A STUDY OF USE PATTERNS, USER SATISFACTION AND WILLINGNESS TO PAY FOR OFF-LEASH DOG PARKS: POST-OCCUPANCY EVALUATIONS OF FOUR DOG PARKS IN TEXAS AND FLORIDA

A Dissertation

by

HYUNG-SOOK LEE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2007

Major Subject: Urban and Regional Science

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ABSTRACT

A Study of Use Patterns, User Satisfaction and Willingness to Pay for Off-Leash Dog Parks: Post-Occupancy Evaluations of Four Dog Parks in Texas and Florida. (August 2007)

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The growing importance of dogs in people's lives and in high-density urban environments has increased demand for a place where people and their dogs can interact and exercise together. The recent increase in the number of dog parks across the country is evidence of these demands of dog owners and their companions. However, due to the absence of empirical study on dog parks and their attribute of non-market values, the benefits of dog parks are often underestimated and considered less in the decision making process regarding resource allocation.

A post-occupancy evaluation at four dog parks was conducted to investigate use patterns of dog parks and user activities, to identify user preferences and the environmental factors influencing activities, to provide insights and guidelines in developing effective dog parks, and to estimate users' willingness to pay for dog parks using contingent valuation method. A multiple-method approach was used to collect data including site observations and analysis, a questionnaire and behavioral mapping. The results indicated that dog parks received considerable use, served a variety of demographic groups and supported their exercise and social activities. Dog-park users were generally satisfied with dog parks but they expressed various preferences and needs. It is evident that dog parks are not only a place for dogs to exercise but a place for people to exercise, socialize, relax and enjoy greenery just like other parks. Proximity of dog parks was found to be a critical

factor in encouraging frequent dog park use and satisfying users' needs. Over eighty percent of survey respondents expressed that they were willing to pay an annual fee for dog parks, indicating the importance of visiting dog parks as outdoor recreation. Conservative estimate of average willingness to pay was $56.17/ household/ year. Satisfaction with maintenance and facilities, income, education and family size were found to be significantly associated with willingness to pay. These results could assist local governments and park planners in estimating aggregate monetary value of the dog parks and cost-benefit analysis to justify the development and maintenance of dog parks. Design guidelines and recommendations were generated based on the empirical findings for future design of dog parks.

DEDICATION

To my mother and to the memory of my father

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CHAPTER I

INTRODUCTION

1. BACKGROUND

The relationship between humans and dogs has evolved throughout history and canines have played a key role in human life. In modern society, the most common reason for owning pets is for companionship, with dogs playing a role as a family member, helper, and healer (Wilson and Turner, 1998). A considerable body of research has been conducted on the relationship between humans and animals, which shows evidence of the benefits of animal companionship upon the health of their owners, in terms of physical, psychological, physiological and psychosocial aspects (Beck and Meyers, 1996). Owning pets has always been popular in the US and it is becoming even more popular over time (Fig. 1). Given the most recent demographic changes, in particular the aging of the population (Hayward and Zhang, 2001) and increasing incidence of people living alone (U.S. Census Bureau News, 2005), there have been significant increases in dog ownership. According to a 2005 survey by the American Pet Products Manufacturers Association [APPMA] (2005), there are approximately 73.9 million owned dogs in the United States and more than forty percent of US households (43.5 million) own at least one dog. In addition to the popularity of dog ownership, the bond between dogs and people grows stronger. A survey of 1,238 pet owners, conducted by the American Animal Hospital Association [AAHA] (2004), reveals that ninety-two percent of pet owners consider their pet like a child or family member, and ninety-four percent take their pet for regular veterinary checkups to ensure their pet's quality of life. However, the needs of dogs and their owners are being increasingly compromised by high-density urban settings,

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This dissertation follows the style of Landscape and Urban Planning.

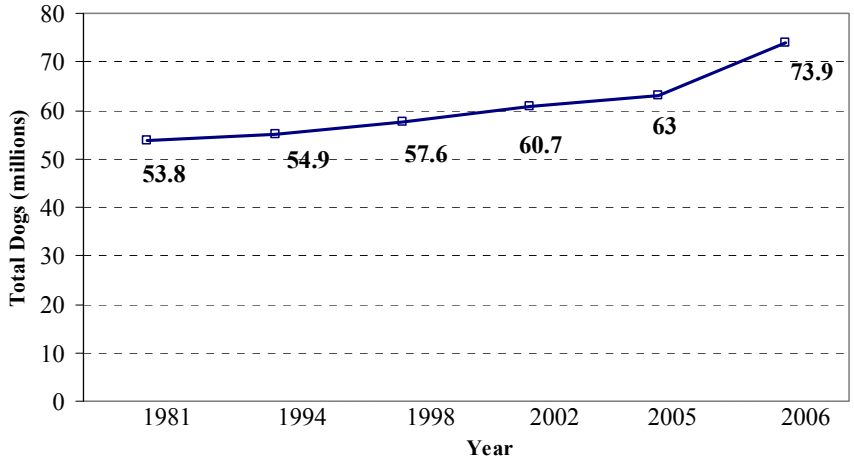


Fig. 1. Dog population historical data (Pet Food Institute, 2006).

environmental concerns, and government legislation. Still, many present park regulations and ordinances limit the number of dogs in parks by requiring the use of *leashes*, and sometimes access to public open space for dogs is totally banned, provoked by concerns such as risk, noise, and complaint of other park users. For dogs, access to a park close to home is the safest and most effective way to provide appropriate exercise, to reduce boredom and built-up energy at home, and to give opportunities to socialize with other dogs. Also, walking dogs to a park and interacting with them provides people more physical activity and are aspects of responsible pet ownership. In this respect, off-leash dog areas not only benefit the dog and its owner, but also neighbors, other park users and the community as a whole. Presently, incorporating dog ownership in the urban environment is becoming an important social issue, and satisfying the demands of dog owners is important in terms of public health.

Dog owners have recently become more vocal and organized against these restrictions, requesting areas where people and dogs can exercise and socialize. In response, public or private dog parks are growing at an amazing rate around the country. There are approximately

700 off-leash dog parks in the US and many park districts are considering developing a dog park (Burkett, 2006). Most of the present dog parks are fenced-in where owners can let their dogs run loose within an enclosed area, either separate from other parks or stand-alone. The off leash area provides ample space for interaction, exercise, and play, thus catering to both physical and social needs for dogs and their owners. Many successful dog parks have been introduced through magazines and their stories have been shared among dog owner groups throughout the U.S. These dog parks are appreciated for integrating the needs of pets, pet owners and non-pet owners, and for promoting a sense of community. It is believed that a dog park is a positive addition to the community, and making dog parks a priority creates positive community spirit (Bourbeau, 1998). In this respect, a community that provides a dog-friendly environment would become more appealing to many people, and a dog park should be an important amenity of a community, playing a role as a significant factor for choosing a community.

Despite expanding demands for off-leash recreation areas throughout the nation, the benefits of dog parks and public perception about dog parks have not been studied. Few research publications are available relating to the value of dog parks, users' needs, and satisfaction. From the viewpoint of park planning and design, the lack of empirical evaluation and guidelines regarding the creation of dog parks leaves dog park design to rely on designers' intuition or personal experience. In addition, the absence of evidence-based research and a well-developed knowledge base make it difficult to convince local governments or private developers of how important and beneficial creating dog parks are to a community.

From an economic standpoint, the benefits of dog parks due to their non-market attributes have never been subjected to economic valuation. Dog parks and other recreational resources, such as forests, parks, and greenways, do not have a market price and are not ready

to be converted into monetary values. Consequently, the benefits of dog parks are often underestimated in the decision making process regarding resource allocation. Cost is one of the primary obstacles to establishing a dog park in a community. Therefore, demonstrating that the benefits of dog parks are greater than the costs is one basis for fund raising and lobbying local governments and private corporations.

2. RESEARCH OBJECTIVES

The primary objectives of this research were to provide insights and guidelines in developing effective dog parks through post occupancy evaluation, and to assess recreational value generated by dog parks using contingent valuation method. Specifically, post occupation evaluation was conducted to determine how dog parks are used, how much dog-park users are satisfied with dog parks, and how physical environments of dog parks support users' activities. In addition, contingent valuation method was used to calculate the monetary value and benefits of dog parks. To this ends, one dog park in Florida and three dog parks in Texas were evaluated and surveys were conducted to investigate how residents value their dog parks.

Harmony Dog Park in Florida was designed in 2001 as part of the 27-acre lakeshore community park. The overall purpose of the park project was to promote physical and psychological health as well as the social and spiritual well-being of the Harmony residents by providing a place for them to contact and to experience nature. Among other objectives, the specific objectives of the dog park were 1) to promote social interactions among the residents of the community by providing opportunities for various outdoor recreational and social activities, and 2) to provide for interactions between people and domestic animals in such a manner that promotes the health benefits of these interactions and responsible pet ownership within the community. Opened in 2003, the Harmony dog park is now recognized as the first dog park incorporated into the master plan of a new community ("Award", 2003). One of the

purposes of this research was to investigate whether the initial design intentions were effectively executed by conducting post-occupancy evaluation. A design evaluation would provide the Harmony community and the designer with useful information about how the park functions and how community residents value the park. Also, as the first dog park planned in the community development phase, its success and positive evaluation by residents may inspire other communities to create their own community dog parks. In order to collect more extensive data and to compare general preference and perception about dog parks, three dog parks in Texas were also evaluated through post-occupancy evaluation. More detailed descriptions of the research sites were discussed in Chapter III.

The specific research goals are;

1. To determine the demographic characteristics of dog-park users and their use patterns.
2. To identify user preference, satisfaction, and constraints to use dog parks in order to evaluate the performance, efficiency, and functionality of dog parks.
3. To identify design features and characteristics that encourage users to be more physically active at dog parks and engage in social interaction.
4. To evaluate whether Harmony Dog Park achieved its main design goals: (1) to support social interactions among residents and between people and dogs, and (2) to promote health benefits of these interactions. All participants in this study were asked whether they generally perceive the benefits of dog parks to people and community.
5. To demonstrate the application of the Contingent Valuation Method (CVM) in assessing the value associated with dog parks, and see how the total economic value for the park is affected by an array of factors, including the respondents' socio-economic factors and proximity to the park.
6. To provide design guidelines and recommendations based on the empirical findings for

future design of dog parks.

3. HYPOTHESES

The followings are the hypotheses to be tested in this study;

H1. Distance to a dog park is negatively related with frequency and user satisfaction.

H2. Distance is negatively related with perception of dog park benefits. People who live closer to a dog park perceive more benefits of dog parks than those who live farther away. In particular, people who walk to dog parks perceive health benefits of dog parks more than who drive to dog parks.

H3. Frequency of dog park visit is positively related with perception of health benefits of people.

H4. Satisfaction with dog parks (i.e., features, safety, and maintenance) is positively related to satisfaction with the community.

H5. Willingness to pay is positively associated with frequency of dog park visit and satisfaction level, but negatively related to travel time.

H6. Willingness to pay is positively associated with income and education level, but negatively related with number of people in family.

4. SIGNIFICANCE OF THE RESEARCH

Given the lack of empirical research on dog parks, basic information about use and users of dog parks can contribute to the knowledge base needed to develop community dog parks. Knowledge of the number and types of users and their spatial and temporal patterns of dog park use can also help in the design of more effective dog parks and assist in making decisions about planning, management and marketing of a community.

Cooper Marcus and Francis (1998) emphasized the benefits of Post Occupancy Evaluation (POE), stating that “it is very rare for design team or their clients to return to the site after a year or two of use to conduct a systematic, objective evaluation. If this kind of feed-

forward was routinely undertaken, individual designers and clients would learn from their mistakes and success, and – if published – the whole design community would benefit." By identifying and solving problems of the parks, POE studies will provide the communities with information about the effectiveness of the parks. In this regard, the POE study at Harmony Dog Park will be an opportunity to test whether the park is being used as effectively as intended.

Another significance of this research is that it is the first application of Contingent Valuation Method to dog parks. A study on translating intangible and indirect benefits of dog parks into monetary terms would be useful for park users, developers and policy makers, in terms of better understanding their contributions and justifying resources for their provision and upkeep. Assessing the economic value of dog parks would provide an evidence of the current demand for dog parks and would help rationalize the local decision making process.

In addition, design guidelines and recommendations based on the post-occupancy evaluation will provide useful and practical information for the planning and design of new dog parks, and evaluate the effectiveness of existing dog parks.

5. DEFINITIONS

The following terms were defined as used in this study:

Contingent Valuation Method (CVM): Contingent valuation method is an approach that employs a hypothetical scenario to identify the monetary value of goods and services similar to actual markets if they existed (Loomis & Walsh, 1997). The objective of CVM is to obtain the respondents' consumer surplus for the amenity – the maximum amount the good is worth to the respondent before he or she would prefer to go without it.

Off-leash Dog Park: A dog park is a place set aside, typically a fenced area, where off-leashed dogs and their owners can safely play and socialize with each other. Often these areas are managed by users, in conjunction with city officials.

Post Occupancy Evaluation (POE): A process of systematically evaluating the performance of built environments after they have been built and occupied for some time. POEs differ from other evaluations of building performance in that it focuses on the requirements of building occupants, including health, safety, security, functionality and efficiency, psychological comfort, aesthetic quality, and satisfaction (Federal Facilities Council, 2002)

Total Recreation Benefits: Total recreation benefits are defined as the sum of the maximum amount individuals are willing to pay to engage in a recreation activity, rather than forego it (Walsh, 1986).

Willingness To Pay (WTP): Willingness to pay is the monetary value of dog parks and it presents a straightforward measure of the economic value of individual recreation benefits.

6. OUTLINE OF THE DISSERTATION

The remainder of the dissertation is organized as follows: A comprehensive review of relevant literature is presented in Chapter II. In the first part of the literature review, benefits of dog companionship are discussed. The second part reviews off-leash dog parks, especially their benefits and issues. Following the review of Post Occupancy Evaluation, as a recreation resources valuation method, Contingent Valuation Method is introduced. The purpose of the review is to understand the basic methodology and identify determinants of willingness to pay. Previous empirical researches, whose subjects are recreational activities or resources, are also reviewed. The methodology and procedures utilized in accomplishing this study are illustrated in Chapter III. The location and description of the study area is discussed as are the sampling, methodologies and analyses techniques used. The results of site observations, and questionnaire surveys, as well as the application of contingent valuation are revealed in Chapter IV. Chapter V discusses the conclusions and suggestions for future research, and includes design guidelines and recommendations for future design of dog parks.

CHAPTER II

LITERATURE REVIEW

This chapter discusses a comprehensive review of relevant literature for this study. In the first part of the literature review, benefits of canine companionship in terms of physical, psychological, and social aspects are discussed. The Second part focuses on off-leash dog parks, reviewing the literatures regarding current demands, benefits, and issues. The benefits of dog parks to dogs, dog owners, and community are each considered. The third part is concerned with Post Occupancy Evaluation. The importance of POE studies and methodologies are introduced. In the final part of the literature review, valuation of recreational amenities and valuation methods, especially, Contingent Valuation Method are introduced. The purpose of this section is to understand the method estimating monetary values of recreational amenity and identify determinants of willingness to pay. Then, previous empirical research which has attempted to measure willingness to pay for recreational activities or resources is reviewed.

1. BIOPHILIA AND BENEFITS OF DOG COMPANIONSHIP

The idea of biophilia, coined by biologist Edward O. Wilson (1984), helps explain many aspects of human behavior with regard to human-pet bond. The biophilia hypothesis suggests that there is an instinctive bond between human beings and other living systems. Wilson (1984) defined the term as "the connections that human beings subconsciously seek with the rest of life." Support for the 'biophilia hypothesis' has come from recent research that shows the effect of nature on physical and psychological health. Numerous studies have shown a significant relationship between contact with nature and improved health. The benefits of the human-animal bond also are well-documented in medical (Friedmann et al, 1980; Siegel, 1990;

Raina et al., 1999) and psychological (Siegel, 1990; Sable, 1995) literature.

The physical health benefits of pet ownership have been reported widely in literature. According to the latest survey by APPMA (2005), fifty-nine percent of dog owners say pets are good for their health and help them relax, and forty percent say that owning a dog motivates them to exercise on a regular basis. Seniors who own dogs go to the doctor less than those who do not (Siegel, 1990). Friedmann et al. (1980, 1983) found that pet owners have lower blood pressure and a higher on-year survival rate following coronary heart disease. Research further indicates that having a pet may decrease heart attack mortality by 3% (Friedmann et al., 1983). Having a pet can provide an impetus for participation in physical activity, which can help to maintain overall health and effective function in older people. Serpell (1991) found that dog owners participated in more physical exercise while walking their dogs and, suggested that such substantial increases in daily physical exercise would be likely to have long-term health implications. Raina et al. (1999) demonstrated the benefits of pet ownership in maintaining or slightly enhancing Activities of Daily Living (ADLs) levels of older people. They also found that pet ownership buffered the negative impact of lack of social support on psychological well being and emerged as a factor that may help some older adults' age successfully.

Much has been written about the psychological benefits of pet ownership. The presence of pets increases feelings of happiness, security, and self-worth and reduces feelings of loneliness and isolation on a daily basis, and during separations or transitions, such as spousal bereavement (Sable, 1995). A care-taking role may provide older people with a sense of purpose and responsibility and encourage them to be less apathetic and more active in day-to-day activities. Siegel (1993) discussed human-animal relations in terms of attachment and stress reduction. Her stress reduction perspective suggests that companion animals, providing an opportunity for humans to experience bonding, buffer people against the impact of stressful

life events. Elderly pet owners without immediate medical attention coped with stressful life events better when they had a pet (Raina et al., 1999).

The role as catalysts for social interaction is another important aspect of pet ownership. Particularly for elderly people whose social involvement is limited, companion animals themselves can be an accessible source of social contact. McNicholas and Collis (2000) found that being accompanied by a dog increased the frequency of social interaction, especially interactions with strangers. Pets increase the opportunities for meeting people, while for others, pets permit them to be alone without being lonely (Beck and Myers, 1996).

Statts et al. (1999) proposed a theoretical model for human health and the pet connection (Fig. 2). Pet owners' health is influenced by human self-care and by the degree of attachment to the pet. The pet attachment effect is believed to incorporate several forms of social support, including companionship, support of self-esteem, and support in maintaining the activities of daily living. They also believe that pet care has a symbiotic or feedback relationship with attachment to a pet and with human self-care. In other words, pet care may provide a stimulus for human self-care or human self-care may provide a stimulus for pet care, so that pets provide pet owners with corresponding health benefits.

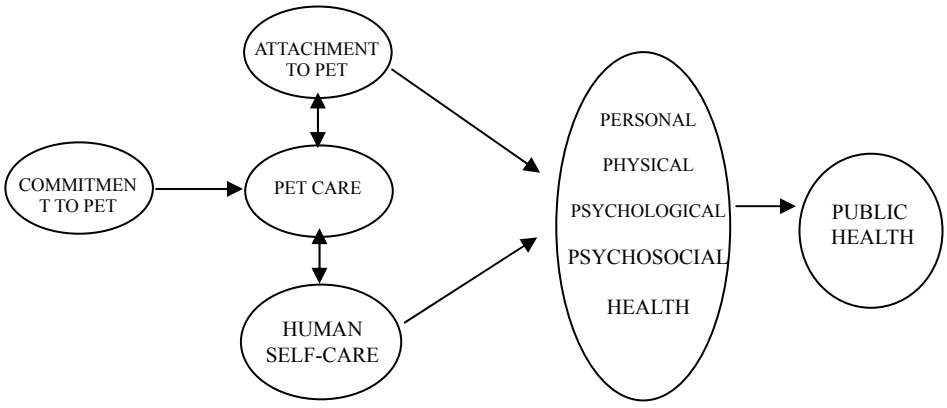


Fig. 2. A theoretical model for human health and pet connection (Statts,1999 Adapted).

2. OFF-LEASH DOG PARKS

2.1. What Is A Dog Park?

Despite the popularity of dog ownership across the country, it is difficult for dog owners, especially those who live in urban areas, to find a place where they can exercise and play with their canine companions. Many municipal code or animal control ordinances require dogs to be kept on leash in public open space and parks, and in some parks dogs are even banned from access at all. In the last decade, however, dog owners have raised their voices and claimed their right to use public land for dog activities. This is evident by the proliferation of dog parks across the country. Although an accurate, more updated number of dog parks nationwide are not available, it is assumed that there are almost 700 dog parks and the number is growing annually (Burkett, 2006). Yet, Dog Park National News (2005) estimates almost 2,000 dog parks and off-leash areas in the US, thus the actual numbers depend on how one defines dog parks.

A dog park is a place for specially designated free-running areas that allow dogs to romp and play, offering adventure and exploration (Harlock Jackson, 1995). A more comprehensive definition of a dog park is a designated off-leash area which offers a safe controlled environment for dogs and their owners to play, socialize and exercise with other dogs, and provides owners an opportunity to interact with park patrons having similar interests. Dog parks have many different names, such as off –leash recreation areas, pet parks, bark parks, dog-friendly parks, dog running areas, etc. Susyn Stecchi, however, stated that off-leash and enclosure are two essential components of dog parks (Gillette, 2004). It is generally agreed that dog parks need to be enclosed by fences or hedges so that dogs can play off-leash without interfering with other recreational activities and to keep dogs from running away.

Dog parks can vary in terms of their location, size, operation type, and amenities.

They can be small pocket parks within existing parks, or a developed stand-alone dog park, and some are enclosed with fencing and some without. Also, the size of dog parks can range from less than one acre to more than 50 acres (Bourbeau, 1998). Some parks are managed by dog owners' groups in cooperation with the local government, but some are privately operated. Most dog parks which have been developed within the last 10 years are founded by dog owners with grass-roots support (McLaughlin, 2005).

2.2. Legitimate Demand for Off-Leash Recreational Areas

Playing with dog companions in a natural setting without constraint is one of the most precious experiences for dog owners. This, which is called off-leash recreation, is increasingly considered as one type of recreation in the same category as leisure activity - just like playing baseball, tennis, or golf. Since many parks around the country still enforce policies that prohibit dogs in parks or permit them only if they are leashed, dog owners feel as though they are being squeezed out of existing parks (Dyke & Phillips, 2000). These restrictive rules against off-leash recreation have increased the number violation cases as well as the demands of dog owners for more land dedicated to off-leash recreation. San Francisco Society for the Prevention of Cruelty to Animals (2005) pointed out the dog owners' right to have dog parks saying that dog owners, like other tax-paying residents, already pay the money used for dog parks (and they independently pay for municipal animal control services) therefore they and their canine companions have a right to numerous, widely accessible off-leash parks.

The study for Freeplay, the off-leash group in Venice, California, argued that more existing open space should be allocated for dog parks to meet the current demand of citizens (Batch et al. 2001). This study showed how dog parks are dramatically under-allocated in Los Angeles compared to other recreational uses. In Los Angeles County there are 175,000 licensed

dogs, and there are only 4 off-leash dog areas, comprising a total of less than 10 acres of space. In contrast, 287 and 1,050 acres of open space are devoted to tennis courts and recreational softball users, respectively. The demand is measured as 3,500 dogs per acre, while the users per acre of tennis and softball are 279 and 40, respectively (Table 1). This means that almost 100 times more dog park areas would be required to provide dog owners the same recreational opportunities as softball players.

Table 1
Competing recreational uses (Batch et al., 2001, p. 3)

Recreational Activity	# of Acres	# of Users	Users per Acre
Off-leash Recreation Area	10	35,000	3500
Tennis	287	80,000	279
Softball	1050	39,375	40
Golf	1040	105,000	101

Public parks serve multiple purposes and are supposed to be accessible for a variety of user groups. Given the popularity of dog ownership, dog owners now comprise one of the largest groups of park users. Therefore, the legitimate demand for dog off-leash recreation areas should be addressed in park planning and policy.

2.3. Benefits of Dog Parks

2.3.1. Benefits for the community

One of the most imperative benefit to a community is that dog parks can promote public health and safety (Kawczynska, 1999; Dog PAC SB, 2002). Dog parks reduce the number of dogs off-leash in other areas of the community because dog owners perceive leash laws outside of dog parks as fair and would be more likely to comply, thus lessening the

number of unwanted encounters outside of dog parks (Harlock Jackson, 1995). In addition, well-exercised and socialized dogs are less prone to nuisance and aggression (American Kennel Club, 2004), thereby decreasing the risk of dog-related incidents in the neighborhoods and conflicts with other park users. Dog parks also provide a measure of security by discouraging crime and loitering (American Kennel Club, 2004). A good example is the Laurel Canyon dog park in Los Angeles which used to be an abandoned park with loitering drug traders. The residents' efforts to establish a dog park made the park "a valued community resource" (Wolch & Rowe, 1992).

Dog parks can also promote responsible pet ownership (City of Regina, 2005; American Kennel Club, 2004). Many dog parks require dog owners to license and vaccinate their dogs in order to gain access. There is considerable social pressure from regular dog-park users to follow the rules, such as cleaning up after dogs and controlling one's dog's behavior. Most dog parks have their own organized resident groups who patrol the park and enforce the rules.

Dog parks can also contribute to building a sense of community (Prince Edward Island Humane Society, 2005; American Kennel Club, 2004). As a social hub for communities, dog parks are a public place where people can get to know each other and socialize. A variety of events related to dogs could bring community residents together and make them more active in community affairs. As a community amenity, a dog park may motivate people to move in and contribute to the overall quality of life for the residents.

Some dog parks bring economic benefits to the city and community (Gillette, 2004). Mecklenburg County Dog Parks, in North Carolina, accrues revenue from pass sales, daily fees and use for maintenance and future capital improvements. Pass sales, $35 per year, generate approximately $26,000 annually. A dog park in Indianapolis also sells daily passes for $3 and an annual pass for $25. In 2003 the city sold close to 1,700 passes for one dog park alone. A

city planner mentioned that dog parks generate revenue and they are a profitable enterprise (Gillette, 2004). In addition, dog parks are being used as fundraisers for local animal welfare organizations. A variety of events and activities often held in dog parks help raise funds for the support of the humane society, shelters or rescues (Deeb, 2004).

2.3.2. Benefits for dog owners

As discussed in the previous section, dog companionship can provide people with physical, psychological, and social benefits. Dog parks where dogs and their owners run, play and socialize with each other can also provide multiple benefits to dog owners.

