offshore depth. However if there is a lack of marine species these factors may play a role in this and will be researched further.

Trail width was measured using a tape measure. The length of shoreline and all walkway areas were measured using a tape measure. Benches and other seating structures, lighting, and the number of trash receptacles were counted and compared to the requirements outlined in the Waterfront Design Standards. Slope of the walkways was measured using a hand-held level. The height relative to eye level while sitting, and the height of any obstructions (vegetation, bulkheads) was measured using surveying equipment. A comparison was made to determine if the obstruction restricts the view. The height of railings, and fences were measured using a tape measure. Lastly photographs were taken of the sites from different angles.

The most effective way of determining the recreational preferences of waterfront users is by direct observation (Gold 1980). Assessment of effective recreational demand is the best indicator of park use characteristics (Gulez 1996). Observations designed to provide information about effective recreational demand which includes factors such as actual waterfront use, how many people are using each of the three waterfront sites, what activities are occurring, and what time of day the waterfront most utilized (Heywood et al. 1991). Construction of a behavioral map ensures that consistent data is collected each time observations are made (Jones 1979). The behavioral map consists of three parts: a map of the site being studied; a grid that divides the site into sub-areas; and a checklist which is used to record the activities occurring at each of the sub- areas for a specified

period of time. User locations on the site, activity, gender, and age are recorded for each user.

Field observations of waterfront users were conducted on 16 separate occasions from August to November. Observations were made on weekdays and weekends at various times of the day and during different weather conditions. This period of time was chosen since use could be observed in a variety of weather conditions. Sampling was not conducted during the summer months due to the large number of people taking vacations and spending time at the Jersey Shore.

Field observations were conducted for twenty minutes at each of the three sites. The order that the sites were visited was varied as was the time of the day observations were made. This was done to determine types of activities that occurred at different times of day. To ensure consistency in the data collected the same person observed and recorded the observations each time (Heywood et al. 1991). At certain time periods user levels were high. A video camera was used during these times to ensure accurate observations. The camera was set up in a stationary position for twenty minutes. At larger sites the video camera was set up to film a part of the site and observations are made at another part of the site simultaneously (Schroeder and Orland 1994).

The method of data collection described above offers several advantages. Analysis is easier because one person using a consistent instrument gathers data. Participants are observed in their natural setting, an important consideration because what people say and do are often two different (Henderson 1995). This is especially true when assessing recreation use since people often indicate what they would like to do, or try to make themselves seem more interesting than they actually are (Gold 1980). Field observations

also allow the researcher to determine relationships between users and their peers or between users and the environment that may not be revealed when using other survey techniques (Henderson 1995).

The presence of an observer can tend to make people feel uncomfortable (Henderson 1995). Observations were done as conspicuously as possible, to make participants feel more comfortable and anyone inquiring about the purpose of the observations was informed. Heywood et al. (1991) found that studies of actual behavior might be affected by a lack of knowledge on the part of participants about the recreation activities that are possible.

4.3 Structured Interviews

In the second phase of the study interviews were conducted of waterfront users to determine their preferences for recreation activities and site characteristics (Heywood 1991). Cheek et al. (1976) concluded that personal interviews guided by a prepared format yield the most valid, reliable, and representative data on individual behavior, preferences, values, and beliefs.

Interviews were conducted with members of community groups active in Jersey City waterfront issues. Groups were selected randomly from a list of Jersey City organizations active in waterfront issues. Dan Frohwirth of the Jersey City Economic Development Corporation provided the list. The groups included condominium owners, homeowners, tenant, business, and senior citizen associations. Seven successful interviews were conducted with members of each of the five categories of groups mentioned above for a total of thirty-five individual responses. Three interviews could

not be used due to unfamiliarity and the data were excluded from the analysis. To improve the quality of responses, respondents were informed that their names and affiliations would be kept anonymous (Sudman et al. 1996). The respondents were interviewed in person with the interviewer recording all responses on a standard questionnaire.

The interview consists of three sections with specific goals (Appendix B). The goal of Section one was to determine the recreation activities respondents participate in both on and off the waterfront. The responses are useful in determining if a demand exists for any activities not currently available on the waterfront. Section two was used to gauge the factors that influence waterfront use. Section three contains several site-specific questions used to determine perceptions of the three study sites. The questions address six factors that influence waterfront attributes: noise; vegetation; maintenance; access; safety/security; and level of crowding.

To aid in visualization of the areas respondents were shown several pictures and a map of each site. Responses in Section one were recorded in a multiple-choice format. Twenty-six possible activities are given as choices and the interviewer marked the category or categories that best fit the responses. In Sections 2 and 3, a five-point Likert Scale was utilized (Appendix B).

4.4 Data Analysis

Data from field observations were recorded on behavioral maps that are easily coded and placed into spreadsheets for statistical analysis. First, participation rates for each of the sites were determined. Activities occurring at each of the sites and user characteristics were determined. These data were compared to the site features measured in the field.

Likert Scales were used to record the interview data because they are easily converted to numerical values (Babbie 1995). A numerical value between 2 and -2 is assigned to each of the five possible responses. Strongly Agree = 2, Agree = 1, Don't Know = 0, Disagree = -1, and Strongly Disagree = -2. The total score for each category is then added indicating the ranking.

The results of field observations and structured interviews were then compared and conclusions made about the study sites. The data were then compared to existing literature on the topic of outdoor recreation and similarities and differences pointed out.

CHAPTER 5

RESULTS

5.1 Controls on Recreational Use

5.1.1 Site 1

Site 1 is comprised of a walkway bordered by natural vegetation. The site is located near an area of intense residential land use and one of two large residential complexes in the study area. It is important to note that while this site is located near a large number of residences there are no food locations or large businesses in the area.

Figure 4 illustrates the configuration of the site as well as the surrounding areas. Site 1 has 550 m of shoreline. The site is designed as two circular paths linked to one another by a linear path. The inland circular path is made from brick while the other circle and the connecting trails are made from crushed stone. The site is relatively flat with a slope of less than 5°. The vegetation that borders the paths has a wild appearance, and appeared un-maintained at the time of field observations. The inland portion of the area is well lit, and there are twelve receptacles available for discarding trash.

Two types of seating are found at this site, benches with backs and low stone walls. There is a relative abundance of both of these seating types on the site. There are no tables, but the stone walls or adjacent benches could be used as a rudimentary table for eating or other activities.

Site 1 is the only study site where users have the ability to directly access the water. Observations often revealed users sunbathing on the large rocks on the shoreline, or fishermen wading into the river. The shoreline composition ranges from smooth

SITE 1



(A)



(B)

Figure 4 Photographs of Site 1 showing A) The vegetation cover, B) The southern shoreline fronting Big Basin looking west with Portside Residential complex in the background, and C) The shoreline looking northeast with Manhattan skyline in background.

SITE 1 (continued)



(C)

pebbles to boulders. There are also areas where old bricks and concrete fragments have been discarded on the shoreline. Wave energy is relatively low with the exception of boat wakes in Big Basin from water traffic to a local marina.