The lack of exercise and its result, obesity, is becoming a serious issue for people, especially in a modern urban setting. Dog parks within walking distance of home encourage dog owners to walk and exercise, thus contributing to overall physical fitness. Dr. Jane Dirks, University of Pittsburgh anthropologist, stated the following about the benefits of dog parks: "For ultimately, the dog people find in the Dog Park a sanctuary, a space for healing. Dog people exult in watching their animals run, feeling that an hour or two's romp with their dogs is essential to health, theirs and their dogs', and makes up for a week of sedentary working hours. Dog people roam a dog park peeling away the stress and cognitions of the human world, cleansing themselves in the world of nature through the heedless antics of a happy dog" (Kawczynska, 1999). The simple joy of watching dogs at play and being outside can reduce stress of dog owners. Moreover, from an economic perspective, playing with dogs in a park is a relatively affordable recreational option, compared to some other activities.

Another important advantage of dog parks is that they provide people the chance to socialize and interact with other community members (American Kennel Club, 2004). Many studies have shown that dogs play a role as "social lubricant" in a local park (Harlock Jackson, 1995). Dog parks can become a vital public space and a community asset where residents

interact and form the bonds of a community. The bonding and cooperation of residents can be established in the process of building their own dog park in their neighborhood. Most of the current dog parks could have been constructed with the effort and support of dog owners and local residents.

Dog parks close to home are especially beneficial to the elderly and owners with disabilities (Harlock Jackson, 1995). Given the increase of the elderly population and their pet ownership, accessible dog parks could provide them with opportunities to exercise and an on-going social contact without safety concern, which is an issue for some public parks.

2.3.3. Benefits for dogs

Dogs need exercise and contact with other dogs daily in order to remain healthy and well socialized (Ewing, 1999). Dogs that are well socialized and exercised are healthier and happier as well as less likely to be aggressive (American Kennel Club, 2004). In high-density urban environments, however, many citizens do not have a backyard big enough for a dog to run loose. Therefore, walking dogs in neighborhoods or parks "on leash" is the best exercise dog owners can provide their canine companions. According to Dr. Nicholas Dodman (1999), Tufts University veterinarian and behaviorist stated that walking dogs on a leash is not sufficient exercise. It is also important for a dog to be provided with natural outlets – to be able to run and exercise and chase things and do as a dog was bred to do (Kawczynska, 1999).

Ewing (1999) stated that being on a leash can even cause some dogs to become territorial, protecting the area to which the leash confines them. Moreover, dogs on leashes have been found to socialize less, so such walks are more of a solitary exercise (The Off-Leash Park Proposal Committee, 2004). A lack of exercise and socialization can cause canine behavior problems such as aggression and hyperactivity, which are potential dangers to people. Off-leash areas can be safe and effective places that dogs can exercise, play, and hang out with

other dogs to reduce boredom and pent-up energy. Dogs also can learn the skills to get along with people and other dogs in dog parks. In this respect, off-leash dog parks can help promote the health and well being of urban dogs.

2.4. Issues Concerned with Off-Leash Dog Parks

Despite the many benefits attributed to dog parks, a number of issues and concerns have been brought forth by residents, other park users, and local municipalities. Although designated off-leash dog parks can allay conflicts with other park users, dog park opponents have expressed concerns over creating dog parks in their community. The following are some of the issues that opponents have: (1) nuisances to adjacent residents; (2) potential health concerns associated with dog feces; (3) dog bites and liability; and (4) the potential need to amend local regulations regarding planning and animal control rules.

Among the issues that most concern community residents are the possibilities of barking noise, increased traffic, lack of parking, or negative impact on the aesthetic of the environment. Some of these issues are not just dog parks' unique problems. Evidence shows that public parks accommodating active recreational activities have negative impacts upon neighborhood and adjacent property values. Nevertheless, it is critical to take into account their concerns in order to generate grass roots support. While dog parks are most often citizen-driven, even many of those who support dog parks have a NIMBY (not-in-my-back-yard) attitude (Leschin-Hoar, 2005). Therefore appropriate locations, along with proper fencing and barriers, are essential to create community dog parks. It would be not appropriate to impose dog parks on an existing neighborhood park directly adjacent to homes (Batch et al., 2001). In addition to considerate site selection, a carefully designed plan, incessant communication with residents, and maintenance are required to appease residents opposed to dog parks.

Much literature has addressed misplaced fears concerning dog feces and dog bites

(Batch et al., 2001; Dog PAC SB, 2002). The findings regarding dog bites show that the majority of incidents occur in the dog owner's home or in the immediate vicinity; not in public open space (Harlock Jackson, 1995). Moreover, the many existing dog parks that have never had dog bite incidents are evidence of misinformed fear (City of Regina, 2005; Batch et al., 2001). Batch et al. (2001) noted that dog feces have a minimal chance to transmit disease to humans, and peer pressure in dog parks would promote responsible dog ownership.

Another issue that dog park proponents often encounter in the process to develop a community dog park is that it sometimes requires modifications to ordinances, which make it difficult to get local government's support. Many local legislators do not want to embrace the highly debated dog park concept, and dog park opponents may object to allocating funds to the implementation or operation of a dog park ("Between Friends," 2003). However, some local governments have started to realize the popularity and benefits of dog parks, and have begun to support dog park advocates to implement an off-leash dog park (Dale, 2005; American Kennel Club, 2004). Dyke and Phillips (2000) stated that "Dog parks are still a relatively new phenomenon that park districts are beginning to explore and consider. As they gradually become more common and gain acceptance in suburban and urban communities and park operation issues are resolved, park districts will become more comfortable with the idea of developing a dog park" (p.163).

One of the biggest challenges in establishing dog parks is funding. Start-up costs, including the expense of purchasing land, are most times not affordable for residents groups. Although many dog owners organize volunteer groups and sponsor fund-raisers to raise revenue to pay for site management, maintenance costs are a big concern for dog owners who want their dog parks. Rhoades (2004) recommended partnering with a local government, if possible, to enhance resources for public dog park development. However, some local

governments and opponents refuse to allocate parts of their limited budgets to dog parks. Among the problems to get local governments to understand the benefits of dog parks is the difficulty in showing their economic values and benefits. One of the ultimate reasons for lobbying and fund raising is that the benefits of creating dog parks exceed the costs. Only by comparing the benefits and costs in dollars can the efficiency of an investment in dog parks be evaluated and rationally defended (Tucker, 1993). Therefore, assessing the economic value of dog parks, which has not been tried, would be evidence of the current demand for dog parks and would help rationalize the local decision making process.

3. POST OCCUPANCY EVALUATION

Federal Facilities Council (2002) defined Post Occupancy Evaluation (POE) as "a process of systematically evaluating the performance of buildings after they have been built and occupied for some time. POE differs from other evaluations of building performance in that it focuses on the requirements of building occupants, including health, safety, security, functionality, efficiency, psychological comfort, aesthetic quality, and satisfaction" (p. 1). Post Occupancy Evaluation (POE) grew out of the interests among researchers in the field of environmental design in the 1960s, which focused on the relationships between human behavior and environmental design. They were interested in evaluating how a building performs, whether it has met expectations, and how satisfied building users are with the environment. POE has evolved over the past 40 years and is now becoming recognized as an important feedback mechanism to improve the quality of environments. A State-of-the Practice Summary of Post-Occupancy Evaluation project by Federal Facilities Council (FFC) in 2000 is one of the evidence that increased POE activity in federal agencies (Preiser, 2002). The FFC, a cooperative association of federal agencies has made an effort to improve POE process to better serve public and private sector organizations (FFC, 2002; Building Research Board,

1987). These POE efforts at different levels contribute to the development of the methods of evaluation and to evaluate a variety of facility types such as government facilities, public buildings, office buildings, hospitals, schools, and museums.

Although POEs have become broader in scope and purpose, POE have primarily focused on buildings and indoor environments while the application to parks or outdoor areas are relatively limited. Some POE studies attempted to evaluate the utilization and user satisfaction of outdoor areas such as an urban park (Kaplan, 1980), healing gardens (Whitehouse et al., 2001; Heath & Gifford, 2001; Sherman et al, 2005), and outdoor spaces in healthcare facilities (Cooper Marcus & Barnes, 1995; Shepley & Wilson, 1999), but a standardized method or structured process to conduct a POE has not been developed. Cooper Marcus & Francis (1998) highly valued the benefits of POE application on outdoor spaces, saying that a POE can be very informative and useful in improving and designing a park, playground, or open space, and enriching design knowledge base and skills.

Several benefits of POE have been identified by POE researchers (Friedmann et al., 1978; Preiser et al., 1998). Zimring (2002) summarized the benefits of POE as the following; (1) aids communications among stakeholders including investors, owners, operators, designers, contractors, maintenance personnel, and users or occupants; (2) creates mechanisms for quality monitoring, where decision-makers are notified when a building does not reach a given standard; (3) supports fine-tuning, settling-in, and renovation of existing settings; (4) provides data that inform specific future decisions; (5) supports the improvement of building delivery and facility management processes; (6) supports development of policy as reflected in design and planning guides; and (7) accelerates organizational learning by allowing decision-makers to build on successes and not repeat failures. However, cost, time, skills, and fear of exposing problems or failures are identified as barriers to conducting POE (FFC, 2002).

Preiser et al. (1998) discussed three key elements be considered in a POE study: (1) technical elements related to health, safety and security performance; 2) functional elements that deal with "the fit between the building (or outdoor space) and the clients' activities" such as efficiency and work flow; and 3) behavioral elements including "psychological, social, cultural, and aesthetic aspects of user satisfaction and general well-being". In order to evaluate these elements, multiple POE techniques are utilized. Shepley (1997) discussed four categories of POE techniques; 1) indirect measures e.g. archives, physical erosion, demographic data, 2) instrumented recording e.g., physiological recording, image recording, movement measuring devices; 3) systematic observation, e.g., behavioral mapping; and 4) self-report methods, e.g., interview, questionnaire.

Cooper Marcus & Francis (1998) presented an example of POE procedure in a park setting in detail; 1) *participant observation* : without particular formula for recoding, to experience and sense the essence of a place are important in this step; 2) *sketch plan an initial site observation:* draw a sketch site plan including all features of the site and materials and identify surrounding land use, access, views, and social context of the site; 3) *functional subareas of the site*: draw a bubble diagram showing different functional areas and analyze their relationship, conflict, confusion, or misuse; 4) *messages from administration*: identify park regulations or signs on the site; 5) *behavior traces*: the authors suggested that most common traces to observe are accretion of material or debris (cigarette butts, dog waste, etc.), erosion (footpath through lawn or shrubs, the paint off a bench, etc.), and the absence of traces where one would expect to find them; 6) *activity mapping*: observation at least four separate half-hour periods on deferent days at different times of the day are suggested to record in detail how the park is being used. It is important to record all types of activity, location, as well as user's age, sex, and ethnicity. 7) *Interviews:* informally interviews two or three typical users on

each visit to the site and conduct a questionnaire survey for a large amount of data; 8) *Data summary & Use analysis*: describe and analyze the collected data using proper statistical analysis techniques and probe correlations; and 9) *Problem definition and redesign & Final report*: document and report the findings clearly and accurately, and provide recommendation.

4. VALUATION OF NON-MARKET RECREATIONAL RESOURCES

4.1. Interdisciplinary Approach in Valuation of Recreational Resources

For normal market or private goods, market price, typically determined by supply and demand, indicates the value of private goods. Public goods, on the other hand, have no market price to indicate how much people value them, and are distinguished from private goods by the characteristics of non-rivalry and non-exclusion. Another category of goods, quasi-public goods, are similar to public goods in terms of non-market properties, but do not have non-rival and non-exclusive properties. For example, recreational amenities are often associated with travel cost or admission fees and the quality and/or congestion of the site affect the use of amenities. Most public parks and recreational areas are considered as quasi-public goods. The characteristics of quasi-public goods require insights on human behavior and psychological aspects to value recreational resources.

Stoll and Gregory (1988) defined that value as “the perceived gains and losses constituting beneficial or adverse changes in welfare, while economic value is generally more narrowly defined as the monetary representation of gains and losses”. Stoll and Gregory presented a diagram showing the process of arriving at values and their use in decisions regarding amenity resources (see Fig. 3). Individuals use their social values, beliefs, or prior knowledge with combining the information they are given in order to arrive at a valuation on alterations in amenity resources. Through cognitive valuation process (Box 3) the recognized gains and losses is translated into the assigned or reported value (Box 4). The

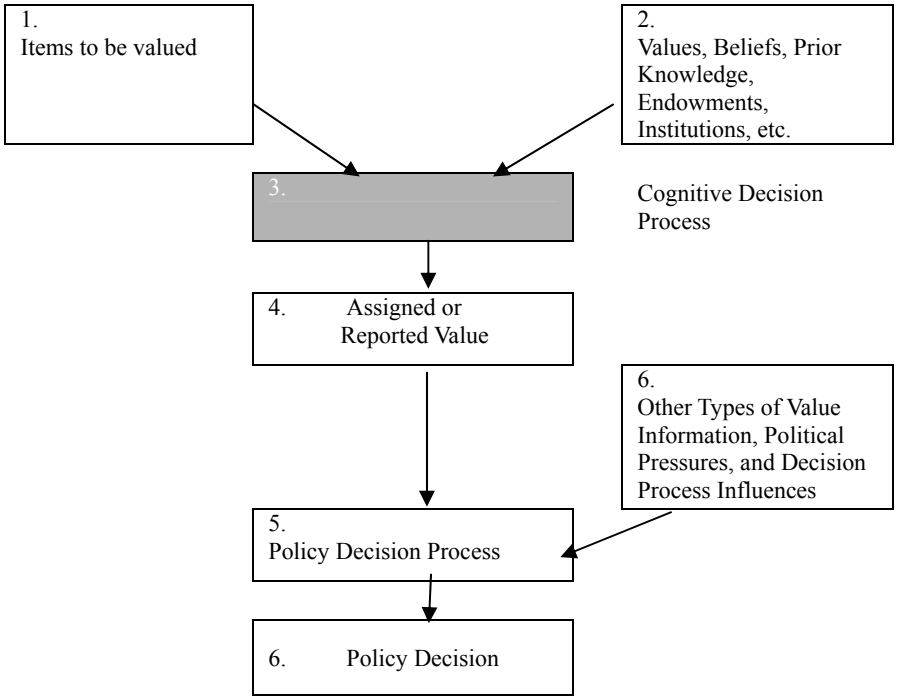


Fig. 3. Policy decision process (Stoll and Gregory, 1988).

authors stated that the reported value would be different depending on a research interest; that is, economists likely will be interested in monetary value whereas behavioral scientists may prefer to obtain non-economic measures such as importance or preference. The authors represented the cognitive decision process as a black box due to the incomplete understanding about the process, which needs to be illuminated by more valuation studies. Stoll and Gregory emphasized that "the economist's monetary, or other social scientists' non-monetary, measures of value are therefore only one input to this decision process that ultimately will determine the fate of the amenity resources under consideration. Peterson et al. (1988) also noted that the attempt to integrate the perspective and methods of economics with other behavioral sciences, such as sociology and psychology is important for the valuation of non-priced amenity goods and services. Economists have long studied valuation of non-market goods for efficient

allocation of scarce resources, and have made good progress in developing valuation theories and methods. Psychologists and other behavioral scientists have studied valuation to describe and explain human decision processes, including economic decisions. Peterson et al. noted that "the continents of economics and behavior sciences have drifted apart, and there is little intercontinental commerce, despite accumulated storehouses full of knowledge and skills with potential for trade". They emphasized that "the disciplines must reach out beyond themselves to find greater strength and usefulness" and the valuation of amenity resources can be successfully achieved by the interdisciplinary approach.

4.2. The Need for Values of Recreational Resources

In recent decades conflicts over resource allocations are getting increasingly intense due to recent decreases in supply (e.g. limited land and budget) and increases in demand (e.g. increased income and leisure time, and increasing population) of amenity resources. However, the demands of recreational amenities or services are often less considered in public or private investments decision processes due to this non-monetary nature, which consequently results in insufficient resource allocation (Tucker, 1993). Reliable estimates of the value of amenity resources can help conduct benefit-cost analyses in many recreational planning and management decisions, and resource allocation decisions (Box 5, Fig. 3). The valuation of amenity resource plays an important role in justifying recreation programs and budgets, formulating and analyzing policies, and making investment decisions (Kaiser et al., 1988). In addition, it provides interest groups with valuable information for political pressures and lobbying (Box 6, Fig. 3).

4.3. Recreational Resources Valuation Methods

Economists have developed a variety of approaches to value non-market amenities and these may be divided into revealed and stated preferences methods. The revealed

preferences approach is based on observed behavior in markets for related goods such as home sale prices (hedonic price method) or costs to travel to a recreational site (travel cost method), and the stated preferences approach asks people their willingness to pay for environmental change (contingent valuation method).

4.3.1. Travel cost method and hedonic price method

The travel cost method (TCM) observes individuals' travel expenditures and time costs to get to a recreation site to measure the value of the site. This method is widely used in estimating the value of National Parks internationally. However, it is not suitable for urban public parks or open spaces since there is no entrance or use fee for using public parks or open spaces, and travel costs may not be a major determinant of visitation (Lockwood & Tracy, 1995). Another problem with the travel cost method is the difficulty of incorporating environmental quality into the travel cost model. The quality of the site to value is related in various ways to the reasons for visits, and it can measure only the direct recreation benefits (Mitchell & Carson, 1993).

The hedonic price method (HPM) is the other major revealed preference approach in common use, mostly used in the analysis of property values under the assumption that the values of certain environmental attributes are reflected in property prices. This approach typically finds that public parks and open spaces have positive impacts on neighboring property values and proximity to a park especially has a lot to do with property values. Although the HPM provides implicit prices for the environmental amenities, it has several disadvantages. Housing prices are influenced by a variety of factors such as structural characteristics, neighborhood, and location. It is not possible to control for all relevant factors, thus one environmental attribute of interest cannot explain the differences in property values (Mitchell & Carson, 1993). In addition, the assumption that the housing market is in

equilibrium may be not realistic and it may not be useful for an urban housing market, which is composed of many separate submarkets (McConnell and Walls, 2005).

4.3.2. Contingent valuation method

The Contingent Valuation Method (CVM), stated preference approach, is the most frequently applied method in the valuation of recreational resources. CVM estimates the economic value by asking people to state how much they would be willing to pay for hypothetical changes in a recreation opportunity or resource. The term "contingent" refers to the fact that the valuation of the goods is contingent on the hypothetical assumption of a plausible market and method of payment for the service. The benefit to the individual is measured in terms of willingness to pay under the assumption the maximum a person would be willing to pay for goods or a service is equivalent to the benefit they would receive from the goods. That is, an individual would not be willing to pay more than the worth of the benefits they would receive from the goods (Rollins and Wistowsky, 1997).

The CVM researcher's objective is to obtain the respondents' consumer surplus for the amenity – the maximum amount the good is worth to the respondent. Summary statistics such as mean and median WTP can be estimated if a parametric function form is assumed for the WTP distribution (Carson et al., 1996), and total recreational benefits are derived by summing individuals' WPT over the appropriate population. Loomis & Walsh (1997) found it to be an appropriate measure for enhancement in the recreation resource such as providing new access, facilities, or improving quality of the site. There are two assumptions for applying the CV method. First, it is assumed that people are able to translate a wide range of environmental criteria into a single monetary amount, representing the total value to them of a particular resource. Another assumption is that the more they value it, the more they will be willing to pay for it (White and Lovett, 1999).

The CV method is increasingly used by government agencies for the purpose of assisting in policy evaluation. The U.S. Water Resources guidelines authorized use of the contingent valuation method and established procedures for its application to recreational problems (Loomis & Walsh, 1997). The CV approach has been widely used to value non-market benefits of many resources and is increasingly accepted as a valuation method. The CV method offers many notable advantages over indirect methods. It produces direct estimates of amenity values for benefit-cost analysis and it assesses a larger number of amenities than do indirect methods such as hedonic pricing model and travel cost method (Tyrvainen & Vaananen, 1998). Furthermore, the CV method is considered the only method that provides estimates of non-use values, which one might have from just knowing that the environmental good exists (Carson, 2000; McConnell and Walls, 2005).

Since Davis (1963) applied the CV method to derive a demand curve for outdoor recreation in northern Maine, the CV method has been used in a variety of areas such as protecting wildlife refuge (Klocek, 2004), forested urban areas (Tyrvainen & Vaananen, 1998), increasing air quality (Pope and Miner, 1988), and natural resource damage assessment (Kopp and Smith, 1993). The recreational resources or activities which the CV method has been used to measure include scenic beauty and aesthetics (Boyle & Bishop 1988); fishing (Cameron and James 1987, Berrens et al., 1993); greenways (Tucker, 1993, Lindsey & Knaap, 1999); biking (Fix & Loomis, 1998); skiing (McCollum et al., 1990); canoeing (Draker, 1997; Rollins and Wistowsky, 1997); and urban forests(Tyrvainen & Vaananen, 1998; Kwak et. al., 2003).

4.3.3. Methodological issues of contingent valuation method

A number of methodological issues regarding the use of CV method have been raised by CV critics. Some researchers question the theoretical and philosophical basis of applying non-market economic valuation methods to the assessment of environmental amenities and

some criticisms are about the accuracy and validity of results of CV studies. Potential issues or biases of the CV method include the following; First, the common criticism of CV is strategic bias, which means that survey respondents will not strategically answer truthful and will underestimate or overestimate their true valuation. People may underestimate when they believe public parks will be provided regardless their contribution (free-riding) or in the case they perceive they have to pay the amount they answered. In contrast, people may overstate the true value they place on the good (overpledging) if they believe they will not actually have to pay the amount the state. (Mitchell & Carson, 1993; Tucker, 1993). However, Mitchell and Carson (1993) examined the theoretical and empirical literature and concluded that strategic behavior would be the exception rather than the rule. They argued that strategic behavior is "not inevitable in preference-revelation situations." The second issue related to validity concerns the differences between stated preferences and actual choices or behaviors, that is, how people react to simulated hypothetical market situations may be quite divergent from how they behave in reality (hypothetical bias). Thirdly, information bias results from erroneous, mistaken, incomplete, or biased information provided to the respondent concerning the hypothetical market. If respondents are unfamiliar with the non-market commodity and misunderstand the situation, they would likely cause the respondent to answer incorrectly. Some studies of the validity of CV have compared hypothetical willingness to pay with actual payments. Breffle et al. (1998) found that the willingness to pay to preserve undeveloped urban land was not overestimating the actual donations. A fourth issue is that payment vehicle bias is related to the proposed hypothetical payment method such as tax payments, entrance fees, or utility bills. Some respondents may prefer paying entrance fees rather than paying higher tax to use public parks. A fifth issue is that starting point bias was manifested when bidding technique was popular in early CV studies. An initial bid may imply incorrectly the range of bids for

valuing a non-market good. Now the dichotomous choice and open ended payment card are the most popular elicitation techniques because they minimize elicitation techniques bias and present the respondent with more realistic market-like situations (Tucker, 1993). In an open-ended payment format, a respondent is simply asked how much a respondent would be willing to pay for a good, while respondents are presented with a dollar amount and asked whether or not they would pay the offered amount (Reaves et al., 1999).

Many researchers, however, have found that the accuracy and usefulness of economic valuations can be improved by more careful attention to the details of the assessment methods (Mitchell & Carson, 1993). Results may depend on the method of elicitation, the information made available to the respondent and other aspects of the survey design. Carson (2000) suggested the following components to assess a CV survey; (a) an introductory section that helps set the general context for the decision to be made; (b) the institutional setting in which the good will be provided (hypothetical market); (c) a detailed description of the good to be offered to the respondent; (d) the manner in which the good will be paid (payment vehicle); (e) a method by which the survey elicits the respondents' preferences with respect to the good (elicitation format); (f) debriefing questions about why respondents answered certain questions the way that they did; (g) a set of questions regarding respondent characteristics including attitudes and demographic information (socioeconomic questions). For validity of CV results, the survey should consider the impacts of different payment methods, such as entrance fees, travel costs, or taxes; bid design and starting point; strategic behavior on the part of respondents; non-response bias and, effects of survey mode. A properly designed survey showed result in a high degree of attitude-behavior correlation, provide adequate and accurate information, and lead to less random responses since respondents will likely better understand the situation. Mitchell & Carson (1993) stated that more attention to wording of the CVM

scenario, administration of the survey, sampling design, and treatment of outliers will prevent many potential biases.

4.3.4. Determinants of willingness to pay

Loomis and Walsh (1997) have noted that learning how to accurately measure variables can provide useful information for recreation economic decision. Many researchers have tested various potential variables which could influence an individual's levels of willingness to pay. Kerr and Manfredo (1991) stated that behavioral variables or attitudes are key components of the consumer decision in the area of recreation. Loomis and Walsh (1997) suggested six categories of determinants of demand; (1) socioeconomic characteristics of the users including income, education, age, gender, and ethnicity; (2) attractiveness or quality of recreation sites; (3) the availability of substitutes or alternative recreation opportunities; (4) travel time; (5) congestion ; and (6) tastes and preferences. Zalatan (1992) developed and tested a user-oriented model of willingness to pay (Fig. 4). He suggested that four factors are taken into account when users express their willingness to pay: (1) the environment in which recreation services are offered; (2) economic choices e.g. users' income, total costs for recreation activities; (3) users' behavior and attitude e.g. familiarity with the site, previous experience; and, (4) characteristics of the delivery system - perceived quality of the recreational service. This model acknowledged that behavioral variables are important component in a consumers' willingness to pay. In addition, he tested the relationship between WTP and selected variables by performing on-site survey at the Rideau Canal, Canada, and found that income, proximity to the Canal and familiarity were significantly related to WTP. Many empirical studies (Davis, 1963; Ralston, 1991; White & Lovett, 1999; Huhtala, 2004; Rollins and Dumitras, 2005; Jim & Chen, 2006) have reported that income is positively related to recreation participation and should be considered in WTP study.

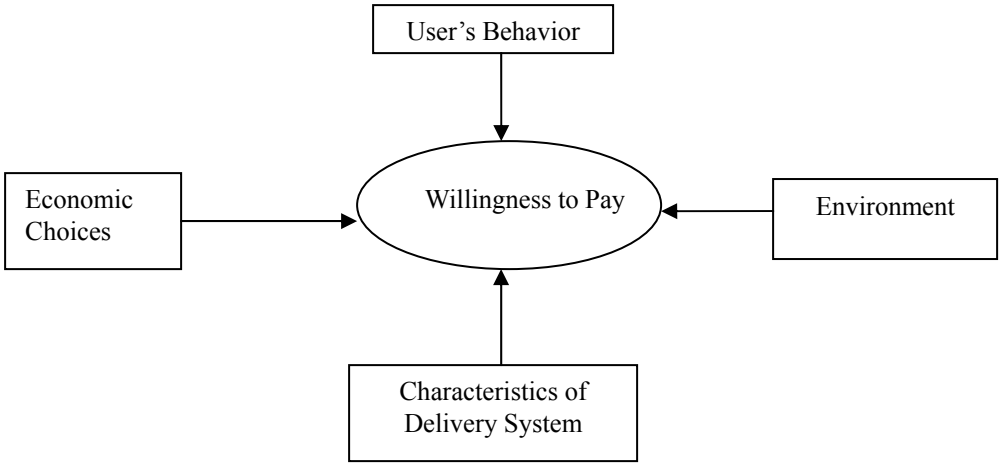


Fig. 4. Foundation of willingness to pay (Zalatan, 1992).

Several studies in park and recreation areas have attempted to explore the influence of psychological and behavioral aspects on WTP. Jim and Chen (2006) considered many other factors pertaining to recreational activities, attitudes and behaviors. They explored the use of pattern and behavior of urban green spaces in Guangjou City, China, using face-to–face interviews of 340 residents aged 18-70. The authors emphasized that user surveys could provide "pertinent information to glean and gauge community expectations, wishes and needs related to urban green spaces" and help improve planning, design, management and conservation. Huang (1996) also investigated various aspects of the public perception of urban parks in Taipei City, Taiwan. The author conducted an extensive mail survey of more than 3,000 residents to investigate how parks are usually used, the demand for park area, and how valuable parks are to local residents. Huang identified an optimal park area, preferred park characteristics, and important park activities. Regression analyses of WTP showed that the numbers of respondents' past and planned future visits are positively associated with WTP.

4.4. Review of Empirical CV Application on Recreation Resources

Economists have investigated a range of theoretical and methodological issues

including problems of potential biases associated with CV research. However, the focus of this literature review is restricted to empirical studies, specifically applied to recreational resources and activities. The particular form a CV study takes varies in terms of methods of payment, elicitation methods, survey mode according to the nature of the good being valued, the methodological and theoretical constraints imposed by CV practice, and the population being surveyed. The literatures are categorized by the methodological issues.

The first attempt to estimate benefits of outdoor recreation using CV was done by Davis in the early 1960s. Davis (1963) interviewed campers, hunters, and fishermen and conducted a bidding game during each interview in order to measure the benefits of a recreational park in Maine. He asked to indicate a bid amount the respondents would refrain from using the park because the additional trip cost while adjusting the bid amount up or down. Davis estimated a multiple regression equation which explained 59% of the variance in the WTP and found that WTP is positively related to income, familiarity with the site, and length of stay. Darling (1973) used Davis' bidding technique in personal interviews to value the benefits of three urban water parks in California. The author also used a property value model to compare the estimates of benefits by the two methods. Although the comparative results were divergent due to the limited sample size, Darling emphasized that both methods have merit and reflect the large value of an urban water resource.

Darling's study was an early example of comparative validation research and many CV studies compared their findings with those obtained by other techniques in an attempt to validate the CVM. Lockwood and Tracy (1995) estimated the nonmarket economic benefits associated with a major urban recreation resource, Centennial Park in Sydney, using the travel cost and contingent valuation methods. While both the TC and CV methods had probable underestimating problems, results showed that the annual value of the Centennial Park is

between $31 million and $33 million, together with a nonuse value of at least $2.6 million, which outweighed the expenditure on the park (Lockwood and Tracy, 1995). Fix & Loomis (1998) also did not find a significant difference in the estimate of the TCM and dichotomous choice CVM. In a study measuring benefits of mountain biking in Moab, Utah, the WTP estimated by the CVM, $235, was slightly higher than the estimates from the TCM, $205, but no statistically significant difference was manifested at the 5% level. They noted that statistical similarity between the two estimates implies convergent validity between the two methods. Tyravainen and Vaananen (1998) supported the credibility of the CVM in their study on economic values of urban forests. They found that the results were similar to their hedonic pricing method in the same study town conducted in 1997.

The main issue related to WTP estimates is whether they provide a reasonable measure of people's true WTP. Bishop and Herberlein (1979) also compared the TCM of valuing outdoor recreation with the CVM in the study of goose hunting in the Horicon Zone of East Central Wisconsin. The significance of their study, however, lies in their attempt to compare the results from hypothetical questions with the one from a simulated market. In the hypothetical market experiment, they sent a questionnaire to 353 hunters asking if they would be willing to buy a hunting permit for a specified price. In the simulated market, they sent a real offer to a different sample of 237 hunters to buy their permits for a specified price, and 105 of these individuals actually sold their permits to them. As a result, responses to the actual cash offer yielded $63 per permit whereas the hypothetical valuation measure of willingness to pay was $21 per permit. Bishop and Herberlein concluded that WTP estimates would yield less than people's true value of wiliness to pay.

Breffle et al. (1998) and Linsey and Knaap (1999) tested whether the WTP in response to the survey is higher than the actual solicitation as well. Breffle et al. used CV method to

estimate a neighborhood's WTP to preserve a 5.5-acre parcel of undeveloped land in Boulder, Colorado, that provides views, open space and wildlife habitat. They compared the estimate of WTP to actual donations of the Cunningham Coalition, a neighborhood group formed to lobby against the proposed development and raise donation to purchase the property. The result of study of Breffle et al. showed that estimated WTP was less than the average pledge, not overestimating maximum WTP. Breffle et al. (1998) concluded that contingent valuation is a flexible policy tool for lands managers and community groups for estimating WTP to preserve undeveloped urban land.

Linsey and Knaap (1999) examined peoples' WTP for greenway projects in a publicly designated greenway in Indianapolis. CV survey and an actual solicitation for funds were mailed to split samples of greenway property owners, renter, and county residents. The mean WTP for greenway property owners was more than 13 times the mean amount actually donated by all property owners. Although the two CV experiments did not provide precise estimates of the value of public goods, the studies demonstrated that CV experiments can help identify sources of support and suggest strategies for planning. Linsey et al. suggested that planners can use the results of CV survey to design and carry out more effective strategies for greenway and open space planning. Another significance of the experiment of Bishop and Heberlein (1979) is that it was the first attempt of the dichotomous CV experiment, in which respondents are asked to answer simply yes or no. Whereas most previous CV studies involved bidding games or open ended form, they formulated their WTP responses as binomial discrete variables, hence, they used logit analysis.

Rollins and Wistowsky (1997) tested vehicle bias by comparing WTP from different payment vehicles. The authors used two payments: permit price and trip-related expenses in the study of benefits of canoeing in three Ontario Wilderness parks. The results indicated that WTP

as measured by the fee increase (mean WTP $26.38) was substantially lower than that measured by an increase in total trip costs (mean WTP $ 66.40). Rollins and Wistowsky noted that it is possible that many respondents may have felt that a positive response to a higher user fee may cause an actual increase in a user fee. Tyravainen and Vaananen (1998) found that the

Table 2
Summary of studies on WTP for recreational resources

Authors	Recreation Resources	Elicitation / data collection method	Comments
Darling (1973)	Benefits of three urban water parks in California	Using property value model, interview technique	
Sellar (1982)	Recreational boating / four lakes in Texas	Questionnaire survey	Compare TCM and CVM $13.81-$39.38
McCollum et al. (1990)	Cross country skiing sites in Vermont.	Mail survey, Dichotomous Choice	The sites in or near the National Forest yielded higher values than those located closer to urban area $7.25-$27.58
Ralston et al. (1991)	Recreational experience in Reelfoot Lake	Open ended	$7.5 per person per year Variables tested: number of visits(+), income, substitute site, education
Berrens et al. (1993)	Recreational demand for salmon fishing, Portland, Oregon.		.
Lockwood and Tracy (1995)	Centennial Park, Sydney	TCM (On-site survey)/ CVM (Off-site mail survey) open-ended format	Used TCM and CVM $25.81 of average bid per household None of the demographic variables had a significant influence on WTP.
Draker (1997)	Recreational canoe trip on the Restigouche River	Open-ended Format/ DC	Compared open-ended vs. DC Variables tested: membership in any recreation group, expenditure, group size, canoe ownership, weather (-)
Rollins and Wistowsky (1997)	Benefits of Back-Country Canoeing, in Ontario Three Wilderness Park	- increase in user fees : mean WTP $26.38 - trip expenses.: mean daily WTP $ 66.40	Increased user fee would likely be influenced by negative attitudes $24.44 Variables tested: Trip length (-)
Breffle et al. (1998)	WTP to preserve a 5.5-acre parcel of undeveloped land in Boulder,	. In person CV survey to 75 residents within one mile of the property	Compared to actual donation, the WTP was not overestimating. Variables tested: distance (-) income (+) and the importance of preserving land (+)
Fix and Loomis (1998)	Mountain biking in Moab, Utah	Dichotomous Choice	Compared the estimate of the TCM and CVM: US $250 and US $235 per trip ($63 per day), for the TCM and CVM, respectively (not significantly different)Variables tested: Bid amount (-), age (+)

Table 2
Continued

Authors	Recreation Resources	Elicitation / data collection method	Comments
Lindsey and Knaap, (1999)	Crooked Creek Greenway 3 groups (property owners:, renters; county residents)	Two different survey (WTP for projects/ solicitation of actual money) /Mail survey	Stated WTP was larger than actual donation
White and Lovett (1999)	North York Moors National Park,UK estimate public preferences and WTP.	Interview/ Postal quest Given specific amount of tax (dichotomous)	Variables tested: Bid amount (-), income (+)
Bennett et al. (2003)	Ridgeway National Trail, England	Dichotomous Choice Questionnaires were either given out in person (68%), or were placed under windscreen wipers (32%) of vehicles parked by the trail.	
Huhtala (2004)	Finnish national parks and state-owned recreation area	Phone interview / mail survey.	Analyzed two payment vehicles (a recreation pass and a tax increase): more negative on tax increase. Variables tested: education (+) , income (+) gender, child, age, payment vehicle, use recreation service, use actively, amount WTP.
Rollins and Dumitras (2005)	Three recreation areas in Ontario	Random Paired dichotomous choice format Mail survey	WTP varies by sites and activities Variables tested: Income (+), trip cost(-) children (+)
Jim and Chen (2006)	Green spaces in Guangju city.	Open-ended payment card, interview.	Users Attitude, behavior, frequency, reason of visits Variables tested: Income (+)

effect of the two different payment formats, monthly and seasonal fees, on the WTP were different in their study on the value of wooded recreation parks in Finland. Using monthly payments resulted in higher WTP estimates for the whole year as well as higher aggregate benefit estimates for the different areas. They also found that the use of tax as a payment vehicle may have increased the amount of protest bids. The same result was also found by Huhtala (2004) in another study estimating the value of outdoor recreation in Finnish state-owned parks. Huhtala analyzed two payment vehicles; a recreation pass and a tax increase earmarked for outdoor recreation. The results indicated that the payment vehicle affects the

WTP; a general tax increase received more zero responses than a recreation annual pass. Twenty-eight percent of the respondents said $0 for an annual pass while 42% said $0 for more tax. In terms of attitudes toward funding of recreational services, it is recognized that people have quite negative attitudes towards tax increases. The study of White & Lovett (1999) also found that people prefer visitor fees (53%) to taxes (25%) in their CV study of the Moors National Park.

A review of literature demonstrates that contingent valuation method has been applied to quantify the non-market values and benefits associated with various recreational resources and activities (Table 2). It shows that CVM can be used to measure the economic value of individual recreation benefits and demand for a recreation amenity or service (Walsh, 1986) and various potential variables (i.e. socioeconomic variables) could influence an individual's levels of willingness to pay. Literature also demonstrated that the results of CVM provide the basis for benefit-cost analysis, which is critical for the development and management of recreation programs and facilities. The present study to estimate the value of dog parks derive in part from previous efforts to estimate the value of open space, urban parks, and greenway, which help illustrate the use of contingent valuation in providing information to decision making about park planning and policy. In this respect, estimating the value of dog parks would also help local governments and park planners with better understanding and insights about the demands and benefits of dog parks.

CHAPTER III

RESEARCH METHODS

The post-occupancy evaluation and economic valuation of dog parks involved multiple data collection techniques including visual documentation, behavioral mapping, casual observation, and survey. The present study consisted of six phases. The first phase included the review of relevant literature on the concepts and research methods to establish a conceptual framework and a practical research strategy as shown in the previous chapters. The second phase included the selection of the sites to be used in the study as well as the gathering of general information regarding the selected parks. The third phase involved site visits and visual documentation of the design features of the park through photographs and physical inventory. Site observation and behavioral mapping of users of the park were conducted in the fourth phase. The fifth phase involved distributing a survey questionnaire to residents to investigate their perception, satisfaction, and values regarding the park environment. Human subjects approval was obtained from Texas A&M University. The sixth phase included analyzing and interpreting the data in relation to the purposes of this study. The dog park user's willingness to pay for dog parks was estimated in this phase. Based on the analysis of the collected data, design recommendations for dog parks were generated.

1. SITE SELECTION

To study the use of dog parks and measure users' satisfaction, four dog parks were selected including Harmony Dog Park (St. Cloud, Florida), Cattail Dog Park (The Woodlands, Texas), Danny Jackson Family Bark Park (Central Houston, Texas), and Millie Bush Bark Park (West Houston, Texas). The selected parks all receive considerable use, serve a variety of demographic groups, and support a number of activities of dogs and their owners. In addition,

they vary extensively in size, location, site layout, park features and surrounding land use. It was expected that those various park characteristics would generate different use patterns as well as different levels of satisfaction from park users. Harmony dog park was chosen, specifically, because it is recognized as the first dog park planned ahead in a development phase. The Harmony Community was committed to incorporating a dog park into the master plan in order to promote physical and psychological health as well as the social well-being of the residents. The community and the author, who was involved in the park development process as a designer, were interested in conducting post occupation evaluation of the dog park. The purpose of this evaluation was to investigate whether the initial design intentions were effectively executed, how the park functions, and how community residents value the dog park. Harmony Dog Park represents a dog park that is provided as a community amenity playing the role of a social hub. Since the park is sited within a residential context, its proximity was expected to influence use pattern of park users.

2. DATA COLLECTION

2.1. Visual and Written Documentation of the Site

Visual physical analysis for each site was conducted to explore and understand physical and social contexts and to visually document design features of the dog parks. A layout plan for each park was drawn, denoting access, fences, gates, furniture placement, and any other important design features. The visual analysis included: (1) circulation and orientations; (2) views into and out of the park; (3) microclimates within the park; and (4) opportunities for social interaction.

A design features checklist was developed to record the people and activities that take place in each park. The design features of the dog parks were noted, as well as the location relative to major roads, the ability to walk from surrounding neighborhoods, access to parking,

and any other site considerations that were notable. Photography was one form of visual documentation used in this study.

2.2. Behavioral Mapping and Observations

Behavioral mapping is a common observation tool for "identifying kinds and frequencies of behavior, and to demonstrate their association with a particular design feature" (Bechtel et al., 1987). The environmental context and its relationship with behaviors are considered important elements in environment-behavior research. Behavior must always be seen within an environmental context (Bechtel et al., 1987), and designers must know how the contexts of observed activities affect the activities, because in different socio-cultural and physical settings the same behavior can have different design implication (Zeisel, 1981).

The purpose of behavioral mapping in this study was to understand by whom the selected dog parks were being used, what user activities take place in the dog parks and how park features support these activities. Behavioral mapping and observation supplemented other methods used in this study by addressing real behaviors within an actual environment. Thus, the observation data may enhance the validity of the research. The observation focused on the following data:

(1) Users – gender, race, approximate age, number of companions
(2) Access- travel mode (walk, automobile, bike, others)
(3) Activities - what are dog owners doing in the park?
(4) The amount of time spent in the park – how long do dog owners stay at the dog park?
(5) Preferred park features and areas - which areas and facilities of park are used and which are not used?

A behavioral mapping recording form was designed to document the activities of park users and to collect detailed information (See Appendix C & D). The instrument was pre-tested

at a dog park and refined according to input from observation raters in order to make it more reliable and easier to use.

Systematic behavioral mapping and quantitative analysis focused on Cattail Dog Park and Danny Jackson Family Bark Park due to cost and time constraints. The two selected parks were proper to conduct behavioral mapping in terms of size and crowdedness. The other parks were also visited regularly for casual or unsystematic observation in order to familiarize with the park site and users' behaviors. The observation in Harmony Park was conducted for two weekdays and two weekend days in August. Since the collected data was not enough for quantitative analysis, only the filed notes from casual observation were reported.

2.3. Questionnaire Survey

A questionnaire was used to collect information regarding user satisfaction, perceptions, and perceived value of dog parks as well as to evaluate the residents' maximum willingness to pay for a dog park (See Appendix B). The survey instrument consisted of five data collection sections containing multiple choices, short answer, and ranking type questions. The first section asked respondents about the use of dog parks, actual recreational experiences and activities in the dog park; and satisfaction with park features and attributes. The second part was designed to elicit users' perceptions concerning the physical and social health benefits, i.e., influences of dog parks on property values and community. The third section included an evaluation of the value of dog parks to individuals. An open-ended payment card approach was adopted to evaluate the residents' maximum willingness to pay when they were required to buy an annual pass for using the dog park. The final section of the questionnaire was developed to gauge demographic data such as gender, age, race, education, and range of total annual income. Such data helps to assess whether the sample is representative of the general population and whether socio-economic status affects recreation pursuits and willingness to pay. The cover

letter of the survey explained the purpose of the study, time and forms of involvement in the research, confidentiality of participation, response anonymity, and contact person. In order to ensure that the survey instrument was working correctly and that the questions were clearly understood by respondents, a pre-test of the questionnaire by 25 dog-park users was conducted before implementing the full-scale survey. The pre-test allowed refinement of the survey format and rewording of the questions.

Two delivery methods including mail delivery and hand delivery were employed for the survey. The mail delivery was conducted July through August 2006 and was primarily designed to evaluate the satisfaction and perceived values of the Harmony Dog Park. The Harmony Community committed to conducting on evaluation study of the dog park and funded the mail survey. Therefore, the survey population in Harmony Community was all households living in the Community regardless of dog ownership. A list of addresses was provided by Harmony Community and all residents were sent a survey instrument along with a stamped return envelope. Two weeks after delivering surveys, follow-up notes were sent to the respondents.

The hand delivery surveys were conducted in September 2006 in Cattail Park, Danny Jackson Park, and Millie Bush Dog Park. The survey population was the dog-park users who visited the dog parks at the time the questionnaires were distributed. This method was chosen in preference to mail survey because of the constraints of cost and time and its expected higher response rate. The questionnaires were handed out to dog-park users two or more weekends at each park. People were approached at random in various parts of the dog park and asked whether they would be willing to participate in the survey. If so, they were asked to fill out the questionnaire and then to mail it back in the supplied stamped envelopes, which allowed respondents to have time to reflect on some of the questions. As this survey was distributed on

site there was no possibility of the usual follow-up mailings.

2.4. Contingent Valuation Method

Contingent valuation method (CVM) was used to measure the recreational value of dog parks in this study. The CVM has been widely used to estimate monetary value of non-market goods or recreational service. Ralston et al. (1991) stated that willingness to pay questions provide a theoretically correct measure of benefits associated with a new or existing site. Using interview or survey method, CVM asks people how much they would be willing to pay (WTP) for a specified recreational service. It is based on "the assumption the maximum a person would be willing to pay for goods or a recreational service is equivalent to the benefit they would receive from the goods or service" (Rollins and Wistowsky, 1997).

The two approaches commonly used in CV study are an open-ended format and dichotomous choice. An open-ended questionnaire simply asks the respondent to reveal his or her maximum WTP as opposed to a dichotomous survey which asks a series of questions in the multiple bid design. The present study used an open-ended format because it has the advantage of providing respondents with explicit and straightforward information and allows them to express their preferred amount of WTP. In addition, there is no possibility that a starting point or interval bias may influence the answers in the open-ended questionnaire. This approach has been successfully applied to valuing environmental goods (e.g. Tyrvainen & Viannaen, 1998; Jim & Chen, 2006). With regard to payment vehicles, an annual admission fee was chosen for the measurement of use value as an appropriate payment vehicle. Other payment types including tax, electric bills, license fees, or a special fund are often used in CV studies, but admission fees are considered the most logical and realistic payment method for users at recreation sites (Forster, 1989). Since people are generally familiar with paying admission fees

for activities at recreation sites (Lee and Han, 2002), it was assumed that people are less reluctant to pay annual fees than tax or special funds.

The CV questionnaire in this study informed respondents that data from their surveys would not be used for specific pricing policies for the admission fee, but instead for academic research to measure the economic value of recreation. This information was intended to help respondents express their true values as accurately as possible and to reduce the rate of zero-responses.

For estimating WTP, the independent variables that are expected to influence WTP should be selected and generally include income, travel time, the price of substitutes, individual preference and other socioeconomic variables (Loomis and Walsh, 1997). Previous studies have showed that willingness to pay is positively linked to income (Lorenzo et al., 2000) and negatively related with people per household. Distance has also been recognized as a major determinant in economic benefits estimations (Brown & Nawas, 1973; Zalatan, 1992). Breffle et al (1998) estimated a neighborhoods' WTP to preserve an undeveloped land and concluded that WTP increases with income, and decreases at a decreasing rate with distance. Pate and Loomis (1997) and Zalatan (1992) also found that distance negatively affects WTP. In this study, the eleven independent variables were selected based on implications from the findings of previous studies; travel time, frequency of visit, satisfaction level with facility, location, size, and maintenance, age, income, number of people in family, education, and perception of dog parks (Table 3). To improve understanding of the factors contributing to WTP, satisfaction level with different design aspects and perception about dog park benefits were included as independent variables into the regression model. The WTP for dog parks by household i maybe written as:

WTPi= f (income, satisfaction level, perception, travel time, education…)

Table 3
Variables used in the study

Variable		Description	Expected Sign	Unit
AGE	X1	Age of respondent	+	Years
FAM	X2	Number of people in family	-	Person
EDU	X3	Years of schooling	+	Years
INC	X4	Yearly household income	+	US dollars
TTM	X5	Travel Time	-	Minutes one way
FRQ	X6	Frequency	+	5 point scale
LOC	X7	Satisfaction level on park location	+	5 point scale
SIZ	X8	Satisfaction level on park size	+	5 point scale
MNT	X9	Satisfaction level on park maintenance	+	5 point scale
FAC	X10	Satisfaction level on park facilities	+	5 point scale
PER	X11	Perception about the community benefits of dog park	+	5 point scale

2.5. Summary

The four dog parks examined in this study included Harmony Dog Park (Harmony, Florida), Cattail Dog Park (The Woodlands, Texas), Danny Jackson Family Bark Park (Central Houston, Texas), and Millie Bush Bark Park (West Houston, Texas). The selected parks vary extensively in size, location, site plan, design features, and users' behaviors. Table 4 summarizes the methods of data collection in each site. Detailed information for each site and data analysis results are described in Chapter IV.

Table 4
Summary of data collection methods

Study Sites	Location	Data Collection Methods/ Population
Harmony Dog Park	St.Cloud, FL	Survey (Community residents) Casual Observation
Cattail Dog Park	The Woodlands, TX	Survey (Park users) Behavioral Mapping
Danny Jackson Family Bark Park	Houston, TX s	Survey (Park users) Behavioral Mapping
Millie Bush Bark Park	Houston, TX	Survey (Park users)

3. DATA ANALYSIS

The data derived from the behavioral mappings and questionnaires were systematically coded and analyzed using the statistical software, SPSS (Statistical Package for the Social Sciences) for Windows version 14. The units of analysis were the dog-park users and the activities at the dog parks from questionnaires and behavioral mappings, respectively. Descriptive statistics were executed to examine the data at the outset prior to further analyses. Frequency distribution and arithmetic average were presented in tables and charts where applicable. Chi-square tests were also performed to inspect the associations between the numerical indicators and respondents' socioeconomic background. Responses to open ended questions in the questionnaire were separately coded.

The Contingent Valuation questionnaire asked respondents to specify their willingness to pay to use dog parks, and the quantified responses were used to calculate monetary value of dog parks. In this study, WTP for dog parks was estimated using stepwise multiple regression. Loomis and Walsh (1997) stated that regression is frequently used because it provides a reasonably good estimate of WTP at a relatively small cost and statistical estimates of the effect of each observed variable.

4. VALIDITY AND RELIABILITY

Triangulation was used to check and establish validity and reliability for the qualitative research. Triangulation refers to the combination of two or more theories, data sources, methods, or investigators in one study of a single phenomenon to converge on a single construct. The basic concept of triangulation is that viewing from many different angles can provide more complete insight and a more rounded picture of the situation or someone's behavior. Guion (2002) identified five types of triangulation: data triangulation, investigator triangulation, theory triangulation, methodological triangulation, and environmental

triangulation, combinations of these methods can provide more complete insight. Three types of triangulation were used in this study.

First, methodological triangulation involved the use of multiple qualitative and/or quantitative methods and if each of the methods draws the same conclusion, then validity is established. In this study, data was collected using different methods including casual observations, behavioral mapping, questionnaires, and informal interview. Various methods of data collection have different advantages and disadvantages, thus using multiple methods in data collection enabled a high degree of validity in the conclusions.

Second, environmental triangulation involved "the use of different locations, settings and other key factors related to the environment in which the study took place, such as time of the day, day of the week or season of the year" (Guion, 2002). In this study, multiple dog park sites were selected to collect data and the observation sessions were conducted over a number days as well as a variety of days and times.

Third, observations were conducted by the author and additional rater for inter-observer reliability, a means of investigator triangulation. Inter-rater reliability is critical in collecting observation data in order to get reliable and consistent results. A pilot observation study was conducted to establish inter-observer reliability before collecting research data. For a 2- hour period, two raters observed and recorded activities of dog-park users at Danny Jackson Bark Park. These observations were checked to ensure that the coding categories were sufficient, and that any discrepancy in coding between the raters could be resolved.

To conclude, using different data collection techniques in multiple sites by more than one observer help enhance the validity and reliability of data, conclusions and design recommendations.