There is no evidence of automobile traffic at or near this site. The road that leads to the area is blocked off by a row of pilings. Streets that run adjacent to the site are small secondary streets with little traffic.

5.1.2 Site 2

Site 2 is the terminus of the New York City Ferry (Figure 5). Site 2 has 185 m of shoreline. There are no major business or residential areas near the site. A temporary walkway, built to accommodate ferry commuters, is laid out more for functionality than for aesthetic value. The Colgate Clock is located at this site. At one time the clock was a part of the Colgate building. After the building was demolished the clock which had become a landmark was placed on a billboard and remains there today. The site experiences a high volume of pedestrian traffic on a daily basis, and the designers chose materials accordingly. The entire surface of the site is asphalt. As illustrated by Figure 5 there are evenly spaced benches and trash receptacles across the length of the site. Lights are also evenly spaced parallel to the water.

The shoreline is protected by a large steel bulkhead that in some cases is at a higher elevation than the benches, restricting the view of Manhattan. There is also a chain link fence located approximately 3.0 m landward of the bulkhead. The bulkhead and fencing reduces visibility and makes water dependent uses such as fishing difficult if not impossible.

SITE 2



(A)



(B)

Figure 3 Photographs of Site 2 showing A) Bulkhead protecting shoreline (Site 3 in the distance), B) Fence preventing access to the shoreline, and C) Site 2 looking southwest

SITE 2 (continued)



(C)

Directly landward of the site is a large parking lot used by ferry commuters. The parking area is separated from the site by a guardrail and a 1.2-m high chain link fence. Automobiles are constantly visible from this section of the waterfront. While automobile noise is not as high as it would be if the site were located near a major road, however the parking lot does affect noise levels. At certain time periods during the day, when commuter traffic is at its peak, automobile noise levels can be quite high. Furthermore there is noise from cars entering and exiting the parking lot almost constantly during the day. The parking lot is busy during both weekdays and weekends, when commuters and tourists travel to New York City.

The surface of Site 2 is relatively flat with a slope of less than 4°. There is no natural vegetation on the site, and little room for landscaping. Thus non-domesticated animals rarely visit the area. Furthermore, there is little variation to the site that may encourage users to stop and spend any more time than is necessary.

A high fence capped with barbed wire prevents access to Site 2 from the south. Between Site 2 and Site 1 there is a large patch of weeds and a vacant lot. Access is possible at the north end of the site via a 2.5 m opening in the chain link fence that surrounds the site. The same is true for the middle of the site, however users must pass through the parking lot to reach the site from the midpoint. Although there are openings in the chain-link fence, visual access is poor. From a distance the openings are not visible, and it is only when a visitor is right on top of the fence that the access points can be detected. Site 2 is physically connected to Site 3 however functionally this is not the case. Travel between the sites is difficult Due to the small opening in the fence, a road, and the need to make some sharp turns.

SITE 3



(A)



(B)

Figure 6 Photographs showing A) Site 3 as seen from Site 2, B) Users of Site 3 appreciating the view of New York City (PATH Station in background), and C) Site 3 looking west.

SITE 3 (continued)



(C)

transportation available on the site via the Port Authority Transit Hub (PATH); the trains run underground so there is no noise.

There are many similarities in the amenities that the three sites offer users as would be expected from sites in close proximity. There are also some important differences that need to be looked at in detail. Table 3 presents the physical characteristics of the three sites. All three sites are relatively the same size. Furthermore they are very similar in terms of slope, both latitudinally and longitudinally. It is also important to note that none of the sites offer a real sense of continuousness. All three sites are somewhat isolated from one another and there is no significant linear area along this portion of the waterfront. As a result of the Design Standards, developed by the Hudson River Waterfront Walkway Commission, all three sites offer users common amenities such as lights, seating, and trash receptacles. All three sites are in compliance with the following design standards relating to amenities.

1.11- The minimum width of pavement free of obstructions shall be 5.0 m

2.12 – The maximum slope of 5.0 m wide pavement should not exceed (3) percent

5.1 – Lighting levels along the paved portion of the Walkway should be an average of no less than ½ foot candle at ground level

7.1 – Seating areas should be provided at a minimum rate of 5.0 m per 35.0 m of linear walkway

(Hudson River Waterfront Study Planning and Development Commission, 1980)

The design standards have kept the waterfront parks consistent in terms of what types of fixtures, colors, and materials are used. Although the Waterfront Walkway Design Standards have kept many of the attributes similar there are some differences that

need to be explored. It is these differences that are responsible for the different use levels of the three sites. In the category of convenience, Site 3 is the only area that is close to food. Site 1 offers users significantly less convenience amenities than the other two sites. Site 1 is the farthest site away from food, public transportation and the central business district. This means that users have to travel longer and sacrifice certain amenities to use the area. The final difference between the sites in terms of convenience is access. Of the three sites, Site 3 is the most accessible both physically and visually. Site 1, although offering a wide opening for users to reach the site, is difficult to see from the central business district, and therefore many users may be discouraged from using it. Site 2 is more difficult to access both visually and physically because of the chain-link fence surrounding the site.

Site 3 has tables and the other two sites do not. The tables, which are conducive to several passive activities, such as eating and game playing, do have an affect on site usage.

The sites are similar in terms of safety with the exception of Site 1, which does not have any type of barricade between users and the river. Site 2 and Site 3 have fences and rails that prevent users from approaching too close to, or falling into the river, While the lack of a railing is a negative safety factor it is a positive in terms of providing users with an escape from the urban environment (sense of nature).

Despite the high density of development that surrounds the river on both sides, it is essentially a natural area. Therefore a site that offers users the ability to come into direct contact with the river, Site 1, adds to this sense of nature. Site 1 offers natural vegetation and large numbers of birds. Site 2 and Site 3 offer little, if any, of these

features and make users feel even more isolated from nature by the materials they are made with and the fences and rails that contain users.

5.2 Use Characteristics

A total of 950 users were observed, of which 221 were at Site 1, 120 at Site 2 and 609 at Site 3. The hypothesis of no difference in number of users at the three sites was tested. The chi-square analysis produced a Pearson Coefficient of 420.7 ($df= -1, p < 0.001$) revealing statistically significant differences. Site 3 is by far the most heavily used with an average of 203 users per hour. Site 1 averages 73 users per hour and Site 2 is the least utilized with an average of 40 users per hour. Observations also indicate that Site 3 is the most heavily used site.