CHAPTER IV

RESULTS

This chapter contains the results of the data analysis based on the methodologies described in Chapter III. In the first section, site description and physical analysis are discussed. The results from behavioral mapping and observations are included in this section, followed by the survey results. The last section provides the estimated users' willingness to pay obtained from the valuation method.

1. DESCRIPTION OF STUDY SITES

The site analysis focused on the background of the community and its dog park, location, accessibility, park design features, and micro-climate. A Dog Park Facilities checklist describing specific details of the physical characteristics is provided in the end of this section.

1.1. Harmony Dog Park

1.1.1. Background

Harmony community is located in Central Florida's Osceola County, set amidst 11,000 acres of pristine and protected wilderness. The site includes two 500-acre natural lakes, and diverse plant and wildlife. Harmony was developed on the concept of building a complete community while maintaining respect for the natural environment and wildlife. In an effort to develop in an environmentally sensitive manner, Harmony's master plan developed only 30 percent of the 11,000-acre property and preserved more than six thousand acres in its original state. Also Harmony allows only kayaks, canoes and a limited number of special electric boats on the two lakes. Harmony has been recognized as an environmentally intelligent community and has received many awards for its vision and endeavors in sustainable development (Moore, 2001; "Award", 2003). Residents began moving into the first phase of homes in the summer of

2002 and currently there are approximately 260 homes in place. More than 7,000 single-family homes and apartment units are expected to be built in the community over the next 15 years.

The off-leash dog park was conceived in the planning process in light of the concept of Harmony, which promotes harmonious relationships between people, animals and nature. The Harmony Dog Park is recognized as the first dog park incorporated into the master plan of a new community ("Award", 2003). It was planned to promote physical and psychological health, as well as the social and spiritual well-being of Harmony residents, by providing a place for them to experience nature. The specific objectives of creating the dog park were: (1) to promote social interactions among the residents of the community by providing opportunities for various outdoor recreational and social activities, and (2) to provide a chance for interactions between humans and domestic animals in such a manner that promotes the health benefits of these interactions and encourages responsible pet ownership within the community. Opened in 2003, Harmony Dog Park has become a well-used park in the community of Harmony.

1.1.2. Site analysis

Located between Birchwood and Cypress Neighborhood, the Harmony dog park encompasses approximately 2.3 acres and includes two separate fenced-in areas—one for small dogs and one for large dogs. The dog park is bounded by the pond on the north side and preserved wetland on the south. The larger dog park (Fig. 5) is a 1.7-acre grassy field with power line easement running through the property. It is fenced with two benches, one double gated entry and one maintenance entry provided. The main attraction at the large dog park is wide open space for unrestrained games of Frisbee or fetch. Since the park is bordered on the north by the pond, many water fowls can be seen inside the park when it is not used by dogs. The 0.6-acre smaller park (Fig. 6) is reserved for smaller dogs, features grass, a pavilion (Fig.

7), three trees, a water hose for dogs (Fig. 8), three benches (two are under the pavilion and the other is not under shade), and a trash receptacle. It also has a lot of room for the small dogs to run. A dog bag dispenser is just outside the park. The small dog area is accessible from both north and south neighborhoods. Adjacent to the smaller dog area is a park with picnic tables, a game table, trees, concrete walk paths, and landscaping.

Fig. 5. Large dog area of Harmony Dog Park.

Fig. 6. Small dog area of Harmony Dog Park.

Fig. 7. Pavilion of Harmony Dog Park.

Fig. 8. Water play of Harmony Dog Park.

Fig. 9. Dog shower of Harmony Dog Park.

The grounds of both dog areas have a clean and tidy appearance with well-mowed grass. A four-foot black chain-link fence and hedges enclose the entire dog park. A system of double gated entries provides security for the dogs. Between the two areas are a paved dog wash station (Fig. 9), a dual-drinking fountain for dogs and owners, receptacles, and a fenced playground for the kids. Adjacent picnic grounds and child play areas accommodate the needs of different individuals in a family enjoying a day in the park. The only on-street parking is available at Cat Brier Drive. The park is open daily from dawn to dusk and there is no lighting in the dog park areas.

A microclimate is the distinctive climate of a small-scale area, such as a garden, park, valley or part of a city. The weather variables in a microclimate, such as temperature, rainfall, wind or humidity, may be subtly different from the conditions prevailing over the area as a whole. On a sunny day in summer, approximately 90% of the dog park is in the sun almost all day. The newly planted trees in the small dog area create very little shade and there are no trees in the large dog area. Therefore, the two benches under the pavilion in the small dog area, the only shaded seating area in the park, become very popular. The other benches are in the sun most of the time. In the morning, however, the interior of the pavilion is exposed to the sun and there is no shade at all inside the dog park. Mid-day in the summer, with temperatures over 90 degrees and combined with high humidity and a lack of shade would inhibit the use of the dog park. The water hose in the small dog area helps cool off dogs and their owners, though. Later in the afternoon when it gets cool and breezy, all the benches in the small dog area become comfortable places to sit and socialize, while those in the large dog area have no shade. In contrast with the dog park, the adjacent picnic area has shade trees, thus more seating options are provided (Fig. 10).

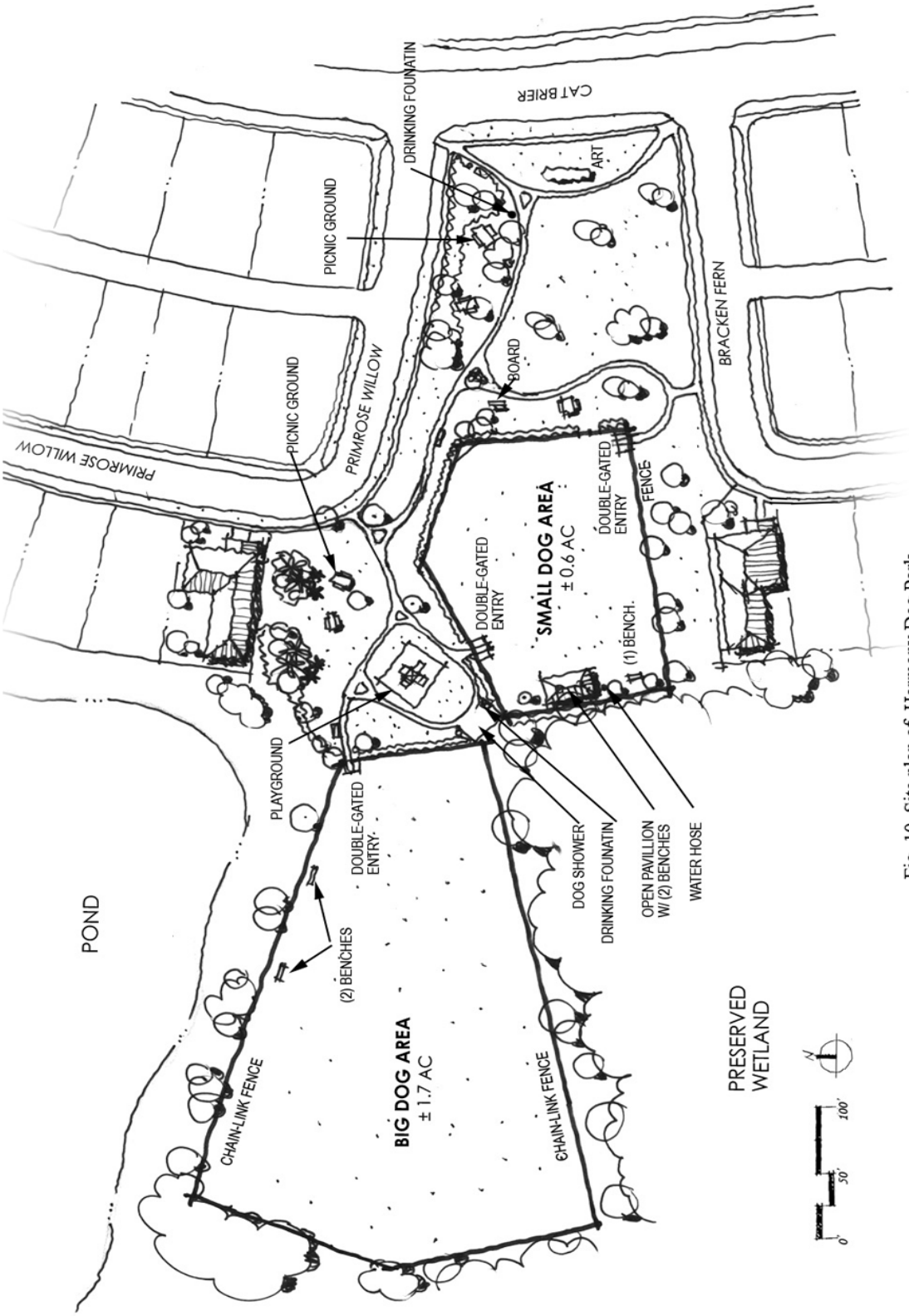


Fig. 10. Site plan of Harmony Dog Park.

1.2. Cattail Dog Park, The Woodlands, Texas

1.2.1. Background

The Woodlands is a 27,000-acre master planned community, 27 miles north of Houston, Texas. It is a census-designated place (CDP) and master-planned community with a total population of 80,659 (2005). Opened in October, 1974, it has grown steadily to become one of the region's most desired places to live and work (Community Association of the Woodlands, 2006). The Woodlands is famous for incorporating many of the environmental design principals espoused by Ian McHarg, a distinguished landscape architect. Designed with nature, The Woodlands community provides parks, lakes, ponds and six championship golf courses and creates environments that encourage people to walk. The Dog Friendly areas in The Woodlands are managed and maintained by The Community Associations of the Woodlands, Parks and Recreation Department. Cattail Dog Park and Bear Branch Dog Park are both located in the northern part of The Woodlands.

1.2.2. Site analysis

The first dog park in The Woodlands, Cattail Dog Park, resides within the 12.7-acre Cattail Park, a community park. Located within a golf course community, the park is surrounded by single family residences and preserved nature areas. It is also adjacent to a church on the north. The park is bordered to the south by a heavily wooded area. A trail in the park connects the whole community. There is also a small stream that runs along the park to the west. All users who drive to the park access it from Cochran’s Crossing Drive while park users who walk or bike use the trail for access. Cattail Park features a soccer field, ball fields, tennis courts, jogging path, skating area, playground, picnic areas, restrooms, a pavilion, and twenty four parking spaces. A variety of park amenities cater to multiple different types of park users.

Cattail Dog Park, dedicated in 2004, is over one acre in size and has separate small

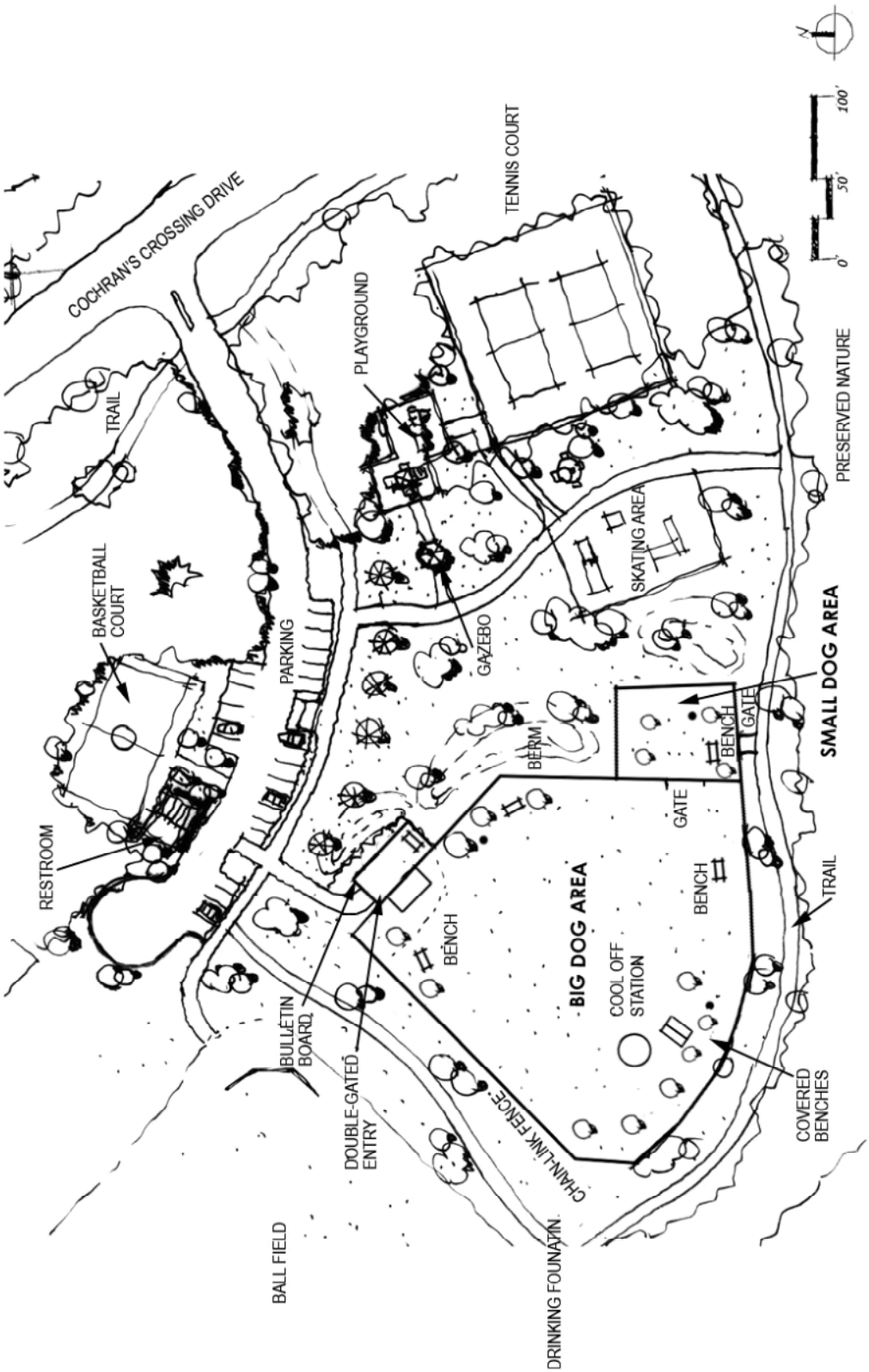


Fig. 11. Site plan of Cattail Dog Park

and large dog areas (Fig. 11). The dog park is used by not only the local residents as “a meet and greet” place, but also non-local population from nearby communities. Informal interviews with users revealed that some users drove up to 50 minutes on weekends to use the dog park.

The dog park is accessible from the parking lot and also from the jogging path on the south end of the small dog section. Since the majority of park users access the park by car, the main entrance is used more frequently (Fig. 12). Dog-park users share parking spaces with other park users. The dog park area is well separated from other park activities areas so there seems to be no conflicts with other park users. The concrete sidewalk is eight feet wide, which is enough for walking with dogs. Differently sized dog paws are printed in the concrete pavement leading from the parking lot to the gate. At the entry metal gateway, dog pictures welcome dog-park users. At the entry of there is also a bulletin board, and a big signage on which dog park rules is posted. The open, grassy field with subtle grading provides ample room for dogs to play (Fig. 13). On the west side of the dog park is a covered pavilion with benches on a concrete pad and a cool-off station. However, the benches under the pavilion are not arranged to foster interactions.

Fig. 12. Entrance of Cattail Dog Park.

Fig. 13. Open field of Cattail Dog Park.

Fig. 14. Pavilion and cool-off area of Cattail Park.

The cool-off station (Fig. 14) has a water tab and a hose, and pea gravel surface with stone edging. One of the advantages of being located in the existing park is that other park amenities provide families and user groups with a variety of park activities. Also, compared with the other dog parks, a restroom is conveniently located in the Cattail dog park. The

biggest disadvantage is the lack of shade due to young trees. There are also some worn out spots in the open field which becomes muddy after rain due to lack of proper drainage.

Bear Branch Dog Park, opened in 2005, is the second dog park of The Woodlands. Located within the six-acre Bear Branch Park, the dog park provides ample parking spaces and open space for dogs and their owners. The park is accessible on foot because community trails are connected to this site. The approximately 2-acre park site is fenced and separated into a large dog section and a small dog section. The dog park features a double-gated entry, drinking water, water hose, benches, dog waste bags and waste containers. One advantage of Bear Branch dog park is that the preserved pine trees inside the park offer protection from the sun and provides a cooler place for users. Another uniqueness of this park is the use of wood chip surfaces, which are controversial among dog owners due to sanitary problems.

1.3. Danny Jackson Family Dog Park, Houston, Texas

1.3.1. Background

Millie Bush Bark Park (MBBP) and Danny Jackson Family Bark Park,(DJBP) established and maintained by Harris County Precint 3, are the two represenatative dog parks in the Houston area. Ever since Houston established the first dog park, MBBP in 2004, the number of dog parks in Houston has increased. There are currently thirteen dog parks in the Greater Houston area and more dog parks are being costructed or are in the planning phase. According to the Harris County park department, Millie Bush and Danny Jackson are probably the busiest day-by-day park locations and they get more use compared to other outdoor amenities (Thai, 2006). According to Jill Cruz of the Houston Dog Park Association (Dicker, 2005), the large size and various park amenities of the two parks attract hundreds of dogs and people on a daily basis and people drive over an hour to use the park. The reasons for such popularity in Houston is that many people live in apartments or have a small backyard and

vehicle oriented streets often do not provide safe dog walking in neighborhoods. Reflecting Houston's racially diverse demographic characteristics, Houston dog parks serve many different types of users.

1.3.2. Site analysis

Located seven miles west of downtown Houston, Danny Jackson Bark Park (DJBP) is a unique dog park in Houston. The 2.5-acre linear park was built on a 100' wide power line easement along Westpark Drive. Opened in October, 2004, this off leash dog park receives considerable use, serves a variety of demographic and socioeconomic groups, and supports a number of off leash activities. The surrounding neighborhood of DJBP is characterized by a mix of high-density residences, single-family residences, office/ business, and commercial buildings. The uses immediately surrounding the park include a parking building to the south, a highway to the west, and a wearhouse and apartments to the north across Westpark Drive. The surrounding views of the park are unattractive due to rows of huge power towers along the park, overhead power lines, and the nearby power plant. The park is accessible from the north and south, but most dog-park users access it from Westpark Drive on the north side, which is directly connected with the highway. Few people access the dog park on foot because there is no sidewalk along Westpark Drive and crossing the street is quite unsafe.

The fenced-in park area is eighty feet in width and over fifteen thousand feet in length, encompassing two separate large and small dog areas (Fig. 15). The two dog areas are enclosed by a six-foot high chain fence and the hedges lining Westveiw Drive help screen busy streets. The big dog area is nearly one thousand feet long, providing a good walking path for dogs and their users. Double doors are not only at the entrance from the parking lot but also between the big and small dog area for security purposes.

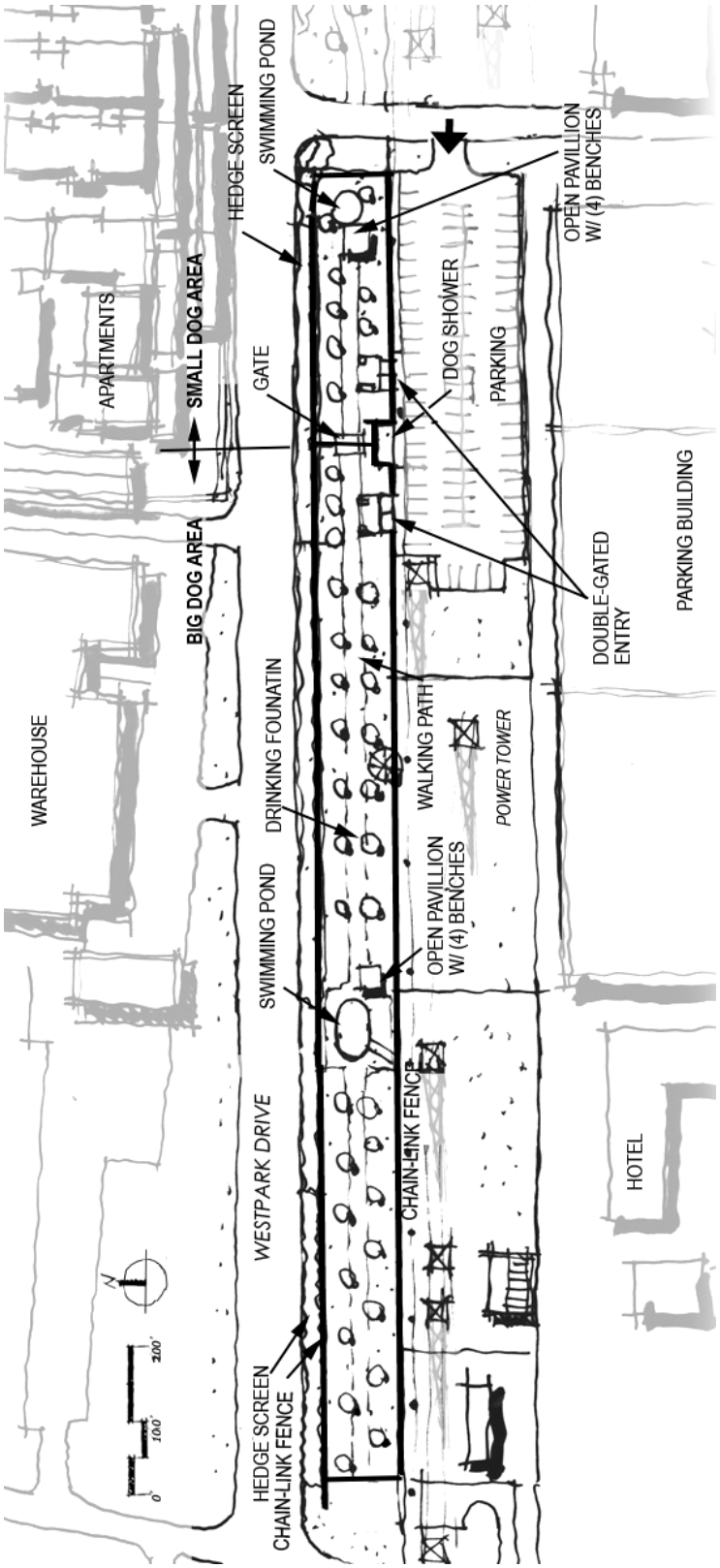


Fig. 15. Site plan of DJBP

Fig. 16. Swimming pond of DJBP (Photo by M. Davenport, 2005).

Fig. 17. Covered seating and swimming pond of DJBP (Photo by M. Davenport, 2005).

A dog swimming pool (Fig. 16) is located in the center of the large dog park and a canopy with benches (Fig. 17) is adjacent to it. The 0.2 mile long decomposed granite walking

path (Fig. 18) leads users from the gate to the pond area and to the other side of park. Along the walking path are benches, trees, poop pick up bag stations, fire hydrants, water drinking fountains and trash cans. The park for small pups also features a mini pool and smaller fire-hydrants. The sides of the walking path include grassy areas where dogs can explore and roam while walking with their owners. The open turf areas on the west side of the park offer abundant room for dogs playing fetch, running, and roaming. Many park users use the long path for their own exercise, walking repeatedly from one end to the other. The newly planted trees are not big enough to provide shade. The slopes on the north side become popular areas in the afternoon because hedges along the fence provide some shade. Many young couples and groups were observed sitting on the grass and talking. The asphalt parking lot provides 100 parking spaces including four handicapped spaces. The park is very accessible since there are no curbs. Between the gates for two dog areas is a dog wash station with two faucets and concrete surface for a clean ride home. This doggie shower (Fig. 19) is a popular feature of the park along with the dog swimming pool.

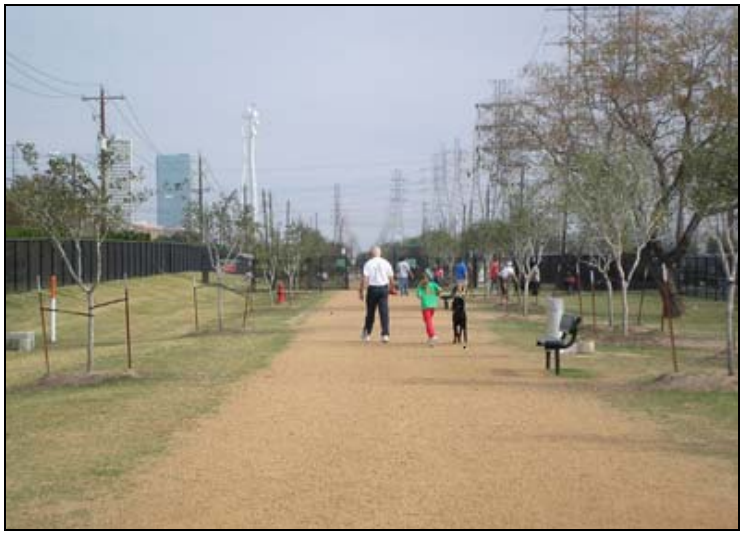


Fig. 18. Walking paths of DJBP.

Fig. 19. Doggie shower of DJBP (Photo by M. Davenport, 2005).

1.4. Mille Bush Bark Park

The fifteen acres Millie Bush Bark Park (MBBP), opened in December 2003, was the first dog park in Houston. Named after the late first dog of former President George Bush, it was ranked the nation's best dog park by *Dog Fancy* magazine in 2005. Located in the 7,800-acre George Bush Park in far west Houston, MBBP provides separate enclosures for large dogs and small dogs. The parking lot at the park can accommodate 100 vehicles, but it is often crowded, especially on weekends. MBBP is totally fenced in with a six-foot high vinyl coated chain link fence with double gated entrance gates (Fig.20). A decomposed granite walk path (Fig.21) meanders throughout the park with benches and water fountains along the way.

Fig. 20. Entrance of MBBP.

Fig. 21. Trails of MBBP.

There are three swimming ponds in MBBP (Fig.22). Overhead canopies with benches next to the ponds provide shade from the sun. Also, complimentary bag stations, water fountains for people and dogs, and hydrants are scattered throughout the park and benches and

picnic tables are provided outside of the fenced area. There is a doggie shower (Fig. 23) and a bulletin board in the entry area as well.

Fig. 22. Swimming pond of MBBP.

Fig. 23. Doggie shower of MBBP.