Table 3 Site Features

Variable	Site 1	Site 2	Site 3
<u>Convenience</u>			
Distance from residential development	on-site	100 m	on-site
Distance from business district	800 m	100 m	on-site
Distance from food	800 m	100 m	on site
Number of access points	1 (wide)	2 (narrow)	1 (wide)
Distance from public transportation	800 m	120 m	on-site
<u>Comfort</u>			
Protection from the elements	1 building	none	3 buildings
Seating	90 linear m	40 linear m	200-500 linear m
Type of seating	benches, stone walls	benches	benches, flower boxes, chairs
Tables	no brick, crushed stone	no	yes
Walkway surface	stone	asphalt	wood
<u>Safety</u>			
Security	no	no	yes
Lighting	yes	yes	yes
Restricted or blind alleys	no	yes	no
Protection from automobiles	yes	yes	yes
Rail for protection from river	no	yes	yes
Vandalism	no	yes	no
<u>Beauty</u>			
Vegetation	natural	limited landscaping	limited landscaping
View of Manhattan	unobstructed	restricted	unobstructed
Odors	no	no	no
Maintenance	good	poor	good

Table 3 (continued)

Variable	Site 1	Site 2	Site 3
<u>Escape from the urban environment</u>			
Automobiles	no	yes	no
Noise levels	low	low	low
Natural vegetation	yes	no	no
Ability to physically touch the water	yes	no	no
<u>Usefulness</u>			
Trail width	< 5.0 m	> 5.0 m	4.0 - 20.0 m
<u>Shoreline</u>			
Sediment composition	Debris, small-medium rock	bulkhead	pier
<u>Size</u>			
Usable waterfront area	550 m	185 m	195 m

times of the day (morning, afternoon, and evening). Site 1 is second in popularity at all times of the day, and Site 2 the least popular at all times.

Temperatures ranged from 10 – 32° C during field observations. The majority of observations were made when the temperature was between 24 – 30° C, the ideal range for outdoor recreation. During inclement weather, observations showed little if any use of all three sites for recreational purposes. Low use levels stem from the lack of protection from the elements. There are no structures to protect site users from precipitation; therefore, the sites are generally not used at these times. Furthermore there are no amenities to attract users to the sites during precipitation events.

The primary users of all three sites are males. Sixty-eight % of the users of Jersey City's waterfront are male while only 32% are female. Site 3 ranks first among female users (32%) followed by Site 2 (30%) and Site 1 (22%). In testing the hypothesis of no difference between female and male use levels on the waterfront. A chi-square analysis resulted in a coefficient of 7.8 ($df = -1$, $p < 0.01$) revealing stastically significant differences.

The higher number of female users observed at Site 3 can be attributed to the large number of offices near the site. The presence of security and high use levels of this site add to its safety, an important factor influencing female users. Site 1 has the lowest percentage of female users. This can be attributed to the isolation of the site, and its more natural landscape factors that take away from a sense of security.

Table 4 classifies user activities as active or passive. Seventy two percent of all activities observed at Site 1 were classified as active uses the highest in the study. Site 3 was second with 63% of observations being classified as active uses. Observations of

Site 2 indicated the least number of active uses with 24% (Table 3). The hypothesis of no difference between the number of active and passive uses on the waterfront was tested chi-square analysis produced a Pearson Coefficient of 78.1, significant at the 0.01 level ($df = -1, p < 0.01$) revealing significant differences.

Table 4 Percentage of Users Engaged in Recreation on the Jersey City Waterfront

	Active	Passive
Site 1	72	28
Site 2	24	76
Site 3	63	37

The majority of users at Site 2 participate in passive recreational activities. The high percentage of passive users is again the result of the ferry schedule; passive activities represent people “killing time” while waiting for the ferry. The lack of active activities at this site shows reluctance on the part of recreational users not using the ferry system to visit the site. Looking more closely at the specific activities (Table 5) it is clear that the high percentage of passive users is the result of a large number of people using the site for reading, eating, drinking, and socializing. Again this can be attributed to the free time people have as they wait for the ferry. This differs from the other two sites that have higher percentages of users engaged in active recreation such as fishing, walking their pets and pushing children in strollers.

Comparison of total use of the three sites reveal that Site 3 is the most heavily used for both active and passive activities. This is due to the large percentage of people who live and work near the site. Site 1 ranks second in the total number of users and

suggests that people are willing to travel to this more remote area due to the natural amenities it offers. Site 2 is the least used of the sites because it offers little environmental interaction, and fails to capitalize on its waterfront location.

Table 5 Percentage of Users Engaged in Recreation Activity, by Type, on the Jersey City Waterfront

		Site 1	Site 2	Site 3
Active	Walking	23.8	19.6	42
	Bicycling	8.7	10.7	0.4
	Running	5	0	1.7
	Fishing	5	0	8.2
	Stroller	7.7	3.6	14.5
	Pet Walking	19.5	3.6	0
Passive	Board Games	0	0	2.9
	Bird Feeding	1.6	0	0.2
	Reading	0	8.9	3.4
	Socializing	6.6	10.7	6.3
	Viewing	4.9	8.9	12.8
	Homeless	0.8	7.1	0.2
	Eating	7.4	16.1	7.4
	Drinking	9	8.9	0
	Sample Size	221	120	609

The hypothesis that there is no difference in the activities taking place at each of the three sites was tested. Chi-square analysis produced a Pearson Coefficient of 511.5, (df = -1, $p < 0.01$). When comparing the three sites some conclusions can be made about the activities that most commonly occur at them. As illustrated by Table 5, all of the sites in the study had a fairly high number of participants engaging in activities such as running and walking. In addition, variations of these activities such as walking children (strollers) were also observed. Pet walking was not as common due to the need for vegetation. Therefore, only Site 1 showed a high percentage of participants walking pets

(85% of all pet walkers were observed at Site 3). Bicycling is also a common activity on the waterfront with the exception of Site 3, which has a low number of bicyclists. This is likely due to the presence of a large number of people at this site, often a hindrance to bicycles. Fishing is a common activity at Site 1 (12% of all fishing) and Site 3 (88% of all fishing); no one was observed fishing at Site 2. The absence of fishing at Site 2 can be attributed to the lack of access to the river. Fences, bulkheads and distance separate site users from the water therefore fishing, an activity very popular at the other sites, is difficult if not impossible at Site 2.

Table 5 reveals a low percentage of walkers at Site 2 that can be linked to the characteristics of this site. Site 2 is an enclosed site meaning that when walkers reach one end they must turn around to exit the site; there is no sense of continuousness. Furthermore, there has been little done to improve the appearance of the site that would attract walkers to the area. Observations indicate a high percentage of walkers at Site 3. Although 42% of the users were observed walking it should be noted that some of these people may have also used the site for eating, viewing or similar activities prior to or after taking a walk at the site. This is especially true during lunchtime when people who work in the area use the site to take a walk after eating. Although it is possible that some of these users may have been double counted, instances of this have been kept to a minimum by using a video camera during peak hours. Walking is by far the most popular activity occurring on this part of the waterfront.

Site 3 is the only site where people were observed playing board games. The data suggests there is a desire among waterfront users to play board games, however they will not do so unless the proper facilities are provided. Site 3 has several tables with game

board tops; the other sites do not. Therefore, it is logical that Site 3 is the only site where people were observed playing board games.

No observations were made of people walking pets at Site 3. This is likely due to the lack of vegetation at the site. Furthermore the park has a wooden surface with no soil or vegetation for animals to relieve themselves.

The data for Site 3 also indicate that no one was drinking alcoholic beverages on the site. This is due to the heavy use of the site and the presence of security personnel. The consumption of alcoholic beverages is more popular at Site 1 (69% of alcoholic beverage consumption on the waterfront) and Site 2 (31% of all alcoholic beverage consumption on the waterfront), which are more isolated and offer more privacy. In addition these sites do not have full time security personnel stationed at them.

On several occasions homeless people were observed at the sites. These occurrences were most common at Site 1 and Site 2. This is likely a result of the lower number of users at these sites. In addition the isolation of these sites may be a factor encouraging use by homeless people.

Observations of people sitting and viewing the scenery are common at all three sites. Observations revealed that participants use all three sites for eating, especially Site 2. This is most likely due to the large number of commuters visiting the site waiting for the ferry. Although the data reveal that all three sites have similar numbers of viewers, this information may be flawed. As with eating the high number of viewers at Site 2 is also a result of the ferry schedule. Commuters are often forced to wait for the ferry and they frequently use this time to eat, read, socialize, and view the scenery. Bird feeding

and reading are passive recreational activities in which the number of observations varies significantly between the three sites.

Observations at Site 1 indicate that although it may not be the busiest of the sites the largest variety of activities take place here. The exceptions are activities such as reading and board game playing. This can be attributed to the higher wind levels on the site especially at the eastern end that extends further east than the rest of the nearby land formations, and is less sheltered by buildings. Site 1 also provides opportunities for different variations of common activities. Sunbathers often venture very close to the water, and fishermen and crabbers can often be observed standing in the water.

The lack of natural features such as vegetation and animals at Site 2 has an effect on the activities that occur there. No observations were made of anyone fishing or bird feeding. The lack of these activities is a good indicator that waterfront users do not associate Site 2 with nature. Users of Site 2 participate primarily in passive recreation due to the isolation of the site from more linear waterfront areas.

Site 3 is by far the most popular site in the study largely due to one factor, convenience. The site is located in close proximity to a large number of corporations and restaurants. Site 3 experiences peak use during afternoon and early evening hours. It is no coincidence that this is also the time when the restaurants are busiest, and large numbers of employees are in the area. However Site 3 is not just a favorite with those who work in the area. Observations show that fishing and other activities such as bicycling are taking place during peak periods as well. This can be summed up in a statement made by Whyte based on a 1979 study of social interaction in public spaces: "people attract people." The presence of large numbers of people throughout the day adds

to the feelings of security and safety at the site. There is little presence of "undesirables" at the site. The sense of security associated with this site is also exhibited in the higher than average number of female users it attracts.

5.3 Interview Results

Thirty-five respondents were asked to list all of the outdoor recreation activities they most commonly participate in both on and off the waterfront. The top ten responses are presented in Table 6.

Table 6 Top 10 Outdoor Recreation Activities Reported by Interview Respondents

Activity	# of Responses	% of Responses
Eating	18	51
Sidewalk Shop	16	46
Walking	15	43
Sunbathing	14	40
Reading	11	31
Walk Pet	10	29
Running	9	26
Bicycling	8	23
Fishing	8	23
Court Games	7	20

The data obtained through the interview process indicate that eating is the most popular outdoor recreation activity with 58% of respondents indicating they like to dine outdoors. Eating (a passive activity) is followed by sidewalk shopping, and walking, both of which are forms of active recreation. Sunbathing is the fourth most common activity with 45% of the respondents indicating that this is an activity they participate in. The remainder of the list is active recreation activities.

Survey respondents were asked to rate access, vegetation, and view of New York City for perceived importance at Jersey City waterfront sites. Interview data indicate that an unobstructed view of New York City is the most important feature to waterfront users, and pleasing vegetation is the least important attribute (Figure 7). Site 2 lacks in both views of New York City and access, features that interview data reveal to be in high demand among users. Thus as observations have shown there is less use of Site 2 than the other two sites.

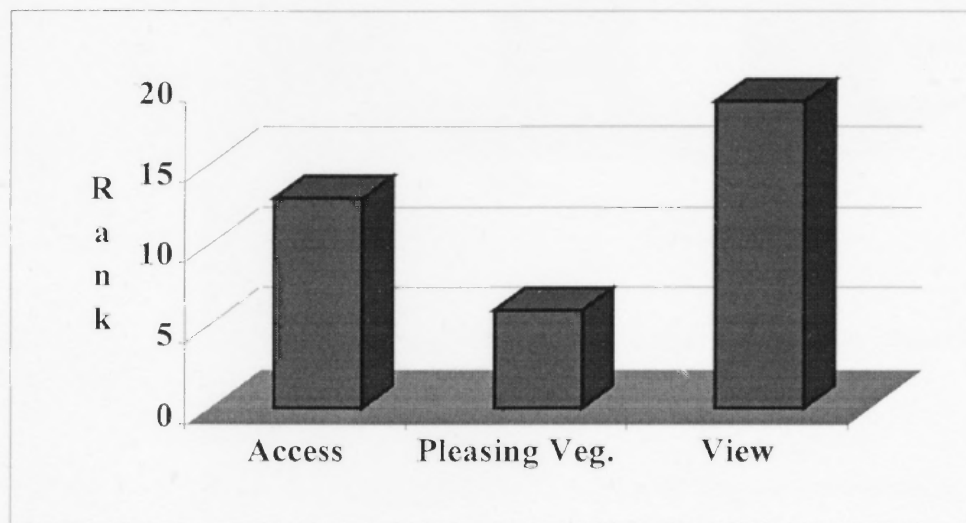


Figure 7 Rankings of Important Features of the Jersey City Waterfront From Interview Responses

Data obtained in interviews about the importance of site features is similar to that obtained through field observations. View (of New York City) and Access received very high scores. Field observations revealed that sites that offer an unobstructed view of New York City, and are easy to access, have greater use levels.

The following Figures (8-12) illustrate user rankings of site attributes. The numbers on the y-axis represent the overall score for the site in each category. All three

sites appear to have comparable noise levels (Figure 8). This is due to the close proximity of the sites to one another. However notice that Site 2 is rated lower in this category due to the ferry noise and the noise from automobiles in the adjacent parking lot.