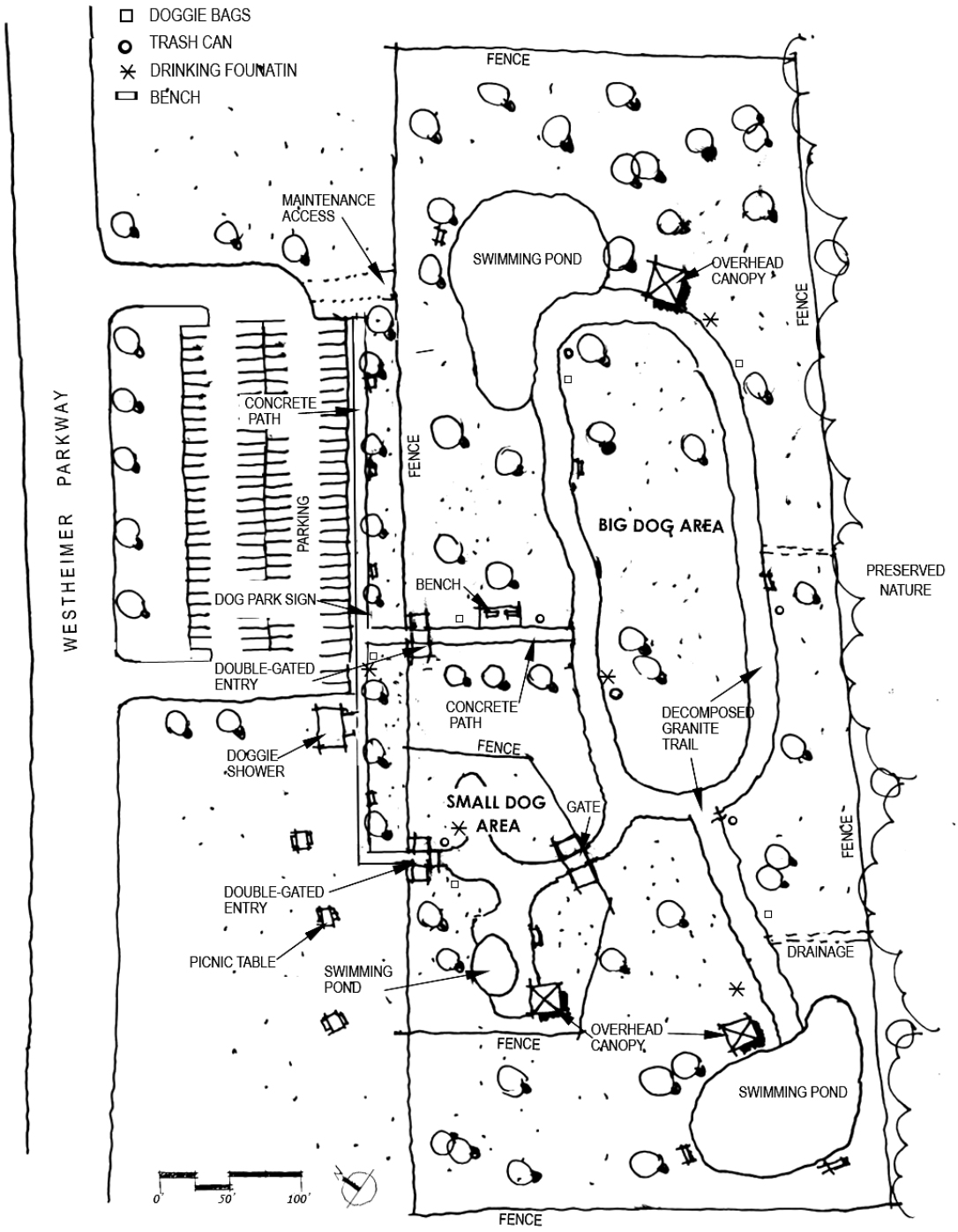


Fig. 24. Site plan of MBBP.

1.5. Summary

Each dog park selected for this study has very unique park characteristic in terms of size, location, site layout, and park features. Each has its advantages and disadvantages. Table 5 presents the summary of design features of the selected dog parks. The differences among dog parks were expected to influence users' satisfaction level and opinions on dog park design.

Table 5
Summary of dog park features

	Harmony	**Cattail**	**DJBP**	**MBBP**
Year opened	2003	2004	2004	Dec. 2003
Park Size	± 2.3 acres	± 1 acres	± 2.5 acres	± 15 acres
Site Context	Amid residential neighborhoods, walkable distance from most of residents' home	Residential area but not adjacent to neighborhoods. Community trail system connected. Part of the 13-acre Cattail Park.	Powerline easement, close to Downtown, adjacent to highway, warehouses, parking buildings, & APTs.	Part of the 7,800-acre George Bush Park, accessed by only vehicles.
Parking Availability	No designated parking spaces, on street parking	24 spaces shared with other park users	Large asphalt parking lot: 100 spaces	Large asphalt parking lot: 100 spaces
Dog Separation	Large and small dog separate areas, not directly connected	Large and small dog separate areas	Large and small dog separate areas	Large and small dog separate areas
Surface Materials	Grass	Grass/ DG & concrete at entry	Grass/ DG paths	Grass/ DG Trails
Fence/perimeter	4' high chain link fence w/ shrub hedge	6' high chain link fence	6' high chain link fence w/ shrub hedge along street	6' high chain link fence
Gate	4' high chain link double gates	6' high chain link double gates	6' high chain link double metal gates, separated enter/ exit gates w/ signs	6' high chain link double gates, separated enter/ exit gates w/ signs
Entrance/ Signage	No signage for park name or rules at the entry. Information kiosk nearby, but not very visible.	Interesting entry features including metal gateway w/ dog images and paw prints on sidewalk, bulletin board, bench next to the gate. A park rules sign is affixed on a fence.	A park rules sign is affixed on a fence.	A sign with image of Mille Bush (Barbara Bush's dog) and the park's name. A free-standing park rules sign at the entry.
Shade Structure	Pavilion w/ 2 benches under it.	Pavilion w/ 2 benches under it.	Two canopies w/ 4 backless benches	Three canopies w/ 4 backless benches

Table 5
Continued

	Harmony	Cattail	DJBP	MBBP
Seating	Benches are lined up at one side of park; not many seating options	Benches are scattered around park.	Benches are located along walking path & entry; backless benches under canopies	Benches are located along walking trails & entry; backless benches under canopies
Drinking Fountains	Provided outside dog play areas	n/a	Provided inside park	Provided inside and outside park
Operation Time	Dawn to dusk	Dawn to dusk	Dawn to dusk	Dawn to dusk
Maintenance	Clean; well mowed grass, well maintained; drainage issues-muddy after rain	Clean and well kept; turf in some areas has been worn away; drainage issues-muddy after rain	Clean; well-maintained pools	Clean; well-maintained pools
Play Areas	Both small and large dog areas are spacious for dog runs and fetching	Large dog area has open field for dog play but small dog area looks tight.	Linear park shape provides dogs and owners with long paths for walk and run.	Large open space and walking trails allow exercise and play of dogs and people.
Water Play Area	No designated water play area; 1 water tab w/o concrete pad, baby pool under the pavilion.	Water tab near the pavilion, pea gravel surface w/ stone edging baby pool	2 swimming pools w/ concrete edging	3 swimming ponds w/ concrete edging
Doggie Shower	Nice shower facility between two dog areas	n/a	2 water faucets on concrete pad at parking lot	1 faucet on concrete pad near parking lot
Lighting	n/a	n/a	n/a	n/a
Sanitation (Smell)	Pick-up bags located outside dog play areas	Pick-up bags inside park	Pick-up bags inside park	Pick-up bags inside park
Trees/ Landscaping	Newly planed trees, Lack of shade	Newly planed trees, Lack of shade	Newly planed trees, Lack of shade	Newly planed trees, Lack of shade
Other amenities	Playground between two dog areas. Picnic tables & benches outside the dog park.	Restrooms nearby, other park amenities (ball fields, skating park, trails, playground) close by.		Picnic tables & benches outside park.

2. BEHAVIORAL MAPPING AND OBSERVATION RESULTS

The purpose of behavioral mapping in this study was to understand how the selected dog parks were being used, who uses them and how design features support the activities. Using

systematic observation during randomly chosen time periods, park use was investigated for the months of July and August. The observation focused on the following data:

(1) Users – gender, race, approximate age, number of companions

(2) Access mode- car, bike, on foot, others

(3) Activities – social vs. unsocial, sedentary vs. active

(4) The amount of time spent in the park – how long do dog owners stay at the dog park?

(5) Preferred park features and areas - which areas and facilities of park are used and which are not used?

Each dog park was observed for at least 44 hours at various times of the day, during the week, and the weekends to better understand the full range of users and activities. Observations were made on at least eight weekdays and four complete weekend days for each location in the summer of 2006. Each observation period was two hours long. The behavioral mapping schedule was based on the results of a pilot behavioral mapping study. The pilot study revealed that summer peak visitation of the dog park occurred early in the morning and in the evening, especially on weekends. Thus, more observation sessions were arranged in the peak hours as shown in Table 6. All observations were conducted by the author and an additional rater for inter-observer reliability. The researchers maintained an unobtrusive presence in order to minimize influence on park user behaviors. The inter-rater reliability between the observers was checked after each observation period. Number of people categorized by demographic characteristics and user activities recorded on a behavioral mapping form was compared and the rate of consistency was computed. The inter-rater reliability between the observers was 92%.

Table 6
Typical behavioral mapping schedule

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Cattail (44 hours)							
Week 1		Evening	Morning Afternoon		Evening	Morning Afternoon Evening	Morning Afternoon Evening
Week 2	Evening			Morning Afternoon	Evening	Morning Afternoon Evening	Morning Afternoon Evening
DJBP (44hours)							
Week 1	Evening	Morning	Afternoon		Afternoon	Morning Afternoon Evening	Morning Afternoon Evening
Week 2	Evening	Afternoon		Morning	Evening	Morning Afternoon Evening	Morning Afternoon Evening
Harmony							
Week 1	Morning				Afternoon Evening	Morning Evening	Morning Afternoon Evening

A behavioral mapping form with a site plan of the dog park (See Appendix C & D) was used to record the date, time of day and weather conditions such as temperature, wind and micro- climate in each observation session. On 15-minute intervals, user activity was recorded on the form and the physical locations of dog-park users were marked on the site plan. The observers counted the number of users entering the park during the observation session along with detailed information including gender, race, approximate age group, and group types. The age group was coded as children, teens, 20-30s, 40-50s, and the elderly, and the group types as single visitor, couple, a single parent with children, parents and children, and mixed or friends group. The mode of dog park access (car, bicycle or on foot) was recorded in Cattail Park. A new behavioral mapping recording form was used for each observation session. A total of 88 hours of behavioral mapping was completed in two dog parks, yielding information on the behavior of more than 1,656 users.

2.1. Summary of Behavioral Mapping

2.1.1. Demographic characteristics of dog-park users

The dog-park users are a diverse group in terms of age groups, group size and group types (Table 7). Of the users observed in the park, 53.9 percent were male and 46.1% female. The most common age groups at Cattail Park were 40-50's (44.7%) and 20-30's (39.1%). Ten

Table 7
Demographic characteristics of dog-park users

		Cattail	DJBP	Total
Gender	Female	44.7%	46.9%	46.1%
	Male	55.3%	53.1%	53.9%
Age Group	20-30s	39.1%	47.4%	44.3%
	40-50s	44.7%	41.0%	42.4%
	seniors	6.2%	7.6%	7.1%
	teenagers	2.2%	0.9%	1.4%
	child	7.8%	3.1%	4.9%
Race	White	87.0%	67.3%	74.7%
	Black	2.5%	2.6%	2.5%
	Asian	8.1%	11.6%	10.3%
	Hispanic	2.5%	18.5%	12.5%
Group Types	Single Visitor	35.1%	44.8%	41.2%
	Couple	41.6%	36.5%	38.4%
	1 adult with children	9.6%	5.9%	7.3%
	Family	7.8%	2.6%	4.5%
	Peer group	5.9%	10.1%	8.6%

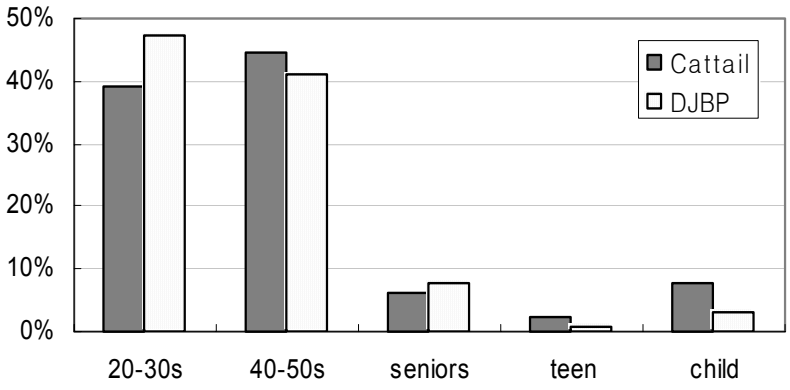


Fig. 25. Use of the dog parks by age groups.

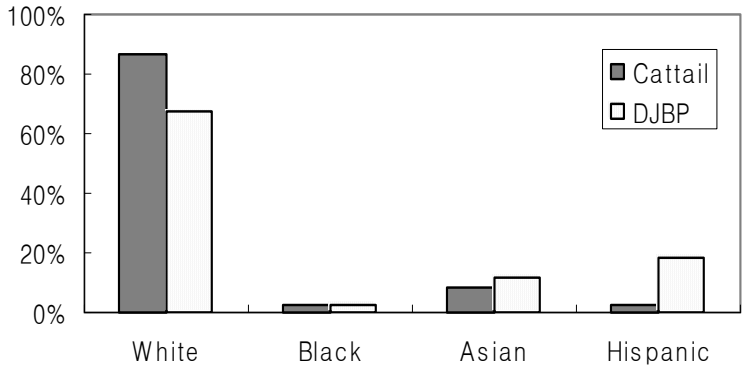


Fig. 26. Use of the dog parks by ethnic groups.

percent of park users were under 18 years of age, and only 6.2 percent were over 60 as identified by the observers. More 20-30s were observed in DJBP, followed by 40-50s and the seniors. Four percent of DJBP users were accompanying kids under 18 years old who made up 10.0 percent of the observed users (Fig. 25).

Regarding group types, couples were the most frequent group type observed in Cattail Park whereas more single users were observed in DJBP. Most single users were white while family or peer groups were predominantly Hispanic. This finding corresponded with Hutchison (1987), who found that Hispanic recreation patterns are distinguished from other ethnic groups in that a greater emphasis is placed on family activities and mixed age groups. As can be seen in Fig. 26, the largest percentage of users was white in both locations. The number of white users is substantially greater than other race groups. However, more minority users were seen at DFBP with 32.7 percent of users being non-white. Cattail Park was less racially diverse with 13% being non-white. This finding corresponds with census data that shows that Houston is racially diverse and has a large Hispanic population (Table 8). The differences in demographic characteristics between the two park users compared above are explained by the location of the dog parks and their surrounding community: DJBP is located close to Downtown Houston

within a relatively urban setting of apartments and town homes, while Cattail is located in the middle of a single-family residential community within a more suburban area.

Table 8
Profile of general demographic characteristics: 2005 census

	Woodlands	Houston
Total population	**65,744**	**4,113,152**
AGE		
Under 17 years	26.60%	28.80%
18 to 24 years	7.90%	9.80%
25 to 44 years	27.50%	30.80%
45 to 54 years	19.80%	14.40%
55 to 64 years	9.90%	8.90%
65 years and over	8.40%	7.30%
Median age (years)	37.8	32.5
SEX		
Male	48.50%	50.00%
Female	51.50%	50.00%
RACE		
One race	98.20%	98.60%
White	90.60%	62.30%
Black or African American	3.30%	17.80%
American Indian and Alaska Native	0.70%	0.40%
Asian	2.60%	6.60%
Native Hawaiian and Other Pacific Islander	0%	0.10%
Some other race	1.10%	11.50%
Two or more races	1.80%	1.40%
Hispanic or Latino origin (of any race)	7.70%	36.10%
White alone, not Hispanic or Latino	84.20%	38.50%
MARITAL STATUS		
Never married	23.90%	29.20%
Now married, except separated	62.00%	53.80%
Divorced or separated	9.30%	12.50%
Widowed	4.80%	4.50%
EDUCATIONAL ATTAINMENT		
Less than high school graduate	2.10%	22.40%
High school graduate (includes equivalency)	10.20%	23.50%
Some college or associate's degree	28.60%	25.30%
Bachelor's degree	39.50%	18.90%
Graduate or professional degree	19.70%	9.80%
HOUSEHOLD INCOME (2005 Inflation-Adjusted Dollars)		
Median household income (dollars)	85,314	45,740

Source: U.S. Census Bureau, 2005 American Community Survey

2.1.2. Temporal pattern of dog park use

Dog park use was found to vary considerably by day of week, time of day, and, particularly with weather conditions (Table 9). The summer months of June through August in the south of Texas can be too hot and humid to enjoy outdoor recreation, given daytime temperatures averaging in the upper 90s. Behavioral mapping revealed that temporal and spatial patterns of dog park use were closely related with weather conditions.

Table 9
Dog park use by time and weekday/weekend

Users	Morning	Afternoon	Evening	Total
Weekday	3.0 %	1.5 %	22.8 %	27.3 %
Weekend	21.8 %	6.4 %	44.6 %	72.7 %
Total	24.8 %	7.9 %	67.4 %	100.0 %

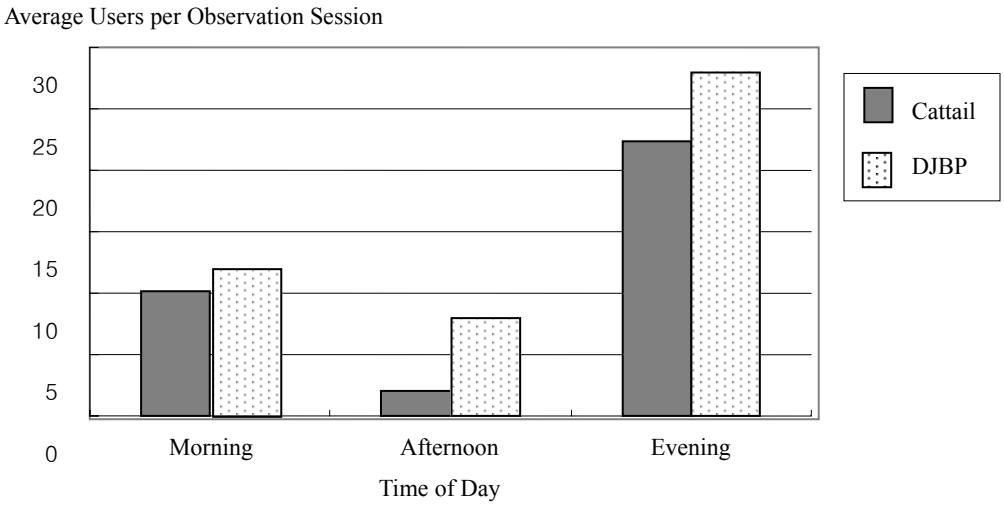


Fig. 27. Dog park use by time of day.

About 72.7% of park use was on weekends, 27.3% on weekdays. Peak use of dog parks was in the evenings and the slow hours were afternoon between 1:00 PM and 5:00 PM. Many elderly persons were observed in the early morning hours, but the number of park users diminished after lunchtime. Fig. 27 depicts the dog park use by time in terms of the average number of users per observation session in Cattail and DJBP. One important observation was that DJBP has a significantly larger number of users even in mid-day compared to Cattail. It is possible that the difference can be explained by the popularity of water play in DJBP. Interviews with DJBP users revealed that they came to the dog park particularly for dog swimming.

The length of stay of users also varied by time of day. Typical park users stayed in a dog park around 30 minutes. Over half of users observed (52.5%) spent between 30 minutes and 60 minutes, while 36% spent less than 30 minutes in the parks. A smaller number of visitors (12%) were observed to spend over one hour in the park. The average length of stay of DJBP users was slightly higher than Cattail users.

(3) Activities Observed

The activities observed during the course of the study are presented in Fig. 28. The activity observations focused on examining how much dog park users engage in mobile activities and social interaction. The hypotheses regarding the activities of dog park users were: 1) there are differences in user activities among the selected dog parks, and 2) the different physical environments of parks are expected to influence users' social and mobile activities in a dog park. These hypotheses were established to see not only whether dog parks play a role in promoting a sense of community, but also whether dog parks can provide opportunities of exercise for dog owners as well as their dogs.

To record the level of mobility and interaction of dog park users, the recording sheet was

designed to record users' activities into four types: social/ nonsocial observations and mobile/ stationary observations. Social observation included talking or walking with another; nonsocial observations included watching dogs play, reading, or talking on the phone while sitting, walking, or standing alone; stationary behaviors included sitting or standing; and mobile observations included walking around the park or playing with dogs. The inter-rater reliability between the observers was 92%. A single individual was recorded whether he or she is socializing and stationary during each observation session, thus, the number of behavioral observations was greater than the number of users observed.

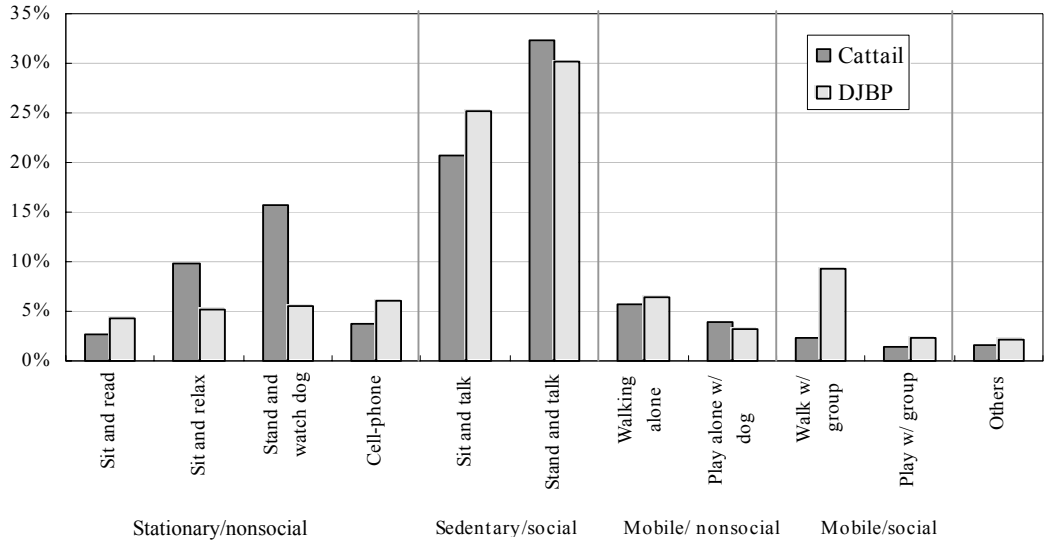


Fig. 28. Activities at dog parks.

Dog-park users typically relaxed and talked while watching their dog play with other dogs. The most common types of activities were social/ stationary activities (54.5%), followed by nonsocial/stationary (25.3%), nonsocial/mobile (9.7%), and social/mobile (8.7%). The typical social/stationary activities were sitting or standing on the canopied benches talking with other users and watching their dog. Nonsocial/stationary behaviors included sitting alone

reading a book or newspapers, and watching dogs play. Other activities observed in DJBP included taking pictures of dogs, smoking, talking on the phone, and drinking coffee. There were no distinct gender or racial differences found in the types of activities, however, children were more likely to be active in playing with dogs.

The predominant activities among Cattail Park users were stationary activities, primarily sitting on benches and talking with other users. A small number of people were observed in mobile activities (15.0%). Cattail park users were more likely to come by car (92.0%). Some people accessed by foot or bike on rare occasions. Cattail Park was easier to access by foot or bike than DJBP because of its location within a residential area and its connection to the trail system at The Woodlands. During peak hours, however, the twenty-one parking spaces were usually full and some cars were not parked at designated parking stalls. Cattail users commented on the need for more parking spaces when asked in a survey if they would recommend any physical changes for the dog park.

More diverse and active behaviors were observed in DJBP. Nearly a quarter of DJBP users (23.6%) were observed participating in mobile activities including walking and playing with dogs around the pond and the open lawn. The linear shape of DJBP and its walking path seemed to encourage exercise walking. The sociofocal seating arrangement near the pond in DJBP fostered talking and interacting with other users. Another important activity in the DJBP was washing the dogs before letting them get in a car. The shower station in the parking lot often got crowded and there was usually a long line. Casual observations at the parking lot revealed that the predominant number of users (96%) accessed the park by car.

2.1.4. Spatial patterns of use and popular design features

The most popular areas in the Danny Jackson Park were covered benches and the water play area. In Cattail Park, the pavilion with benches was the most commonly used park

feature. A large percent of social behaviors were observed in these areas. Benches placed individually were mostly used by single users. Fig. 29 and Fig. 30 show the popular areas of each park. There was relatively less use of the open grassy areas where there was no seating, and in particular, almost no use in the middle of a hot day. Trees in both parks provided little shade and most of the park areas were exposed to the sun. People often were seen squatting down under the small trees to get some shade. In the case of DJBP, young couples or peer groups were often observed sitting on the grass along the north side of the fence and hedge which provided some shade in the afternoon.