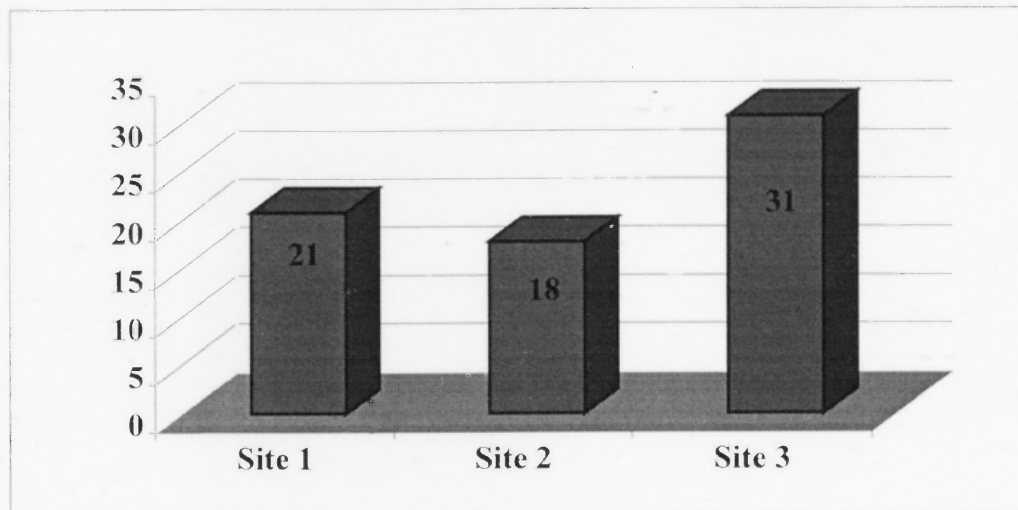


Figure 8 Rankings of Noise Level at Each Site on the Jersey City Waterfront from Survey Responses

Despite the significant differences in the type of vegetation between Site 1 and Site 3 they have similar approval ratings in this category (Figure 9). These data suggest that people are willing to accept both natural-looking and landscaped vegetation. The high score Site 1 received for vegetation is significant because it shows approval for natural looking vegetation. The low score of Site 2 in this category suggests that people do not approve of simple landscaping.

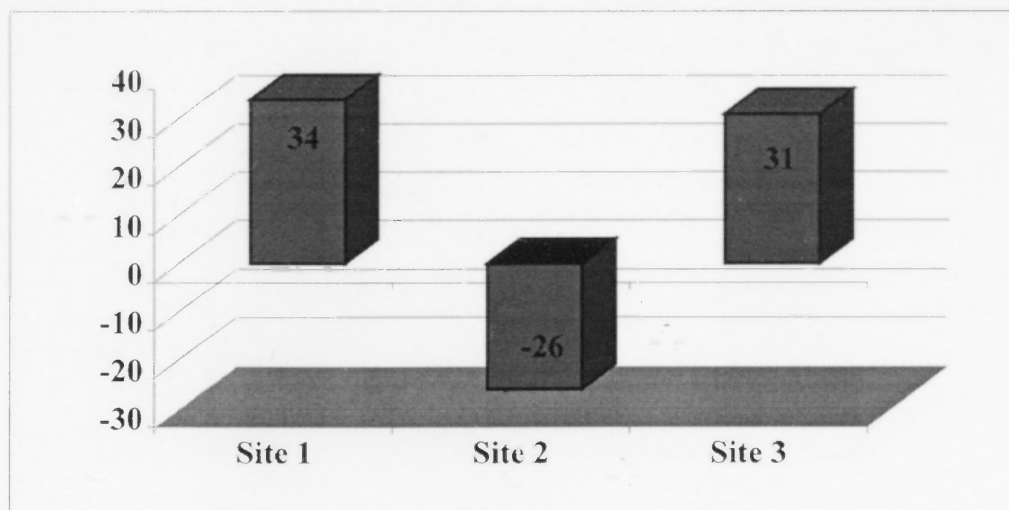


Figure 9 Rankings of Aesthetically Pleasing Vegetation at Each Site on the Jersey City Waterfront from Survey Responses

Site 1 and Site 3 are again similar in the maintenance category (Figure 10). Site 2 has a negative ranking in this category. Again this can be attributed to the site's weathered appearance. It is also worthy to note that Site 1 received a high score for maintenance despite its natural appearance, which can result in an area being perceived as un-maintained (Gold, 1980). The low use levels at Site 2 can be attributed to the lack of maintenance. Users perceived the site to be unmaintained and observation has shown that they avoid it.

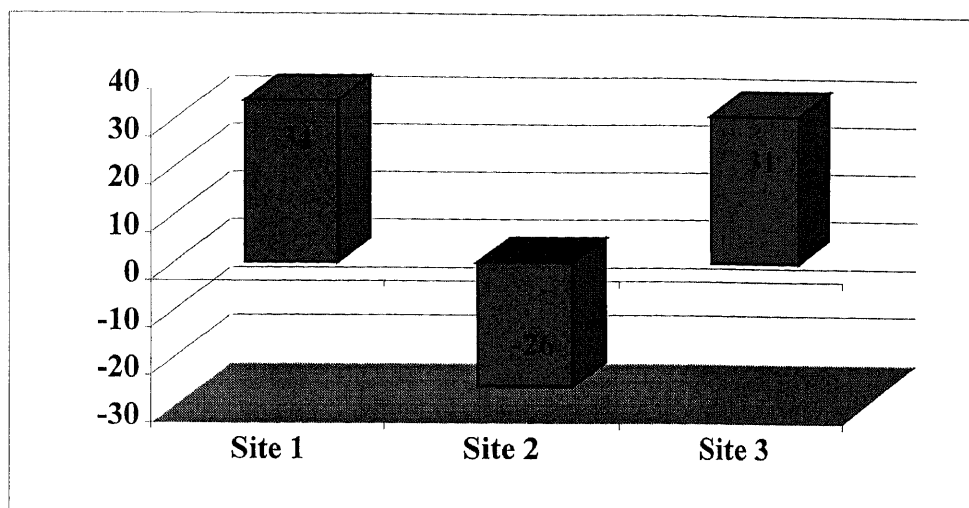


Figure 9 Rankings of Aesthetically Pleasing Vegetation at Each Site on the Jersey City Waterfront from Survey Responses

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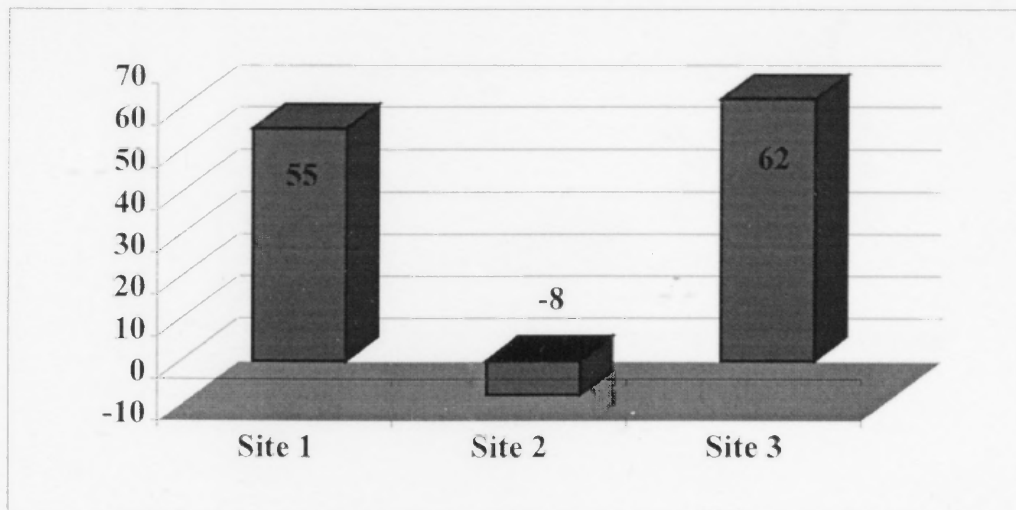


Figure 10 Rankings of Maintenance at Each Site on the Jersey City Waterfront from Interview Responses

Site 3 is perceived as being the easiest to access and is the closest to the business district (Figure 11). Site 2 is perceived as the second easiest site to access in the study but has received a significantly lower score than Site 1. This is due to the fence that surrounds the site and the lack of visual access to the narrow entrances. Site 3 received the lowest score in this category because it is the furthest away from the business district. Furthermore the site can not be seen from the business district significantly reducing scores in this category.

Up to this point Site 1 and Site 3 have received similar scores from waterfront users. As field observations have shown the sites have significantly different use levels. (221 users at Site 1 compared to 609 users at Site 3). Access can then be said to be a contributing factor to the differences in use levels between the sites.

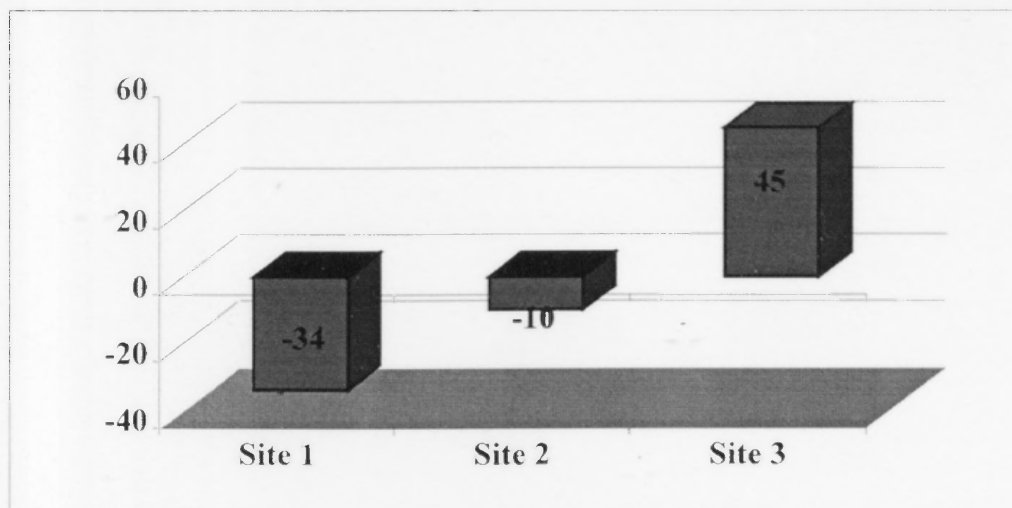


Figure 11 Rankings of Access at Each Site on the Jersey City Waterfront from Survey Responses

Site 3 received significantly higher scores for safety than the other two sites (Figure 12). The many people who use the site provide safety in numbers. A full time security official at the site during peak hours significantly adds to user perception of safety. Users gave Site 1 and Site 2 lower rankings in this category likely due to the isolation of these sites. Site 1 was also ranked low due to the lack of a fence or rail separating users from the river. Site 2 received the lowest score in this category due to the layout of the site. A fence surrounds users on three sides where users can easily feel cornered. Furthermore it is difficult to see the southern end of the site from the ferry dock creating a feeling of isolation. Lastly there have been observations of “undesirables” at this site, making users feel unsafe.

Actual use levels follow the same pattern as data on safety. Site 3, the most heavily used, received the highest score for safety. Site 1, the second most popular site, also ranked second in safety and Site 2, the least utilized site, ranked the lowest for safety.

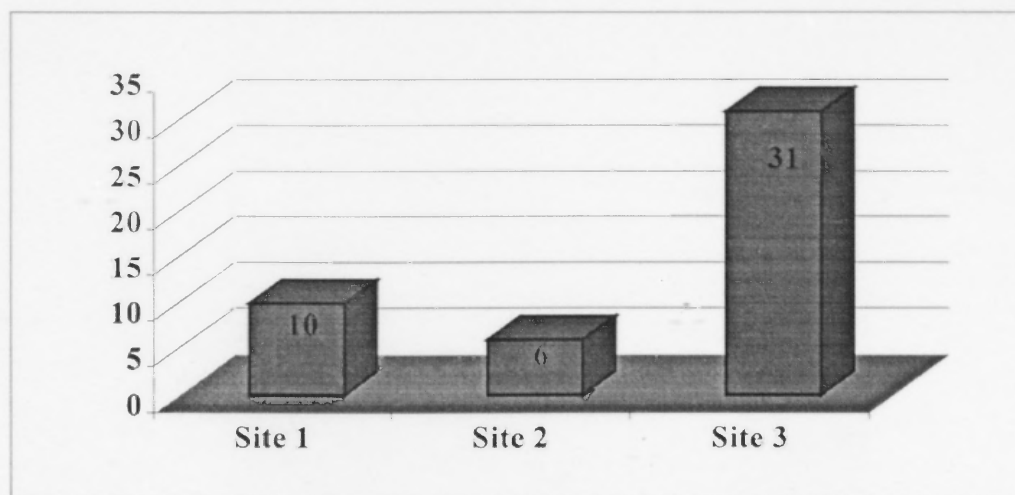


Figure 12 Rankings of User Perceptions of Safety at Each Site on the Jersey City Waterfront from Interview Responses

Figure 13 reveals user perceptions of crowding. A high score in this category means that users feel the site is normally too crowded. However the scores in this category are somewhat out of proportion with the actual use levels. The score for Site 2 is especially low, meaning that waterfront users perceive the site to be even less popular than it actually is. This is likely a result of physical layout. Site 2 is a long narrow site and some parts of it are difficult to see. Users on the site are often found sitting at benches that are lined up parallel to the shore. This may make the site appear to be less crowded than clusters of people would.

The scores received by Site 1 and Site 3 are very similar in terms of crowding despite the large differences in their actual use levels. This is likely due to the features of Site 1. This site offers users a number of different seating arrangements facing in different directions; a factor that helps the site to appear less crowded. In addition there

are flower boxes that also conceal areas of the site, thus making it feel less crowded than it actually is.