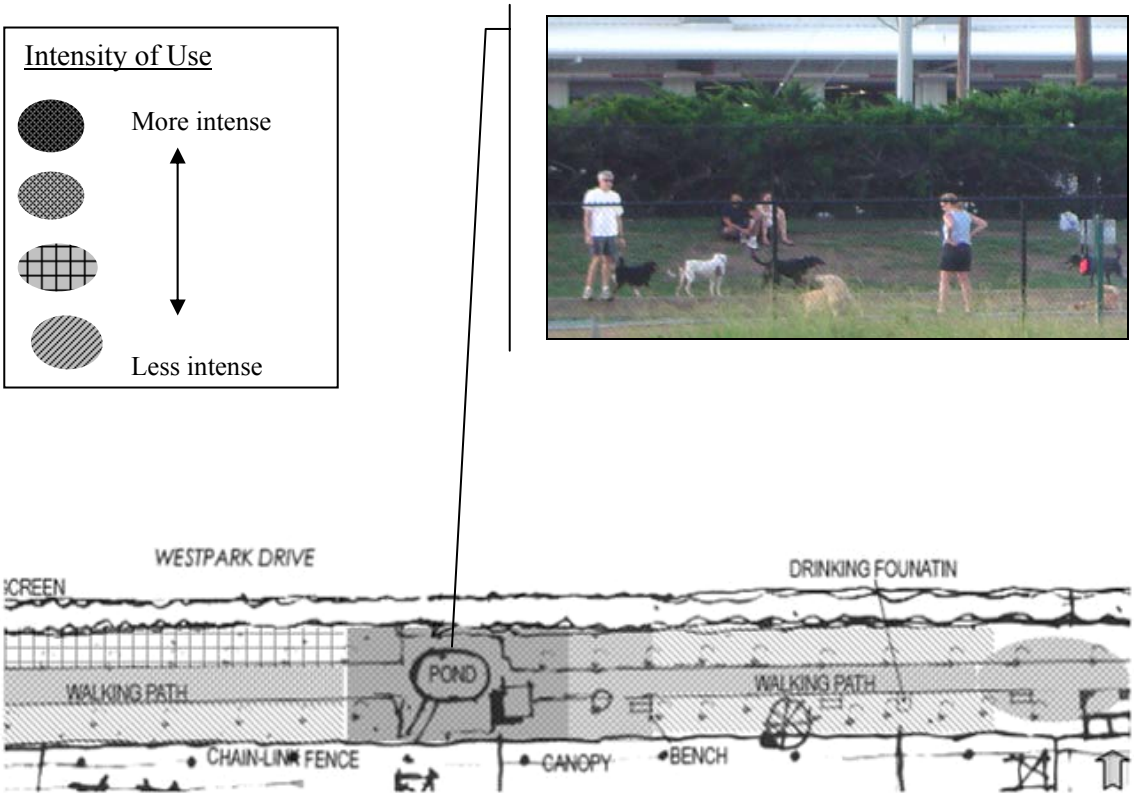


Fig. 29. Spatial pattern of use at DJBP.

The swimming pond was the most attractive feature at DJBP, particularly during the hot summer season. Some users commented that they come to the dog park specifically so that their dogs can swim and cool down. However, the water hose and baby pool in Cattail Park did not seem to get used as much as the swimming pool. A few children were observed splashing water on dogs during the observation period.

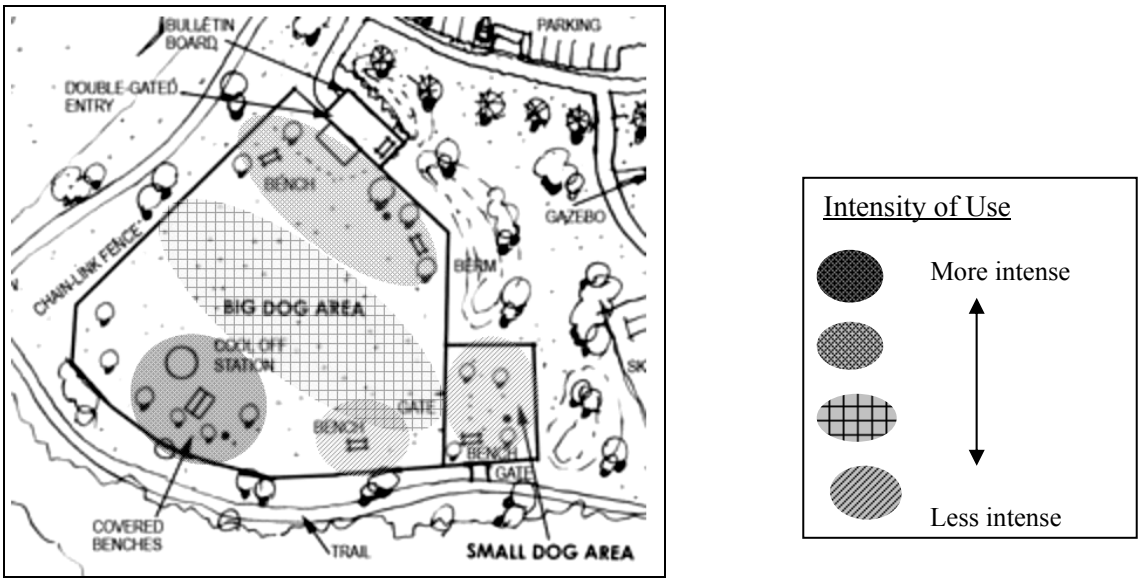


Fig. 30. Spatial pattern of use at Cattail Dog Park.

2.2. Casual Observation in Harmony Dog Park

The dog-park users included children, adolescents, adults, and the elderly. Typically in the small dog area, adult users sat on the canopied benches, or stood talking and watching dogs, while children actively played with the dogs. During the observation period, there was very little use of the large dog park area where there was no shade. There was also little use of

the picnic area. It appeared that the most popular areas in the dog park were the covered pavilion and the benches in the small dog area. The playground between the two dog runs was also popular with children and dogs. Several children were observed playing with dogs in the playground. Most users walked to the park and children rode bicycles. One resident who brought a golf cart gave a ride to several dogs and owners.

Observation revealed that the dog park often appeared to be empty for long periods of time during mid-day but was well utilized during weekend mornings and in late afternoons. A maximum of three or four residents used the dog park simultaneously in the middle of the day, probably because of high temperature and humidity. During mid-day, most users walked briefly around the park and then left within a few minutes. Most users spent between ten to fifteen minutes in the park during the morning hours. They seemed to prefer walking around the community along the shaded trails instead of being confined to the dog park. The most popular time for using the dog park was about five o'clock in the afternoon, when it began to cool down. On the weekend, about twenty people were observed between five and six o'clock. During these times, the dog park plays the role of a social hub within the community. People appeared to know each other very well and sometimes took a neighbor's dog to the park.

3. RESULTS FROM THE DOG PARK SURVEY

This section summarizes the data obtained from the questionnaire survey, presents the analyses performed, and describes the results. The survey was designed to identify the general use pattern of dog parks, to understand users' satisfaction and perception regarding dog parks, and to estimate the recreational value of dog parks. In this section, the results are presented in sequence. The overall survey profile is discussed first, followed by a description of the respondents' demographic and socioeconomic characteristics (e.g., gender, age, education, income, etc) and dog ownership. The next section discusses the dog-park users' satisfaction

with dog parks and their perception of dog parks. The survey results regarding users' willingness to pay for dog parks and its relationship with the selected variables are discussed in the following section.

3.1. Survey Profile

A mail survey (See Appendix B) was conducted in Harmony Community to reach all Harmony residents while hand delivery survey was used at Cattail, Danny Jackson, and Millie Bush Dog Park. In the mail survey in Harmony Community, there were a total of 224 delivered surveys and 27 undeliverable surveys, of which 90 questionnaires were returned, for an effective response rate of 45.7 %. The response rate for the other three parks ranged from 67.8% to 71.1%. A detailed survey profile is shown in Table 10.

The relatively low response rates in Harmony can be explained by the fact that the sample in Harmony included non-dog owners who probably have less interest in the dog park survey. The participants in the hand survey expressed their interests in the survey and often provided comments on the dog park. Three responses were considered invalid and unusable since little useful information was provided on the questionnaires. As a result, a total of 302 valid responses were used for further analysis with an overall 60% response rate.

Table 10
Survey profile

	Surveys distributed	Surveys deliverable	Surveys completed n	Response rate %
Harmony Park	224	197	90	45.7 %
Cattail Park	125	125	87	69.6 %
Danny Jackson Park	90	90	64	71.1 %
Millie Bush Park	90	90	61	67.8 %
Total	529	502	305	60.2 %
Response rate = (the number of completed surveys / the number of delivered surveys) X100				

3.2. Residents' Socioeconomic Characteristics

The socioeconomic and demographic characteristics of the valid dataset are presented in Table 11. A majority of the survey respondents were female (67.6%). The average age of respondents was 43.3 years and 73.1% of the respondents fell between the ages of 25-54. The average schooling years was 16.3 years. The majority of the respondents (74.4%) had no children under age 18 living in their household. and 71.5% were married. Average reported annual household income was $95,709 calculated using the midpoint of given intervals. Considering that 72.4% of the respondents held a college degree or higher (25.8 % held at least a Masters degree), it can be expected that the annual household incomes would be high. Moreover, 39.7 % of all respondents reported a household annual income above $100,000. The majority of the respondents (86.4%) owned their homes. In summary, the participants of this study were more likely to be between 25 and 54 years old, white, married, highly educated, with annual household incomes between $60,000 and $120,000.

Table 11
Socioeconomic profile of respondents

		Frequency	Percent (%)	Cumulative %
Gender (n=293)	Male	95	32.4	32.4
	Female	198	67.6	100.0
Age (n=294)	18-24	16	5.4	5.4
	25-34	82	27.9	33.3
	35-44	60	20.4	53.7
	45-54	73	24.8	78.6
	55-64	51	17.3	95.9
	65 Up	12	4.1	100.0
Race (n=294)	African-American	7	2.4	2.4
	Asian	18	6.1	8.5
	Hispanic/ Mexican American	27	9.2	17.7
	White/ Caucasian	236	80.3	98.0
	Other	6	2.0	100.0
Marital Status (n=295)	Single	60	20.3	20.3
	Married	211	71.5	91.9
	Divorced	22	7.5	99.3
	Widowed	2	.7	100.0

Table 11
Continued

		Frequency	Percent (%)	Cumulative %
Number of people in family (n=294)	1	44	15.0	15.0
	2	164	55.8	70.7
	3	44	15.0	85.7
	4	30	10.2	95.9
	5	7	2.4	98.3
	6 or more	5	1.7	100.0
Number of Children under 18 (n=293)	None	218	74.4	74.4
	1	41	14.0	88.4
	2	24	8.2	96.6
	3	7	2.4	99.0
	4	3	1.0	100.0
Level of Education	High School Degree (12 Yrs.)	14	4.8	4.8
	Some College (>12 Yrs.)	67	22.8	27.6
	College Degree (16 Yrs.)	137	46.6	74.1
	Graduate School (>16 Yrs.)	51	17.3	91.5
	21 Years or more	25	8.5	100.0
Job (n=293)	Full Time	185	63.1	63.1
	Part Time	12	4.1	67.2
	Self Employed	39	13.3	80.5
	Retired	31	10.6	91.1
	Student	4	1.4	92.5
	Homemaker	14	4.8	97.3
	Others	8	2.7	100.0
Income (n=282)*	Less than 20,000	4	1.4	1.4
	20,000 - 39,999	20	7.1	8.5
	40,000 - 59,999	25	9.2	17.4
	60,000 - 79,999	53	18.8	36.2
	80,000 -99,999	68	24.1	60.3
	100,000 - 119,999	34	11.3	72.3
	120,000 -139,000	16	5.7	78.0
	140,000 Up	63	22.3	100.0
Residence (n=295)	Single Family Home	242	82.0	82.0
	Apartment/ Condo	43	14.6	96.6
	Duplex/Triplex	8	2.7	99.3
	Other	2	0.7	100.0
Home Ownership (n=294)	Rent	40	13.6	13.6
	Own	254	86.4	100.0
Length of Residence (n=293)	Less than 1 Year	56	19.1	19.1
	1-2 Years	63	21.5	40.6
	2-3 Years	47	16.0	56.7
	3-5 Years	29	9.9	66.6
	More than 5 years	98	33.4	100.0

* The data of respondents who declined to answer certain socioeconomic questions were omitted in the analysis.

3.3. Dog Ownership and Outdoor Activity of Dogs

Among the 267 dog owners[1] in the study, over 62 percent had one dog and 37.8 percent own more than one dog. On average, there were 1.2 dogs per dog owner. Among the ogs owned, 47.1 % were over 51 lbs, followed by medium (21-50 lbs) dogs (31.9%) and small (20 lbs or less) dogs (21 %). When asked about the relationship with their dogs, 98.5 percent of dog owners responded that they are very attached to their dogs and consider them as their family (Table 12).

With regard to the average outdoor activity of dogs (Table 13), the majority of dog owners (74.0 %) provided exercise for their dogs at least once a day. The most frequented locations for outdoor activity were dog parks (33.4 %), followed by walking around neighborhoods (31.0 %) and the backyard (18.3 %).

Table 12
Dog ownership

		Frequency	Percent	Cumulative %
Number of Dogs (n=267)	1	166	62.2%	62.2%
	2	80	30.0%	92.1%
	3	16	6.0%	98.1%
	4	2	.7%	98.9%
	5	3	1.1%	100.0%
	Total	267	100.0%	
Size of Dogs	under 20 lbs	66	21.0%	21.0%
	21-50 lbs	100	31.9%	52.9%
	over 51 lbs	148	47.1%	100.0%
	Total	314	100.0%	
314 dogs / 267 dog owners = Average 1.18 dogs per owner				

[1] Out of the 305 persons who completed the survey, 34 persons (29 in Harmony and 5 in The Woodlands) were not dog owners but expressed their perception and opinions on dog parks. The reason that the responses from Cattail Park included non dog owners is because surveys were handed out to other park visitors who used other park amenities other than the dog park

Table 13
Outdoor activity

	Frequency	Percent
Frequency of outdoor activity		
2+ times a day	19	7.1
daily	159	59.8
4-5 times per week	45	16.9
2-3 times per week	31	11.7
once a week	4	1.5
2-3 times per month	4	1.5
once a month	2	.8
less often	2	.8
Total	266	100.0
Outdoor activity	Frequency	Percent
Taking to an off-leash dog park	241	33.4%
Walking around neighborhood on leash	224	31.0%
Leaving off-leash in backyard	132	18.3%
Walking to a nearby park on leash	107	14.8%
Other	17	2.4%
No outdoor exercise provided	1	.1%
Total (multiple responses)	722	100.0%

3.4. Dog Park Usage

3.4.1. Frequency of dog park visit

Among the 256 dog-park users[2], 13.5 % have visited dog parks on a daily basis and 2 % have visited it more than twice a day (Fig. 31). Over 73 % of dog owners visit the dog park at least once a week (Table 14). The Harmony dog-park users visited the park significantly more often than the other groups ($F = 40.82$, $p < .01$). Over thirty percent of Harmony park users visited the park more than once a day whereas daily users of other dog parks ranged from 3.5% to 19.1%. Nearly three-quarters (74.5%) of Harmony users visited the park at least once a week. The DJBP and MBBP users reported that they visited the park, on average, between 2-3 times a week and once a week. The first hypothesis attempted to find a relationship between

[2] Out of 267 dog owners, eleven respondents (6 in Harmony and 5 in The Woodlands) responded that they have not visited a dog park in their community.

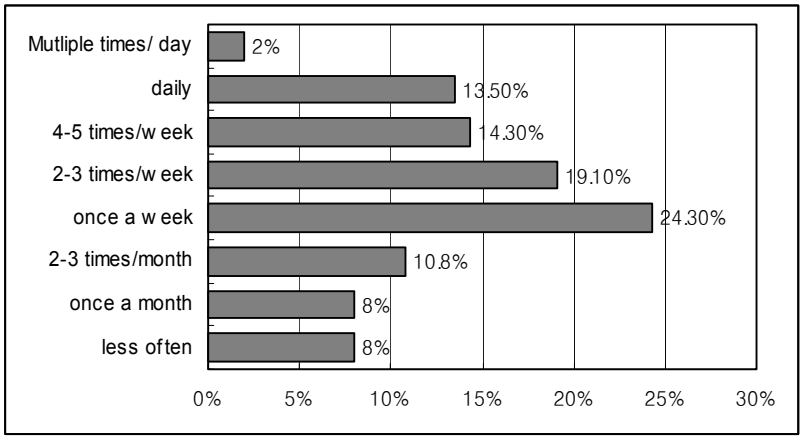


Fig. 31. Frequency of visit to dog parks.

Table 14
Frequency of visit by the study sites

	Harmony	Cattail	DJBP	MBBP	Total
2-3 times a day	5.5%	1.3%	1.6%	.0%	2.0%
daily	25.5%	9.2%	17.5%	3.5%	13.5%
4-5 times per week	12.7%	21.1%	12.7%	8.8%	14.3%
2-3 times per week	18.2%	14.5%	30.2%	14.0%	19.1%
once a week	12.7%	26.3%	17.5%	40.4%	24.3%
2-3 times per month	7.3%	11.8%	11.1%	12.3%	10.8%
once a month	7.3%	7.9%	4.8%	12.3%	8.0%
less often	10.9%	7.9%	4.8%	8.8%	8.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

distance to a park and frequency of visit. It was expected that Harmony dog-park users living close to the park visit more frequently than other park users. As illustrated in Fig. 32, Harmony park users frequented the park significantly more than other park users. A chi-square test indicated a significant difference between the selected park users in the frequency of visit ($\chi 2$ = 40.82, df = 21, p < .01). In addition, the results of the correlation analysis showed that correlation between travel time (distance) and use frequency was significant at the 0.01 level (r=-.361). It was conclude that proximity to a dog park promotes frequent visits.

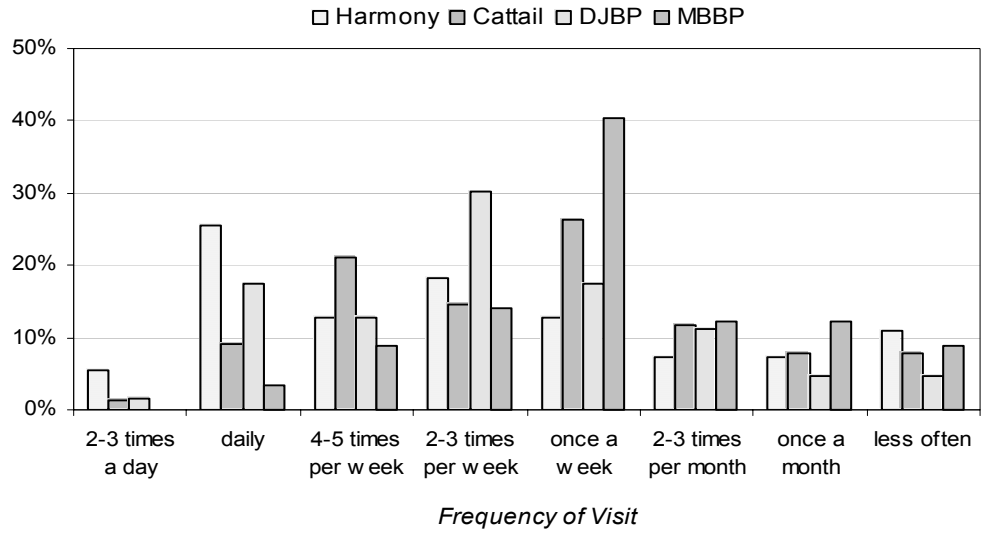


Fig. 32. Frequency of visit by the study sites.

3.4.2. Access mode

When asked how they travel to the dog park, 75.1 % of the respondents answered that they access the dog park by vehicle, followed by on foot (24.5 %) and bike (0.4%). It was expected that there would be differences in travel mode between Harmony dog-park users and the users of the other sites. A chi-square test showed that there was a significant difference among the park users in travel mode (χ^2=190.723, p=<.001). In Harmony Community, the majority of dog owners (95.6 %) walked to the park and only 5.5 % used automobiles to visit the dog park (Fig. 33). Most Harmony residents lived within a half mile radius of Harmony Park so that people could access the park without driving. A majority (63 %) of these dog owners live within a five minute walk from the dog park and over 90.0 % answered that it takes them less than ten minutes to access the dog park from their home. The average travel time to Harmony Dog Park by walk is 6.5 minutes. On the contrary, other park users heavily depended on driving to visit dog parks due to the long distance. Approximately ten percent of

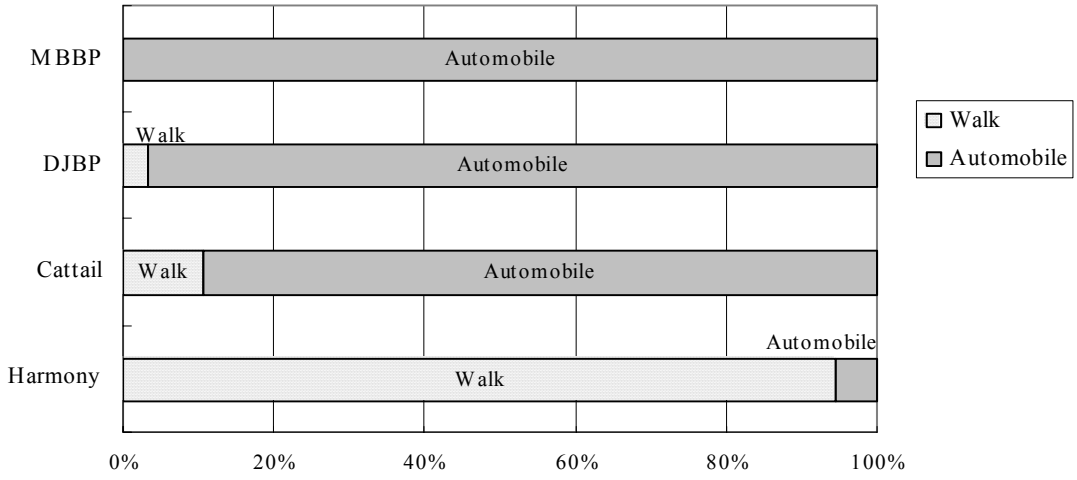


Fig. 33. Mode of park access by the study sites.

the Woodlands dog-park users walk to the park but the remaining 88.2 % drive to the dog park. The majority of dog-park users in Houston use vehicles to access the dog parks.

3.4.3. Travel time

It was found that the average travel time was 11.7 minutes (S.D.=10.85) and the average driving time was 15.2 minutes (S.D.=10.25). Fig. 34 shows the differences among the clusters in terms of travel time to access the dog parks. The MBBP users have a longer drive than users of other parks at an average of 22.4 minutes (S.D.=10.4). The average travel time of Cattail users and DJBP users were 12.4 minutes and 10 minutes, respectively. The majority of Harmony dog-park users (95.6%) usually walk to the dog park. The Harmony Dog Park has the most residents living within walking distance (defined as a ½ mile radius), and they are able to access the dog park without driving. Close to 63% of these dog owners live within a five minute walk from the dog park and over 90% answered that it takes them less than ten minutes to access the dog park from their home (Table 15). The average travel time of Harmony dog-park users is 6.5 minutes on foot. The results of cross tabulation analysis and one-way ANOVA revealed that the average travel time between the groups are significantly different, with F =

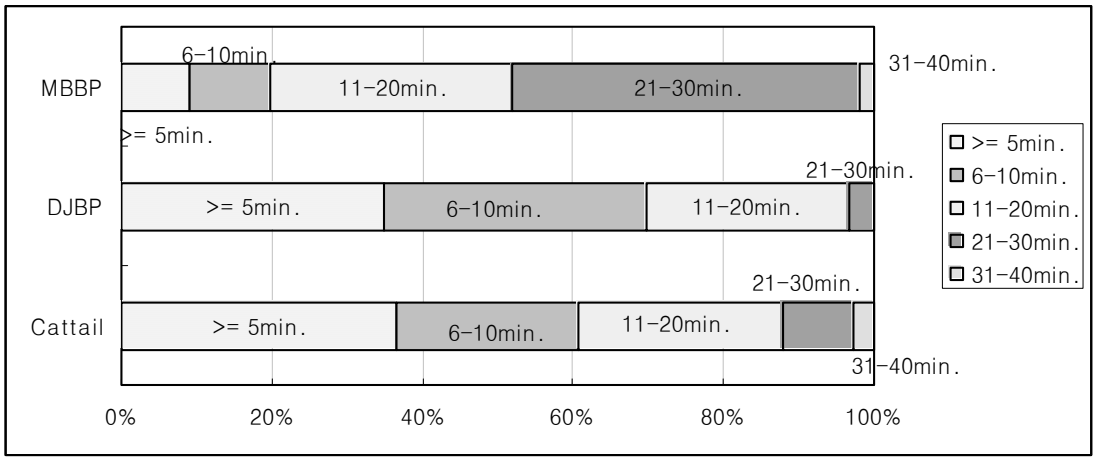


Fig. 34. Travel time (driving) to dog parks by the study sites.

Table 15
Travel time (driving) to dog parks by the study sites

	Harmony	Cattail	DJBP	MBBP	Total
Mean (S.D.)	0.68 (0.54)*	12.4 (9.97)	10 (6.08)	22.4 (10.4)	11.7 (10.85)
Less than 5 min.	53 100.0%	27 36.0%	22 34.9%	5 8.5%	107 42.8%
6 min. to 10 min.	0 .0%	18 24.0%	22 34.9%	6 10.2%	46 18.4%
11 min. to 20 min.	0 .0%	20 26.7%	17 27.0%	18 30.5%	55 22.0%
21 min. to 30 min.	0 .0%	7 9.3%	2 3.2%	26 44.1%	35 14.0%
31 min. to 40 min.	0 .0%	2 2.7%	0 .0%	1 1.7%	3 1.2%
41 min. to 50 min.	0 .0%	1 1.3%	0 .0%	3 5.1%	4 1.6%
Total	53 100.0%	75 100.0%	63 100.0%	59 100.0%	250 100.0%
* Walking time was converted into driving time for the comparison of travel time					

69.038, $p < .001$. The results of the correlation analysis showed the correlation between travel time (distance) and use frequency is significant at the 0.01 level.

3.4.4. Days visit and length of stay

Popular days of visit among dog-park users were during weekend mornings (30.2%), weekday evenings (20.8%) and weekend evenings (16.7%). Of the remaining respondents, a

smaller proportion (6.9%) use dog parks on weekday afternoons between 12 pm and 6 pm (Fig. 35). Most dog owners (47.0%) stay for thirty minutes to one hour and nearly 29 percent usually stay in the park for one hour to two hours during their visits (Fig. 36). In the selected study areas, the time of visit during the day and duration in a park vary depending on weather condition.