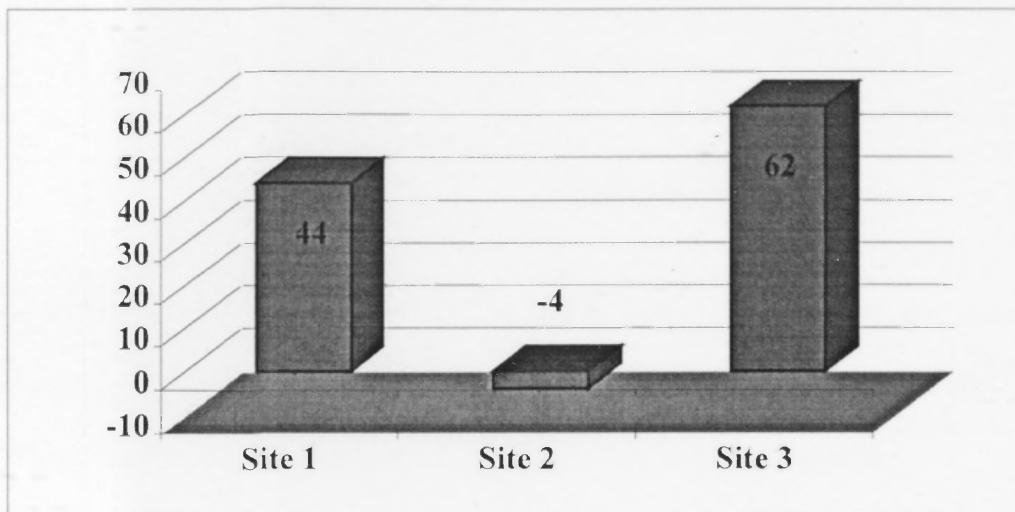


Figure 13 Rankings of Crowding at Each Site on the Jersey City Waterfront from Interview Responses

5.4 Comparison of Field Observations and Interview Data

There is an uncommon similarity between the activities which people normally participate in and what was observed on the waterfront. The table below lists the outdoor recreation activities that have been determined to be most popular. The observed column lists the activities determined to be most popular in field observations of waterfront users. The stated column lists the outdoor recreation activities interviewees indicated they participate in both on and off the waterfront.

Table 7 Six Recreation Activities Most Frequently Observed Occurring on the Jersey City Waterfront and Most Frequently Stated by Interview Respondents

Observed	Stated
1. Walking	1. Eating
2. Eating	2. Sidewalk Shopping
3. Viewing	3. Walking
4. Stroller	4. Reading
5. Pet walking	5. Running
6. Fishing	6. Pet Walking

Walking and eating are in the top three of both lists and are the most popular activities both stated and observed (Table 7). In addition similar activities such as running, bicycling, and pet walking have also proven to be very popular.

Sidewalk shopping was the second most popular recreational activity with survey respondents, however there were no observations of shoppers on the waterfront. This is because there are no opportunities for outdoor shopping on the waterfront. This is a feature waterfront developers may want to incorporate in future plans. It is important to note that although eating was the third most common activity observed on the waterfront this was in the form of brown bag meals. At the present time the study area offers no restaurants with patio dining.

Interview results also show running to be a popular recreation activity, but this is not supported by field observations. This is likely due to the lack of continuousness between the waterfront sites. Running requires linear areas that do not currently exist. Since the demand exists for activities such as running, future development should be aimed at linking the parks and creating a linear waterfront.

Looking at both lists it is obvious that there is little demand for, or participation in water-related or water-dependent activities. This is surprising considering the study area

is a waterfront. It seems that the draw of the Jersey City waterfront is the view it offers rather than the water itself.

The three sites chosen for purposes of this study have proven to be quite different in not only their physical characteristics, but in the activities they support. The data shows that there is little demand for areas such as Site 2 that do not offer any interaction with the river. Furthermore it is apparent from the lack of users that people have come to expect more of a recreation area than just asphalt and a few benches. I ask the question, would the Jersey Shore be as popular if the shoreline resembled Site 2?

Site 3 is the most popular area in the study mainly because it is convenient to a large number of people. However the activities supported by this site are few. There is a lack of active recreation such as bicycling and running. It is likely that people would use an increasingly large area of the waterfront and a wider variety of activities would take place if other desirable sites were interconnected with this park. This would not only ease congestion at Site 3 but it would also attract more users to the waterfront.

CHAPTER 6

DISCUSSION AND CONCLUSIONS

Although all three sites are in compliance with the Design Standards established by the Hudson River Waterfront Walkway Commission, users seem to be drawn to Sites 1 and 3 because of certain features. The features that attract users to these sites are similar to those most important in other waterfront studies.

One of these features is the view the Jersey City waterfront affords site users. Interview results confirm that this is a high priority among waterfront users, which is similar to the conclusions of studies of other recreational spaces. Areas must take advantage of their unique surroundings and draw their identities from them (Searns 1995). Interview results from Jersey City reveal that an unrestricted view of Manhattan is a very important feature to waterfront users. New York City is one of the most famous places in the world, and the Jersey City waterfront offers a spectacular view of this area. Future waterfront areas should be designed to accommodate viewing of the city from as many observer positions as possible. The results from Jersey City show that the waterfront derives most of its identity from its unique surroundings (New York City).

Attractive vegetation also ranks high among users and affects use levels in Jersey City. This supports the existing literature such as Whyte (1979), Gold (1980), and Ryan (1993). The high scores received by Site 1 for visually pleasing vegetation confirm that people do regard natural areas favorably. Natural spaces will not only add to the respect for the river it will provide Jersey City residents a much needed escape from the urban

environment in which they live. A paradigm shift is slowly occurring in which people are beginning to regard the Hudson River as a part of nature (Ryan 1993). Thus environmental quality and respect for nature are likely to become more important to Jersey City residents.

Access is an important factor in site usage. Sites 1 and 2 have significantly lower use levels than Site 3, a large part of which is due to a lack of access, or disconnectedness. Users of the Jersey City waterfront have shown a reluctance to seek out isolated sites. By creating linear areas access is improved and sites which presently seem isolated will become more associated with the waterfront. The linear potential of the Jersey City waterfront is tremendous, however at the present time that is just what it is, potential. The popularity of activities such as walking, running, and bicycling highlights the need to connect sites along the Hudson River. Linear areas enhance these activities and establish the waterfront as a waterfront rather than a random set of unrelated parks. It is expected that linear portions of waterfront will become even more important as Hoboken and Bayonne complete their sections of the waterfront walkway. Similar conclusions have been made in other studies of waterfronts such as Searns (1995) and Ryan (1993). Sites need to be connected (Eckstut 1986; and Gordon 1996). One way to make recreation areas more versatile is to make them more linear (Searns 1995). A second is to make the usable areas as wide as possible (Ryan 1993). The provision of the right amenities such as seating and tables also adds to the usability of sites (Gold 1980). Since the Jersey City waterfront has the potential to serve such a large population these factors should all be incorporated in future development efforts. Safety and public perceptions will be improved by connecting waterfront sites that are currently separated

by vacant lots, barbed wire fences, and debris fields (Gordon 1996). For many years the Hudson River was used to connect New York and New Jersey with the Great Lakes, now its waterfront is fragmented. For the waterfront to achieve its full potential, sites need to be connected. Not only will this make the area more visually appealing it will also make it more functional.

The activities taking place in Jersey City are similar to those taking place in other waterfront areas. The Jersey City waterfront has the potential to be a linear area where active recreation is common. Observations revealed high numbers using the waterfront for viewing and brown bag dining. These activities have been observed at other waterfronts as well (Jordan 1996). However Jersey City's waterfront differs from other waterfronts because there are no opportunities for shopping or outdoor dining. These are popular activities at other waterfronts even as close as Hoboken, Jersey City's neighbor to the north (DePalma et al. 1996).

Another important feature is the ability of users to escape from the urban environment. What waterfront users are trying to escape are automobiles and paved areas. Natural areas or areas that provide a more unique experience are in demand. Jersey City waterfront users have shown a preference for sites that provide an escape from the urban environment. This supports Gordon (1996) who looked at buffer zones between urban environments and recreation areas and found that sites that create a feeling of escape from urban areas tend to be most popular.

Results also indicate that there is little demand for water-dependent or water-related uses of the waterfront with the exception of fishing. Therefore future development need not include major provisions for interaction with the river. This does

not mean that waterfront use levels are unrelated to the river. Floyd (1997) found that river use is a function of surroundings and users will adapt their activities to make them possible in the current surroundings. The fact that there are few water-related activities taking place in Jersey City with the exception of fishing confirms the fact that there is little demand for these activities. This is also supported by interview results that reveal little demand for water-related activities.

Sense of security plays a large role in waterfront use levels. Two of the sites in this study have features that make users feel unsafe. Evidence for this can be found in the low number of female users and the concerns expressed in interviews with Jersey City residents. Future waterfront recreation areas should provide users with the features that influence security levels. These features include linear areas, adequate lighting, openness, and patrols by security or law enforcement personnel. By enhancing user sense of security at waterfront sites the numbers of users will increase, and more female users will come to the waterfront.

Like other urban waterfronts such as Columbia, SC, San Antonio, TX, and Cleveland, OH this study has shown that walking, eating, and viewing are the most popular recreation activities on the Jersey City waterfront (Jordan 1997). The activities most in demand as determined through the interview process are the same, however there is a high demand for sidewalk shopping. Since eating and sidewalk shopping are in such great demand on the waterfront, future developments should make provisions for these activities. Areas that allow waterfront users to dine and shop are needed on the waterfront. What this essentially represents is a tie between the built environment (stores

and restaurants) and the recreation areas. This is similar to what is being done at other waterfronts as close as Hoboken, New Jersey (DePalma et al. 1996).

Results also indicate that different types of sites can be successful in close proximity to one another. Site 1 and Site 3 offer users completely different environments, yet there is no reason they can not be linked to one another and visited by the same population. In fact the two sites compliment one another by allowing the waterfront to provide a varied experience that could not be accomplished by a single site.

The purpose of this study is not to determine a single type of site that should be encouraged in the future. Rather these results indicate features that promote or discourage waterfront activity. As the success of Sites 1 and 3 have shown there is a demand for both natural areas and more developed areas, provided they support the activities that Jersey City residents participate in during their leisure time. Data, such as presented here are necessary if the limited waterfront area in Jersey City is to satisfy the recreation needs of the large population that lives and works in close proximity to the waterfront.

Presently the view of New York City afforded to Jersey City waterfront users is such a strong influence that other amenities such as the opportunities for such as water dependent use have not achieved their full potential. It is expected that as the waterfront is transformed it will develop an identity that is rooted in the culture and tradition of Jersey City. However waterfront planners need to be careful about what this identity will be. Ultimately the identity of the waterfront will be shaped by those who use it. In Jersey City there are two distinct demographic groups of waterfront users. The mid to upper class people who live and work in Jersey City, and indigenous residents.

Waterfront planners must be careful not to exclude either of these two groups in developing waterfront opportunities for recreation nor restrict access through perceived class ownership of physical spaces. To ensure the waterfront appeals to all populations linked nodes can be utilized. Nodes include small parks, playgrounds, picnic grounds, and natural areas. Connectivity between the sites will allow users to access the sites they desire no matter what their origin. Expected transportation improvements such as the Light Rail Transit (LRT) system proposed for Jersey City would also improve access and add to the importance of the river. This research documents that significantly different areas (Site 1 and Site 3) can exist simultaneously. Nodes would help to ensure the waterfront offered areas desired by different groups of waterfront users. Perceptions of waterfront focus on improved land and water quality will eventually increase demand for water-related recreation use. This current redevelopment should allow for increased diversity of recreation use in the future. Obstructions to access should allow for entry (gates) or less permanent structures.

It is expected that Jersey City residents will become more aware of what the waterfront has to offer and recreational use will increase. Increased demand may affect the types of activities in demand on the waterfront. As people become more familiar with the river demand the demand for water related activities is likely to increase. A waterfront comprised of a series of diverse areas has the best chance of supporting a wide range of users and uses and is encouraged. Eventually the Jersey City waterfront will be known for more than just the view it affords of New York City.

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APPENDIX B

INTERVIEW QUESTIONS

The goal of this survey is to measure preferences for recreation activities and site preferences for use in evaluating the Jersey City riverfront.

General Questions

(Recreational Interests)

1. In my leisure time I participate in the following activities.

- | | |
|---|--|
| <input type="checkbox"/> Walking
<input type="checkbox"/> Running
<input type="checkbox"/> In-Line Skating
<input type="checkbox"/> Skateboarding
<input type="checkbox"/> Bicycling
<input type="checkbox"/> Walking Pet
<input type="checkbox"/> Fishing
<input type="checkbox"/> Crabbing
<input type="checkbox"/> Boating (motorized)
<input type="checkbox"/> Boating (non-motorized)
<input type="checkbox"/> Field games
<input type="checkbox"/> Court Games
<input type="checkbox"/> Catch | <input type="checkbox"/> Exercise (Aerobics, Stretching etc.)
<input type="checkbox"/> Recreational Equipment (children)
<input type="checkbox"/> Sidewalk Shopping
<input type="checkbox"/> Cultural Festivals
<input type="checkbox"/> Outdoor Eating/Drinking
<input type="checkbox"/> Outdoor Theater
<input type="checkbox"/> Gathering
<input type="checkbox"/> Sunbathing
<input type="checkbox"/> Boat/River Watching
<input type="checkbox"/> Chess/Board Game Playing
<input type="checkbox"/> Nature Watching
<input type="checkbox"/> Card/Dice Playing
<input type="checkbox"/> Reading |
|---|--|

Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
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(Waterfront Qualities)

2. It is important to have unrestricted (no fence or railing) access to the shoreline.

1 2 3 4 5

3. It is important for a site to have aesthetically pleasing vegetation.

1 2 3 4 5

4. It is important for a site to offer an unobstructed view of Manhattan.

1 2 3 4 5

Site Specific Questions

Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
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(User Perceptions)

5. The normal noise level at site ___ is acceptable.

S1	1	2	3	4	5
S2	1	2	3	4	5
S3	1	2	3	4	5

6. The vegetation at site ___ is aesthetically pleasing.

S1	1	2	3	4	5
S2	1	2	3	4	5
S3	1	2	3	4	5

7. Site ___ is well maintained.

S1	1	2	3	4	5
S2	1	2	3	4	5
S3	1	2	3	4	5

8. Site ___ is isolated from other waterfront areas.

S1	1	2	3	4	5
S2	1	2	3	4	5
S3	1	2	3	4	5

9. When using site ___ I feel safe from personal harm.

S1	1	2	3	4	5
S2	1	2	3	4	5
S3	1	2	3	4	5

10. Site ___ is normally to crowded.

S1	1	2	3	4	5
S2	1	2	3	4	5
S3	1	2	3	4	5

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