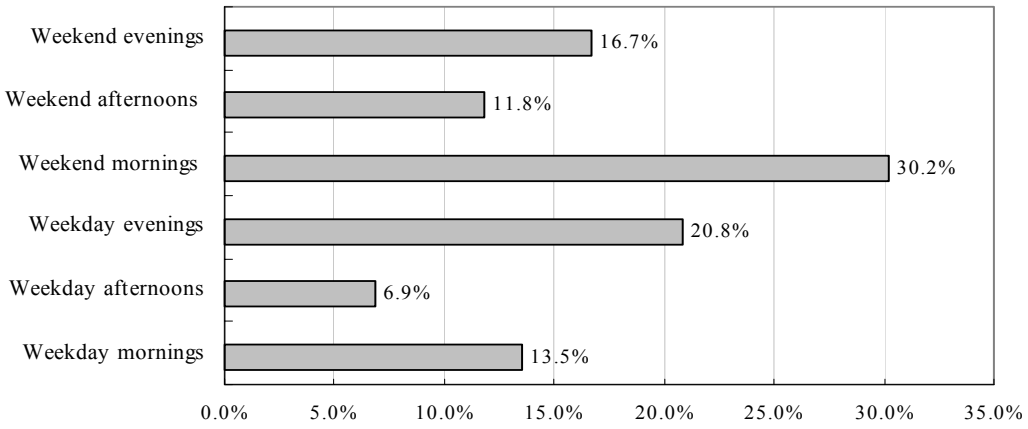


Fig. 35. Dog park use by days and time.

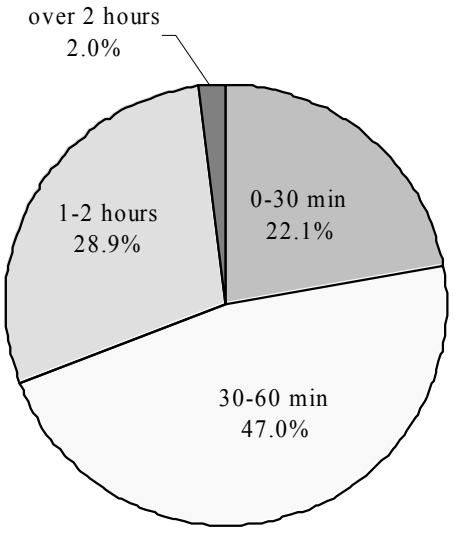


Fig. 36. Length of stay.

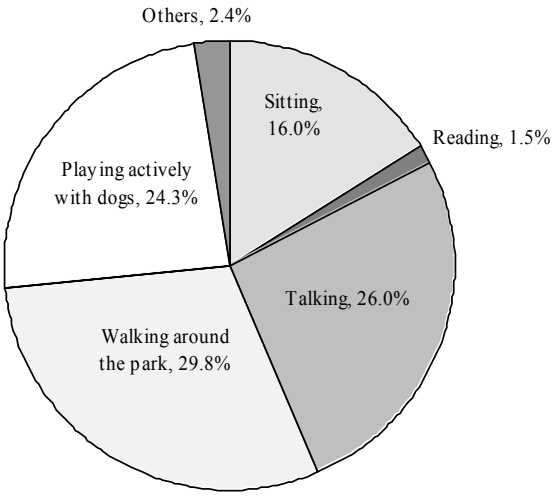


Fig. 37. Park activities.

3.4.5. Activities and reasons of visiting dog parks

Among the activities dog-park users engage in (Fig. 37)., nearly 30% was walking around the dog park, followed by talking with other dog owners (26.0%) and playing actively with dogs (24.3%). The results showed that dog parks provide people with a place to freely play with dogs and interact with other dog owners. The main reasons people visit the dog park are to exercise their dogs (29.5%), have their dogs socialize with other dogs (25.9%), and socialize with other dog owners (14.5%). The dog parks also appeared to provide a place where people can relax, rest, and enjoy green space (Table 16).

Table 16
Reasons for visiting dog parks

	N	Percent
For dog's exercise	238	29.5%
For dog's socialization	209	25.9%
To meet other dog owners and socialize	117	14.5%
To relax and rest outdoors	82	10.2%
To exercise with dogs	62	7.7%
To enjoy green space	59	7.3%
To participate in dog related events	33	4.1%
Other	7	0.9%
Total	807	100.0%

3.4.6. Constraints to visiting dog parks

Should constraints to the dog park visit exist, severity of weather (28.9%) was recognized as the leading factor keeping dog owners from using the park. Two other notable constraints were lack of time (19.9%) and long distance to dog parks from home (18.2%). Over 36% of MBBP users responded that the distance of the park from home is the reason for not visiting the park more often. Nearly 18% of Cattail users also responded that the distance is a constraint (Table 17).

Table 17
Constraints to visiting dog parks

	Harmony		Cattail		DJBP		MBBP		Total	
The dog park is too far from my home.	4	4.6%	23	17.8%	11	11.2%	38	36.5%	76	18.2%
The dog park is too crowded.	4	4.6%	0	.0%	4	4.1%	6	5.8%	14	3.3%
Concern about other dogs' behaviors (e.g., dog fights)	14	16.1%	9	7.0%	7	7.1%	13	12.5%	43	10.3%
The park do not offer the preferred features	4	4.6%	2	1.6%	1	1.0%	2	1.9%	9	2.2%
Lack of time	11	12.6%	29	22.5%	26	26.5%	17	16.3%	83	19.9%
Hot weather	30	34.5%	45	34.9%	27	27.6%	19	18.3%	121	28.9%
Times of Park Operation	0	.0%	4	3.1%	4	4.1%	2	1.9%	10	2.4%
Lack of interest	1	1.1%	1	.8%	0	.0%	0	.0%	2	.5%
Other	8	9.2%	6	4.7%	6	6.1%	3	2.9%	23	5.5%
None	11	12.6%	10	7.8%	12	12.2%	4	3.8%	37	8.8%
Total	87	100 %	129	100 %	98	100 %	104	100 %	418	100 %

* Percentages and totals are based on responses.

3.5. Satisfaction with Dog Parks

Dog park satisfaction was measured using fourteen questions regarding dog park design and amenities. The items included were park size, location, site layout, recreational facilities, parking, maintenance, and safety. For reliability analysis, Chronbach's alpha was used as a measure of internal consistency. It is designed to test whether all items within the instrument measure the same thing. Alpha value is between 0 and 1 and the closer the alpha is to 1.00, the greater the internal consistency of items in the instrument being assessed (George and Mallery, 2001). A rule of thumb that applies to most situations is: $\alpha>0.9$ is excellent, $\alpha>0.8$ is good. Since Cronbach's alpha reliability coefficients was 0.868 (Table 18), so the reliability of the instrument construct was deemed to be at an acceptable level.

Table 19 indicates the level of satisfaction among the respondents that use the dog park. The overall satisfaction showed the mean rating to be 4.42 on 5-point scale. Over 96 percent of

Table 18
Reliability statistics

Variables	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Overall Satisfaction	52.53	69.360	.403	.217	.865
Park size	52.35	68.878	.403	.393	.865
Park location	52.61	68.145	.302	.152	.871
Site layout	52.63	64.643	.599	.499	.856
Facilities	52.77	64.795	.510	.290	.860
Parking Availability	52.74	63.301	.517	.692	.860
Access to Parking	52.64	63.938	.522	.705	.860
Operation time	52.43	67.670	.504	.308	.861
Maintenance	52.78	63.575	.631	.529	.854
Safety	52.63	66.047	.579	.441	.858
Enough Seating	53.53	61.172	.636	.477	.853
Lighting	53.36	59.458	.639	.483	.853
Sanitation	52.91	64.106	.549	.477	.858
Shade (trees)	54.28	60.402	.616	.448	.854
	Mean=56.94 Variance=74.258 Std. Deviation=8.617		Cronbach's Alpha=.868 Cronbach's Alpha Based on Standardized Items=.870		

Table 19
Dog park user satisfaction

	Mean	SD	Percent					n
			Very unsatisfactory	unsatisfactory	Somewhat	Satisfactory	Very satisfactory	
Overall Satisfaction	4.42	0.66	0.8	0.8	2.0	48.2	48.2	245
Park size	4.56	0.75	0.4	2.4	6.4	22.0	68.8	250
Park location	4.28	1.03	4.0	2.8	10.1	26.7	56.3	247
Site layout	4.29	0.91	0.4	5.9	10.5	30.5	52.7	239
Recreational facilities	4.13	1.02	3.3	3.7	16.7	29.7	46.7	246
Parking Availability	4.24	1.11	4.5	4.5	10.7	22.3	57.9	242
Access to Parking	4.35	1.02	4.2	2.1	9.2	24.2	60.4	240
Operation time	4.54	0.70	0.4	0.4	8.0	26.9	64.3	249
Maintenance	4.14	0.94	1.6	4.0	17.3	32.5	44.6	249
Safety	4.33	0.78	0.0	2.8	10.8	36.5	49.8	249
Enough Seating	3.32	1.19	7.2	18.8	28.0	26.4	19.6	250
Lighting	3.58	1.33	11.4	8.1	25.1	21.8	33.6	211
Sanitation (Smell)	4.06	1.00	2.8	6.4	11.2	41.4	38.2	249
Shade(enough trees)	2.58	1.25	23.2	28.4	26.0	12.4	10.0	250

Mean is the average of all the scores. S.D. is the standard deviation from the mean.

users were satisfied or very satisfied with their dog park, 2.0 percent were somewhat dissatisfied, and 1.6 percent were dissatisfied. Though overall satisfaction level was high, the satisfaction level with different aspects of dog parks varies. The mean ratings of park size and sanitation were fairly high (4.56 and 4.54 respectively) and access to parking, recreational facility, location, and safety also received comfortably high scores. Seating, operation time and maintenance received relatively low ratings (4.06, 4.13, and 4.14, respectively). Lighting, parking availability, and shade received low mean ratings (3.58, 3.32 and 2.26, relatively).

As the data were not normal to fulfill ANOVA assumptions, the Kruskal–Wallis test was used to check the equality of distribution of the response variables among the different dog parks. Table 20 presents the results of crosstabulation and Kruskall-Wallis test. Significant difference was found in the seven items including park size, location, site layout, parking availability, access to parking, recreational facilities and sanitation (Fig. 38). When the overall

Table 20
User satisfaction by the study sites

	Harmony		Cattail		DJBP		MBBP		Kruskall-Wallis	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Chi-Square	Asymp. Sig.
Overall Satisfaction	4.23	0.64	4.45	0.78	4.44	0.62	4.55	0.50	8.45	0.058
Park size	4.78	0.60	4.38	0.91	4.35	0.81	4.84	0.37	24.88	0.000***
Park location	4.65	0.80	4.25	0.96	4.32	0.99	3.93	1.25	15.88	0.001**
Site layout	4.44	0.85	3.99	1.00	4.28	0.92	4.56	0.69	15.29	0.002**
Recreational facilities	4.07	1.13	3.78	1.09	4.46	0.81	4.28	0.94	16.90	0.001**
Parking Availability	3.65	1.59	3.80	1.11	4.81	0.43	4.68	0.51	48.72	0.000***
Access to Parking	3.67	1.57	4.09	0.95	4.81	0.44	4.72	0.49	39.62	0.000***
Operation time	4.55	0.67	4.49	0.74	4.49	0.76	4.67	0.58	2.36	0.501
Maintenance	3.94	1.08	4.04	1.01	4.35	0.88	4.25	0.76	6.15	0.105
Safety	4.31	0.86	4.27	0.81	4.51	0.67	4.25	0.76	4.71	0.194
Enough Seating	3.30	1.21	3.08	1.24	3.56	1.06	3.42	1.22	6.30	0.098
Lighting	3.47	1.36	3.33	1.46	3.76	1.35	3.88	0.96	4.48	0.214
Sanitation (Smell)	4.17	1.00	4.08	1.00	4.24	0.87	3.72	1.08	10.29	0.016*
Shade(enough trees)	2.30	1.16	2.54	1.36	2.83	1.25	2.61	1.15	6.02	0.111
Responses (n)	53.00		74.00		63.00		55.00		245.00	

*p < 0.05, ** p < 0.01, *** p < 0.001

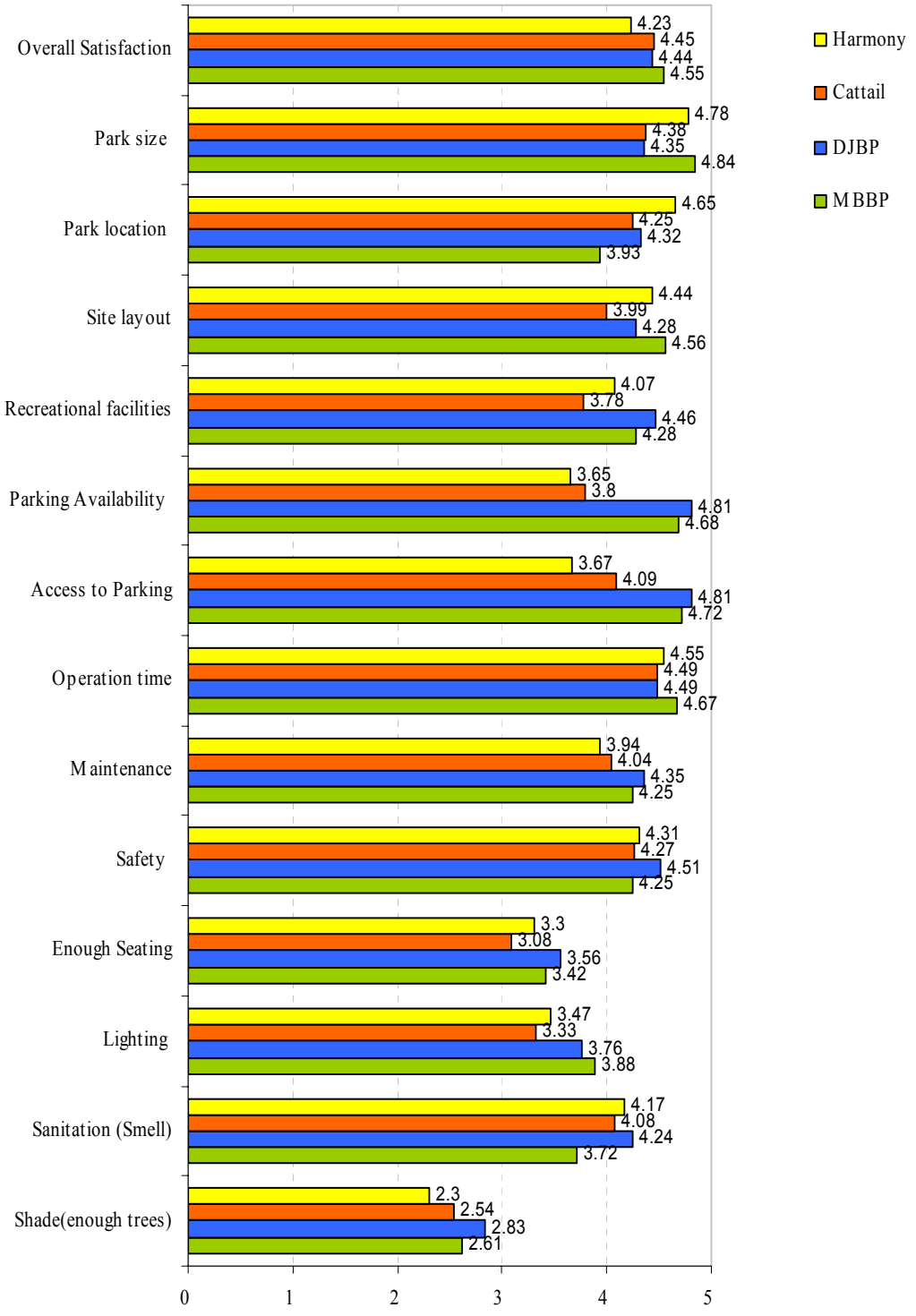


Fig. 38. User satisfaction by the study sites.

Table 21
Pairwise comparisons using Mann-Whitney test

		Harmony vs. Cattail	Harmony vs. DJBP	Harmony vs. MBBP	Cattail vs. DJBP	Cattail vs. MBBP	DJBP vs. MBBP
Park size	Mann-Whitney U	1520.5	1153.5	1537.5	2264	1575	1183.5
	Wilcoxon W	4446.5	3169.5	3190.5	4280	4501	3199.5
	Z	-3.12	-3.63	-0.01	-0.62	-3.34	-3.91
	Asymp. Sig.	0.002*	0.000*	0.989	0.538	0.001*	0.000*
Park location	Mann-Whitney U	1457	1294	969	2196	1845.5	1444.5
	Wilcoxon W	4307	3247	2565	5046	3441.5	3040.5
	Z	-3.14	-2.52	-3.73	-0.62	-1.28	-1.7
	Asymp. Sig.	0.002*	0.012*	0.000*	0.538	0.202	0.088
Site layout	Mann-Whitney U	1346.5	1416.5	1335.5	1772.5	1309	1393
	Wilcoxon W	3974.5	3246.5	2713.5	4400.5	3937	3223
	Z	-2.87	-0.94	-0.69	-1.89	-3.55	-1.64
	Asymp. Sig.	0.004*	0.347	0.489	0.058	0.000*	0.100
Recreational facilities	Mann-Whitney U	1648	1346	1409.5	1433.5	1534.5	1556
	Wilcoxon W	4423	2831	2894.5	4208.5	4309.5	3209
	Z	-1.77	-1.87	-0.83	-3.89	-2.82	-1.1
	Asymp. Sig.	0.077	0.062	0.408	0.000*	0.005*	0.270
Parking Availability	Mann-Whitney U	1709	858.5	879.5	1097.5	1160.5	1576.5
	Wilcoxon W	4635	1939.5	1960.5	4023.5	4086.5	3229.5
	Z	-0.22	-4.39	-3.26	-6.1	-4.95	-1.57
	Asymp. Sig.	0.830	0.000*	0.001*	0.000*	0.000*	0.117
Access to Parking	Mann-Whitney U	1579	812	815.5	1300	1338.5	1617.5
	Wilcoxon W	2614	1847	1850.5	4226	4264.5	3270.5
	Z	-0.74	-4.43	-3.62	-5.15	-4.2	-1.11
	Asymp. Sig.	0.457	0.000*	0.000*	0.000*	0.000*	0.268
Sanitation	Mann-Whitney U	1901.5	1679	1130	2187.5	1679	1283.5
	Wilcoxon W	4751.5	3164	2783	5037.5	3332	2936.5
	Z	-0.64	-0.13	-2.57	-0.81	-2.26	-2.87
	Asymp. Sig.	0.525	0.896	0.010*	0.419	0.024	0.004*

* significance was accepted when $p < 0.0125$ by applying Bonferroni's correction to the p values

differences among the groups were statistically significant, the Mann-Whitney tests were performed for pairwise comparisons (Table 21) while adjusting the appropriate significance levels according to Bonferroni's correction (p threshold becomes $0.05/4 = 0.0125$). Results of the post hoc analysis to examine how the groups differed are the followings:

- Park Size MBBP users' (mean= 4.84) satisfaction with park size was significantly higher than DJBP users (mean= 4.35, $p<0.001$) and Cattail users (mean=4.38, $p<0.01$). Further, Harmony users' (mean= 4.78) satisfaction with park size was also higher than DJBP users (mean= 4.35, $p<0.001$) and Cattail users (mean=4.38, $p<0.01$).

- Park Location Harmony users' (mean= 4.65) satisfaction with park location was significantly higher than Cattail (mean= 4.25, $p<0.01$), DJBP (mean= 4.32, $p<0.05$), and MBBP users (mean= 3.93, $p<0.001$).
- Site Layout Cattail users' (mean= 3.99) satisfaction with park layout was significantly lower than Harmony users (mean= 4.44, $p<0.01$) and MBBP users (mean= 4.56, $p<0.001$).
- Facilities Cattail users' (mean= 3.78) satisfaction with facilities was significantly lower than DJBP users (mean= 4.46, $p<0.001$) and MBBP users (mean= 4.28, $p<0.01$).
- Parking Availability Harmony users' (mean= 3.65) satisfaction with parking availability was significantly lower than DJBP users (mean= 4.81, $p<0.001$) and MBBP users (mean= 4.68, $p<0.01$). Further, Cattail users' (mean= 3.80) satisfaction with parking availability was significantly ($p<0.001$) lower than DJBP users (mean= 4.81) and MBBP users (mean= 4.68).
- Access to Parking Harmony users' (mean= 3.67) satisfaction with access to parking was significantly ($p<0.001$) lower than DJBP users (mean= 4.81) and MBBP users (mean= 4.72). Further, Cattail users' (mean= 4.09) satisfaction with access to parking was significantly ($p<0.001$) lower than DJBP users (mean= 4.81) and MBBP users (mean= 4.72).
- Sanitation MBBP users' (mean= 3.72) satisfaction with sanitation was significantly lower than Harmony (mean=4.17, $p<0.05$) and DJBP users (mean= 4.24, $p<0.01$).

Following the question regarding satisfaction level for the thirteen design features, respondents were given the opportunity to comment on their likes, important design components and desired improvements for the park (Table 22). When asked what they liked about the dog park, one-quarter (25.1%) of the Harmony park users responded that they liked their dog park for the freedom and exercise it provided to their dog, followed by interaction with other dogs (20.6%), socializing with neighbors (19.2%), proximity (18.4%), park size (18.4%), and separate areas for small/ big dogs (5.3%). The other park users also responded

Table 22
Likes of dog parks/ important features/ improvement of dog parks

	Harmony	Cattail	DJBP	MBBP
Likes of Dog Parks				
1	Dog can play freely (25.1%)	Dog can play freely (48.3%)	Dog can play freely (16.7%)	Dog can play freely (31.5%)
2	Dog can socialize (19.6%)	Dog can socialize (13.8%)	Dog can socialize (16.7%)	Dog can socialize (20.5%)
3	Meeting other dog owners (19.2%)	Meeting other dog owners (12.1%)	Swimming Pond (13.9%)	Meeting other dog owners (19.2%)
4	Proximity (18.4%)	Park size (12.1%)	Meeting other dog owners (11.1%)	Swimming Pond (15.1%)
5	Park size (18.4%)	Sanitation (6.9%)	Park size (9.7%)	Park size (11.0%)
6	Small/ big dog areas (5.3%)	Park location (3.4%)	Small/ big dog areas (6.9%)	Sanitation (4.1%)
Important Design Features of Dog Parks				
1	Park size (25.0%)	Location (17.0%)	Location (14.6%)	Size (19.0%)
2	Sanitation (17.9%)	Sanitation (14.2%)	Size (13.6%)	Safety (17.5%)
3	Maintenance (14.3%)	Shade/Trees (12.3%)	Water play (9.7%)	Location (15.9%)
4	Shade/Trees (14.3%)	Safety (11.3%)	Safety (9.7%)	Water play (7.9%)
5	Location (10.7%)	Size (11.3%)	Sanitation (7.8%)	Sanitation (6.3%)
6	Seating (10.7%)	Maintenance (7.5%)	Shade/Trees (6.8%)	Shade/Trees (4.8%)
Design Features to be Improved or Added to the Existing Dog Park				
1	Shade/Trees (40.9%)	Shade/Trees (25.5%)	Shade/Trees (44.9%)	Shade/Trees (34.2%)
2	Seating (18.2%)	Seating (17.0%)	Seating (10.2%)	Restroom (28.9%)
3	Swimming pool (15.9%)	Swimming pool (12.3%)	Agility equipment (6.1%)	Agility equipment (13.2%)
4	Agility equipment (9.1%)	Size (7.5%)	Restroom (6.1%)	Seating (7.9%)
5	Parking (9.1%)	Drinking Fountain (5.7%)	Lighting (6.1%)	Shower (7.9%)
6	Lighting (6.8%)	Shower (4.7%)	Drainage (6.1%)	Lighting (2.6%)
7		Gate (4.7%)	Shower (4.1%)	Maintenance (2.6%)
8		Grass (4.7%)	Drinking Fountain (4.1%)	Drinking Fountain (2.6%)
9		Agility equipment (3.8%)	Maintenance (2.0%)	

that dog's freedom and socialization were what they liked about the dog park most, while DJBP users mentioned swimming ponds (13.9%) more frequently than meeting other dog owners (11.1%). Nearly 20 percent (19.4%) responded that the proximity and size of the Harmony Dog Park are what they liked most. Other answers included separate areas for small/ big dogs, relative cleanliness, well-maintained grass, and a bathing facility. A portion of

respondents said they liked the fact that dog parks are available. With regard to the components that are important to the design of a dog park, respondents generally expressed that park size, location, sanitation, maintenance, safety, water play are important design features (Table 22).

The survey also asked respondents about the design features to be improved or added to the existing dog park (Table 22). More shade/trees were ranked first at all the dog parks followed by seating except MBBP. Agility equipment, water play areas, and restroom also received strong support. Other features the respondents wanted included dog shower facility, gate, lighting, and drinking fountains.

In an attempt to test whether high satisfaction level with dog parks is positively related to satisfaction with community, correlation test was performed. The results indicated that those who have higher satisfaction level with location, safety, and sanitation of dog parks tended to have higher satisfaction with community: $r_{location}$=.320, r_{safety} =.231, and $r_{sanitation}$ =.208 at the 0.01 level.

3.6. Perception about Dog Parks

The respondents were asked about their perception of the dog park regardless of dog ownership in order to identify residents' perceived benefits of dog parks. A total of fifteen items was designed to find how people perceive the benefits of dog parks to the community, to personal and public health, to socializing, and to property value. Reliability tests were conducted and Chronbach's alpha was fairly high (0.875), as shown in Table 23.

The survey results found that people believe dog parks are beneficial to dogs' health, community, and socialization with neighbors (Table 24). Most respondents (71.0%) "strongly" agreed that dog parks help promote the physical health of their dogs. Over sixty four percent of the respondents including non-dog owners expressed the view that it is important for communities

Table 23
Reliability statistics

Variables	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
percep_1	54.3454	76.162	.504	.417	.869
percep_2	55.4337	72.029	.505	.434	.869
percep_3	54.7068	72.926	.634	.607	.863
percep_4	54.6988	71.356	.709	.717	.859
percep_5	54.8474	69.154	.743	.677	.856
percep_6	55.6586	86.306	-.184	.120	.909
percep_7	55.4096	73.186	.532	.369	.867
percep_8	54.7390	71.702	.709	.671	.860
percep_9	54.5020	74.364	.587	.577	.865
percep_10	54.4618	72.766	.699	.632	.861
percep_11	54.6064	77.296	.354	.339	.874
percep_12	54.7309	70.206	.751	.712	.857
percep_13	54.9317	69.419	.726	.592	.857
percep_14	56.0120	74.447	.435	.450	.872
percep_15	55.8474	69.670	.639	.586	.862
	Mean= 58.9237 Variance = 83.514, S.D. = 9.13862		Cronbach's Alpha = .875 Cronbach's Alpha Based on Standardized Items=.889		

Table 24
Perception about dog parks

Dependent Variable	Mean	SD	Percent					n
			Strongly disagree	Disagree	Somewhat	Agree	Strongly agree	
1. Dog parks help promote physical health of my dogs.	4.58	0.78	1.4	1.0	6.6	19.9	71.0	286
2. Dog parks help promote my physical health.	3.44	1.19	6.6	13.9	33.1	22.0	24.4	287
3. Dog parks help people socialize with others and opportunities chance to meet neighbors.	4.17	0.95	1.7	3.1	18.2	30.6	46.4	291
4. Dog parks help build a sense of community.	4.15	0.99	2.4	4.1	15.8	31.5	46.2	292
5. A dog park is one of the important community amenities.	4.09	1.07	3.4	5.2	16.6	28.3	46.6	290
6. Dog parks have values only to the actual users.	3.27	1.36	13.4	18.2	20.3	24.1	24.1	291
7. Dog parks enhance public safety.	3.51	1.03	3.1	11.4	37.0	28.4	20.1	289
8. Dog parks help improve quality of life.	4.18	0.92	1.4	4.1	14.4	35.1	45.0	291
9. I recommend that others visit the dog park.	4.42	0.85	1.4	2.1	9.7	26.6	60.3	290
10. It is important for communities to include dog parks.	4.45	0.88	2.1	0.7	11.7	21.0	64.6	291
11. I am satisfied with living in my community.	4.32	0.87	1.4	2.5	11.0	33.3	51.8	282
12. The dog park increases your overall satisfaction with my community.	4.18	1.00	2.4	3.5	17.4	27.1	49.7	288
13. If I were to move to another place, I would consider the presence of dog park in my community.	4.03	1.08	3.4	5.9	18.3	29.3	43.1	290
14. Being located near the dog park has affected the resale value of this property.	2.90	0.78	12.7	15.0	52.1	10.5	9.7	267
15.A dog park influences whether I recommend my community to others.	3.09	1.19	11.5	16.8	37.3	20.1	14.3	279

Table 25
Perception about dog parks by the study sites

Dependent Variable	Harmony		Cattail		DJBP		MBBP		Kruskall-Wallis	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Chi-Square	Asymp. Sig.
percep_1	4.53	0.777	4.63	0.715	4.69	0.715	4.73	0.578	3.056	0.383
percep_2	3.83	1.142	3.16	1.061	3.35	1.368	3.73	1.087	14.768	0.002**
percep_3	4.48	0.755	4.15	0.792	4.19	0.998	3.93	1.081	10.590	0.014*
percep_4	4.4	0.793	4.14	0.833	4.25	0.933	4	1.074	5.919	0.116
percep_5	4.14	0.981	4.2	0.906	4.22	1.007	4.23	1.031	0.829	0.843
percep_6	3.22	1.475	3.37	1.299	3.34	1.318	3.15	1.325	1.058	0.787
percep_7	3.6	0.961	3.45	0.953	3.55	1.183	3.63	0.92	1.303	0.728
percep_8	4.33	0.846	4.18	0.792	4.27	0.971	4.43	0.722	4.589	0.204
percep_9	4.41	0.773	4.52	0.749	4.54	0.839	4.7	0.53	4.798	0.187
percep_10	4.45	0.73	4.45	0.899	4.67	0.762	4.68	0.624	7.889	0.051
percep_11	4.47	0.627	4.39	0.861	4.28	0.968	4.05	0.961	6.436	0.092
percep_12	4.36	0.788	4.37	0.787	4.3	0.909	4.21	0.913	0.940	0.816
percep_13	4.26	0.828	4.19	0.982	4.02	1.094	4.18	0.965	1.188	0.756
percep_14	3.14	1.028	3.05	0.999	2.58	1.078	2.65	1.118	14.327	0.002**
percep_15	3.19	1.184	3.28	1.182	2.79	1.185	2.98	1.129	12.103	0.007**
Responses (n)		83.00		86.00		63.00		60.00		292.00

*p < 0.05, ** p < 0.01, *** p < 0.001

Table 26
Pairwise comparisons using Mann-Whitney test

		Harmony vs. Cattail	Harmony vs. DJBP	Harmony vs. MBBP	Cattail vs. DJBP	Cattail vs. MBBP	DJBP vs. MBBP
Dog parks help promote my physical health.	Mann-Whitney U	1,558.000	1,460.500	1,644.000	2,198.000	1,681.500	1,593.000
	Wilcoxon W	4,798.000	3,413.500	3,474.000	5,438.000	4,921.500	3,546.000
	Z	-3.397	-1.832	-0.538	-1.198	-3.137	-1.413
	Asymp. Sig.	0.001**	0.067	0.591	0.231	0.002**	0.158
Dog parks help people socialize with others and opportunities chance to meet neighbors.	Mann-Whitney U	1,773.000	1,544.000	1,208.000	2,354.000	2,200.500	1,596.000
	Wilcoxon W	5,094.000	3,560.000	2,978.000	5,675.000	3,970.500	3,366.000
	Z	-2.677	-1.639	-2.979	-0.853	-0.848	-1.431
	Asymp. Sig.	0.007**	0.101	0.003**	0.394	0.397	0.152
Being located near the dog park has affected the resale value of this property.	Mann-Whitney U	1,728.000	1,156.000	1,026.000	1,655.000	1,464.000	1,533.000
	Wilcoxon W	4,213.000	2,986.000	2,404.000	3,485.000	2,842.000	3,363.000
	Z	-1.256	-3.186	-2.862	-2.272	-1.988	-0.170
	Asymp. Sig.	0.209	0.001**	0.004**	0.023	0.047	0.865
A dog park influences whether I recommend my community to others.	Mann-Whitney U	2,184.000	1,248.500	1,174.500	1,765.500	1,658.000	1,458.000
	Wilcoxon W	5,265.000	3,139.500	2,552.500	3,656.500	3,036.000	3,349.000
	Z	-0.357	-2.897	-2.102	-2.693	-1.823	-0.773
	Asymp. Sig.	0.721	0.004**	0.036	0.007**	0.068	0.440

* significance was accepted when p < 0.0125 by applying Bonferroni's correction to the p values

to include a dog park (mean = 4.45, S.D. = 0.88) and three quarters of respondents consider a dog park as one of the important community amenities. Almost 50% of respondents "strongly" agreed that the dog park increased the overall satisfaction with their community (mean =4.18, S.D.= 1.00) and 45 percent strongly agreed that the dog park helped improve the quality of life (mean =4.18, S.D.= 0.92). Among other benefits of a dog park, its benefits in developing a feeling of community were identified by most residents. Almost 77% of respondents "strongly agreed" or "agreed" that a dog park provides opportunities to meet neighbors and build a sense of community by socializing with others. However, a relatively a small number of people perceived that a dog park influences public safety, provides physical health to dog owners, and aids in the resale value of nearby property (mean ratings were 3.51, 3.44 and 2.90 respectively).

A crosstabulation and Kruskal–Wallis test was used to check the equality of distribution of the response variables among the four park users' perceptions (Table 25). The significant differences were found in the items including perception about health benefits for dog owners, social benefits and property value. When the overall differences among the groups were statistically significant, the Mann-Whitney tests were performed for pairwise comparisons (Table 26) while adjusting the appropriate significance levels according to Bonferroni's correction (p threshold becomes 0.05/4 = 0.0125). Results of the post hoc analysis to examine how the groups differed are the followings:

- Dog parks help promote my physical health. Harmony users' rating (mean= 3.83) was significantly ($p<0.01$) higher than Cattail users (mean= 3.16). Further, MBBP users' rating (mean= 3.73) was significantly ($p<0.01$) higher than Cattail users (mean= 3.16).
- Dog parks help people socialize with others and opportunities chance to meet neighbors. Harmony users' rating (mean= 4.48) was significantly ($p<0.01$) higher than Cattail (mean=

4.15) and MBBP users (mean=3.93).

- Being located near the dog park has affected the resale value of this property. Harmony users' rating (mean= 3.14) was significantly ($p<0.01$) higher than DJBP users (mean= 2.58) and MBBP users (mean= 2.65).
- A dog park influences whether I recommend my community to others. Harmony users' ratings (mean= 3.19) was significantly ($p<0.01$) higher than DJBP users (mean= 2.79). Further, Cattail users' ratings (mean= 3.28) was significantly ($p<0.01$) higher than DJBP users (mean= 2.79).

The results suggest that the residents living closer to a dog park (Harmony users) perceive it as benefits for human health, social interaction with neighbors, and property value more than the other community residents.

Hypothesis 2 was intended to examine whether distance is negatively related with perception of dog park benefits. People who live closer to a dog park perceived more benefits of dog parks than those who live farther away. In particular, people who walk to the park perceived health benefits of dog parks more than who drive to dog parks. There were no significant associations found between distance and perceptions of dog park benefits except social benefits. People who live closer to a dog park more likely perceived benefits of dog parks than those who live farther, but the relationship was weak ($R=-1.52$ $p=.017$). People who walk to a dog park tended to perceive the health benefits of dog parks than those who drive to dog parks ($F=4.886$, $p=0.003$). Kruskal–Wallis test showed that Harmony residents perceived significantly more effects of dog parks on their property value ($F=5.331$, $p= 0.0001$) and dog parks help people meet neighbors ($F=3.644$, $p=0.013$). If dog parks are situated in residential areas, dominant dog-park users will be residents from surrounding neighborhoods and thus, people can build a sense of community. These results provided evidence that the design goals

of the Harmony Dog Park were largely met. In other words, the Harmony dog park helps social interactions among the residents and to promote the health benefits of the interactions between people and dogs.

In order to find out whether or not the existence of the dog park affected the decision to move to Harmony, the respondents were asked about their awareness of the dog park before they purchased their house. The majority of respondents (98.7%) were aware that the dog park was included in the Harmony community when they moved to their property, and nearly 68 % answered that the presence of the dog park positively affected the decision to buy the property (Table 27).

Table 27
Influence of dog park on property appeal

		Frequency	Valid Percent
Prior awareness of the presence of dog park			
	No	1	1.3 %
	Yes	74	98.7 %
	Total	75	100.0 %
Influence of dog park on property appeal			
	Add to property appeal	52	67.5 %
	No effect	22	28.6 %
	Total	74	100.0 %

Hypothesis 3 was set to examine whether frequency of dog park visit is positively related with perception of health benefits. There was the positive relationship between frequency of dog park visit and perception of health benefits of people with $r=.169$ and $p<.01$. Results showed that frequent users tend to perceive that the dog park increases the overall satisfaction with the community and a dog park is one of the important community amenities.

4. WILLINGNESS TO PAY FOR DOG PARKS

The purpose of contingent valuation (CV) method is to develop a CV model to estimate the value of the recreational experience for dog-park users. This study uses an open-ended elicitation method to obtain estimates of WTP for annual fee. The introduction to the valuation section stressed that the questions were hypothetical and the payment vehicle was described as an annual fee to access dog parks.

4.1. Willingness to Pay Estimates

The questionnaire asked respondents to specify their willingness to pay to use dog parks, and the quantified responses were used to calculate the monetary value of dog parks (Table 28). Of the 302 participants including non-dog owners and non-dog-park users, 28.1 % (n=85) gave zero responses or did not respond. This percentage is not high compared with the previous CV studies. Among the 256 dog-park users, 19.9% objected to being willing to pay. It is assumed that non-respondents and protests had zero value (Boyle and Bishop, 1988). According to Carson (2000), an item non-response of 20-30% for the economic elicitation questions is common when the sample is random, the scenario is complex and people are not accustomed to valuing the object in question in monetary terms.

The most commonly cited reasons for people who were willing to pay were to guarantee themselves an opportunity to use the sites (29.4%) and to ensure the preservation of

Table 28
Willingness to pay responses rates

	Zero WTP		WTP		Total	
Non-dog owners	27	79.4%	7	20.6%	34	100.0%
Non-dog-park users	7	58.3%	5	41.7%	12	100.0%
Dog-park users	51	19.9%	205	80.1%	256	100.0%
Total	85	28.1%	217	71.9%	302	100.0%

the off leash recreation sites for potential future use (29.0%). Other reasons included 'for better maintenance of dog parks' (1.2%), 'to provide a place for dogs to play and swim' (0.9%), 'excellent amenities that city should provide' (0.3%) and 'well worth the money' (0.3%) (Table 29).

The reasons for respondents' disagreement responses were also asked (Table 30). The most frequently cited reasons for responding "no" to the willingness to pay questions was that the costs of dog parks should be covered by current revenues of the association fee or taxes (49.4%). Other reasons for not wanting to contribute money included: budget constraints (11.2%), 'will not use' (12.4%), and 'visiting the dog park is not important' (19.1%).

Table 29
Reasons for willingness to pay

Reasons For Willingness to Pay	N	Percent
I use the dog park and I want to guarantee myself an opportunity to use the sites	193	29.4%
I want to ensure the preservation of the off leash recreation sites for potential future use	190	29.0%
I want to support the provision of recreation services to all residents.	132	20.1%
I want to support the preservation of cultural and natural values for future generations.	108	16.5%
Other reasons	33	5.0%
Total	656	100.0%

Table 30
Reasons for protest responses

Reasons for respondents' protest responses	N	Percent
Visiting the site is not important enough to me	17	19.1%
I would use other sites (on-leash), I don't need these services	11	12.4%
I cannot afford the fees.	10	11.2%
The maintenance costs should be covered by current revenues of the association or tax.	44	49.4%
Other reasons	7	7.9%
Total	89	100.0%

4.2. Median and Mean WTP Estimates

The mean and median results of the CVM can be found in Table 31 and Fig. 39. The mean of $ 64.18 and the median $ 50.00 are affected by the zero responses. The inclusion of the protest zeros led to a lower mean WTP than when they were excluded. Mean WTP dropped from $64.18 to $46.12 when protest zeros were included. The median remains at $50.00 regardless of whether or not the protest zeros were included. As arithmetic means are particularly sensitive to extreme WTP values, median WTP or 5% trimmed means are recommended as measures of central tendency in open-ended question formats (Jim & Chen,

Table 31
Distribution of CV responses

	Frequency	Valid Percent	Cumulative Percent		
5.00	2	.9	.9	Mean	64.1843
10.00	15	6.9	7.8	Median	50.0000
15.00	1	.5	8.3	Mode	50.00
20.00	19	8.8	17.1	Std. Deviation	60.54707
25.00	29	13.4	30.4	Variance	3665.947
30.00	6	2.8	33.2	Skewness	3.366
35.00	1	.5	33.6	Std. Error of Skewness	.165
40.00	4	1.8	35.5	Range	495.00
48.00	1	.5	35.9	Minimum	5.00
50.00	69	31.8	67.7	Maximum	500.00
60.00	2	.9	68.7	Sum	13928.00
70.00	1	.5	69.1	Std. Error	4.11020
75.00	7	3.2	72.4	5% Trimmed Mean	56.1674
100.00	41	18.9	91.2		
120.00	6	2.8	94.0		
150.00	1	.5	94.5		
200.00	7	3.2	97.7		
240.00	1	.5	98.2		
250.00	1	.5	98.6		
300.00	1	.5	99.1		
400.00	1	.5	99.5		
500.00	1	.5	100.0		
Total	217	100.0			

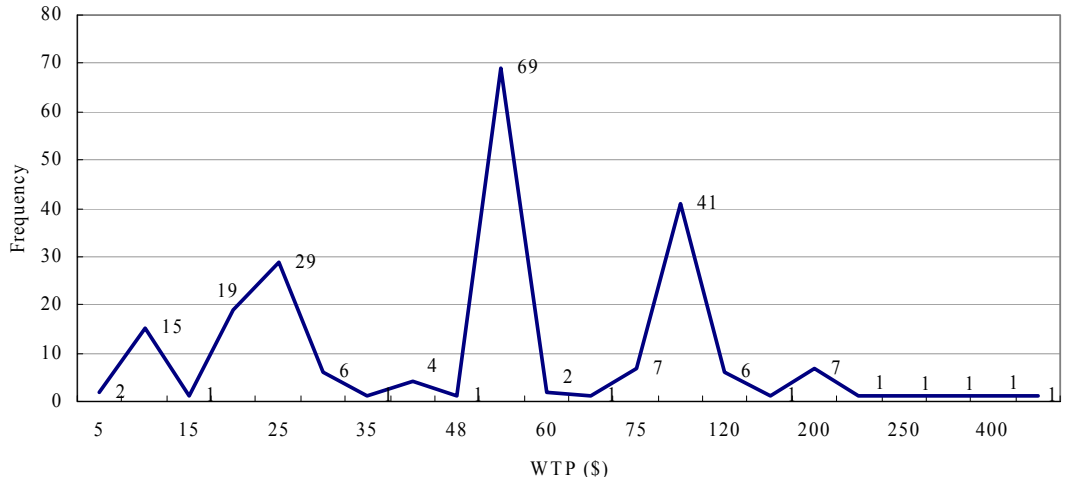


Fig. 39. Distribution of CV responses.

2006). To adopt a conservative approach (Bateman et al., 2002), the average willingness to pay of $64.18 derived from the survey data was trimmed by 5% to $56.17.

4.3. Dog Parks WTP Model

Regression procedures have been widely employed in CV due to their robustness and easily interpretable results. In this study, stepwise linear regression was utilized to determine which variables explained the greatest amount of variation in WTP for dog parks. The stepwise method is useful for determining which combination of possible independent variables best explains the dependent variable (Argyrous, 2002).

As described in Chapter III, eleven variables were incorporated in the regression model as independent variables including Age, Number of people in family, Education, Income, Travel Time, Frequency, Satisfaction with location, Satisfaction with park size, Satisfaction with maintenance, Satisfaction with facilities, and Perception. Applying the collected data to the linear regression model yield the results shown in Table 32.

Table 32
Results of stepwise linear regression of the selected independent variables on WTP

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	15.294	32.929		.464	.043		
MNT	8.952*	4.068	.183	2.201	.030	.786	1.272
FAC	9.876**	3.718	.215	2.657	.009	.827	1.210
INC	.444**	.110	.367	4.033	.000	.657	1.521
FAM	-8.495*	3.450	-.200	-2.462	.015	.827	1.209
EDU	-3.325*	1.586	-.168	-2.096	.038	.851	1.176
R = .542(e) R Square = .294 Adjusted R Square = .266 Std. Error of the Estimate = 40.05439 `				Durbin-Watson = 2.041 ANOVA F = 10.805 Sig.= .000(e)			
a Dependent Variable: WTP1							

The results of stepwise regression yield the following regression equation:

WTP = 15.294 + 8.952 (MNT) + 9.876 (FAC) + 0.444 (INC) - 8.495 (FAM) - 3.325 (EDU)

where MNT= Satisfaction with maintenance

FAC= Satisfaction with facilities

INC=Household income (thousand dollars)

FAM=Number of people in family

EDU= Years of schooling

The model was significant at the 0.01 level as indicated by an F value of 510.81. The R^2, adjusted for degrees of freedom, was 0.266, indicating that the independent variables explain approximately 26.6 % of the total variation in maximum WTP for dog parks. Out of the selected variables, five variables including income (INC), education level (EDU), number of people in family (FAM), satisfaction with facility (FAC), and satisfaction with maintenance (MNT) were identified as important variables for predicting WTP. The t-statistics for each

individual variable were significant at the 0.01 or 0.05 level. The results show that as predicted higher income and satisfaction level affect WTP positively while the variables of number of people in family and education are negatively related with the WTP. The only variable in the WTP model which had an unexpected sign was education level since education level has often been found to have a positive effect on WTP (Carson et al. 1996). The multicollinearity statistics in Table 32 shows that each of the variables is independent of each other. Analysis of residuals revealed that heteroscedasticity was not significant in the data.

5. RESULTS OF HYPOTHESIS TESTS

5.1. H1: Distance to a Dog Park Is Negatively Related with Frequency and User Satisfaction.

It was expected that the dog parks which were studied would be used differentially by users because of their location and amenities. In order to examine the relationship between distance to a park and frequency of visit, it was hypothesized that Harmony dog-park users living close to the park visit more frequently than other park users. The chi square test in which all four dog park user groups were compared indicated the presence of a significant difference between groups ($\chi 2= 40.82$, $p < .01$). That is, Harmony park users frequented the park significantly more than other park user. In addition, the results of the correlation analysis showed that correlation between travel time (distance) and use frequency is significant at the 0.01 level with a Pearson correlation coefficient r=-.36, confirming Hypothesis 1. Overall satisfaction level was not significantly correlated to travel time since the respondents were generally satisfied with their dog park regardless of distance. However, a significant negative correlation (r =−.463, $p < .001$) existed between distance and satisfaction with park location. This suggests that a closer dog park would likely satisfy dog-park users.

5.2. H2: People Who Live Closer to A Dog Park Perceived More Benefits of Dog Parks Than Those Who Live Farther Away. In Particular, People Who Walk to Dog Parks Perceived More Health Benefits of Dog Parks Than Who Drive to Dog Parks.

No significant association was found between distance and perceptions of dog park benefits except social benefits. People who live closer to a dog park more likely perceived benefits of dog parks than those who live farther away, but the relationship was weak (r=-1.52 p<.05). People who walk to a dog park tended to perceive their health benefits than those who drive to dog parks (F=4.886, p <0.01).

Harmony residents, more than the other park users, perceived that dog parks helped to increase socializing opportunities with neighbors, and positively affected resale values. If dog parks are situated in a residential area, most users will be residents from surrounding neighborhoods, thus, building a sense of community. The Kruskal–Wallis tests showed that Harmony residents significantly more perceived about the effects of dog parks on their property (F=5.331, p < 0.001). These results show that the design goals of the Harmony Dog Park were largely met. In other words, Harmony Dog Park helps social interactions among the residents and promote the health benefits from the interactions between people and dogs.

5.3. H3: Frequency of Dog Park Visit Is Positively Related to User Perception of Health Benefits of People.

It was hypothesized that frequent dog-park users perceive that dog parks help people be physically active and healthy. A positive, but weak relationship was found between frequency of dog park visit and perception of health benefits of people with r=.169 and p<.01. It appears that perception of health benefits of dog parks are likely related to how users get to the dog park, as mentioned earlier. Correlation tests indicated that frequent users tend to perceive that a dog park increases the overall satisfaction with community (r=.193 and p<.005)

and a dog park is one of the important community amenities (r=.172 and p<.01).

5.4. H4: High Satisfaction Level with Dog Parks (i.e., Features, Safety, and Maintenance) Is Positively Related To Satisfaction with the Community.

People who have a higher satisfaction level with location, safety, and sanitation of dog parks tended to have higher satisfaction with their community with $r_{location}$=.320, r_{safety} =.231, and $r_{sanitation}$ =.208 at the 0.01 level. A significant inverse correlation existed between distance to the dog park and satisfaction with community (r =−.281, p < .001). This suggests that a closer dog park can increase satisfaction level with community. However, many other factors influence satisfaction with community. Thus, further studies are needed to confirm this result.

5.5. H5: Willingness to Pay Is Positively Associated with Frequency and Satisfaction Level, but Negatively Related with Distance.

The result of the regression analysis implied that satisfaction with facilities and maintenance were found to be significant determinants of WTP. That is, the higher satisfaction level with maintenance and facilities, the more people will be willing to pay for dog parks. Frequency and distance, however, were not found to be significant determinants of WTP.

5.6. H6: Willingness to Pay Is Positively Associated with Income and Education Level, but Negatively Related to the Number of People in Family.

In an attempt to identify which socioeconomic variables are significant determinants of WTP, regression analysis was conducted. As expected, the sign of the coefficient on income was positive and statistically significant. That is, an increase in WTP was associated with an increase in the income level of respondents. Education level was also found to be a significant determinant of WTP, but the sign of the coefficient was negative. Similar relationship was found in the study of estimating the value of recreational experience for visitors to Reelfoot Lake in Tennesse (Ralston et al, 1991). These results are, however, contradict with results from

the previous studies by Huhtala (2004) and Machado (2000). Huhtala (2004) found that education level was positively associated with WTP for services in Finnish national park. Machado (2000) also stated that the relationship between education level and WTP for conservation of the Galapagos National Park in Ecuador was statistically significant, but the relationship was weak. According to Loomis and Walsh (1997), participation in less strenuous recreation activities are moderately related to education and, in some cases, demand falls when education rises, all other things being equal. The results of a national survey by the Heritage Conservation and Recreation Service (1980) indicated that education is positively related to participation in physically strenuous activities such as canoeing, sailing, skiing and playing golf. Therefore, the negative association of education level with WTP may be due to less active pursuits of dog-park users.

Results also showed that family size has a negative association with WTP for dog parks. The result might be related to ability-to-pay: as family size increases, budgets tighten, and WTP falls. Also it may be possible that singles or couples who own dogs may consider their dog as a companion or a child and they may be willing to pay more for their dog than households with large number of people. Zalatan (1992) found no statistical significance when testing for the degree of association between the presence of children at home and WTP for skating on the Rideau Canal in Canada. The author initially hypothesized that the number of children at home may negatively affect the WTP because of the financial impact of user fees.

Since there are no previous studies that have attempted to model WTP for dog parks, it is not possible to compare the result of this study with other relevant results in the CV literature. However, the results of the analysis presented here are consistent with previous studies that have attempted to model WTP as a function of socioeconomic and demographic variables (Ralston et al., 1991; Zalatan, 1992; Jim and Chen, 2006).

CHAPTER V

DISCUSSION

The present study used different methods to collect data from different park users in order to investigate the use patterns of dog parks, user activities, user perception, and assessments of the dog park by dog owners. The four parks which served as study sites vary in size, layout, location, and amenities, thus comparing them allowed the researcher to identify user preferences and the environmental factors influencing activities. In this chapter, the findings of this study are included, as well as the limitations, implications and design guidelines for practice.

1. THE USE OF DOG PARKS

This multimethods study revealed that dog parks receive considerable use, serve a variety of demographic groups, and support exercise and social activities. Dog park use varies considerably by day of week, time of day, location, and with weather conditions.

Nearly three-quarters of dog owners who responded to the survey provide outdoor exercise for their dogs on a daily basis, and dog parks (33.4 %) and neighborhoods (31.0 %) were their most frequented locations. Some people visit a dog park as part of their dog's daily routine. Among the 256 dog-park users, 13.5 % have visited dog parks on a daily basis and 2 % have visited it more than twice a day. Over 73 % of dog owners visit the dog park at least once a week.

The results of the survey and behavioral mapping revealed that a significant proportion of dog owners use dog parks on weekends, mornings and evenings after 5 pm. During workdays, evening times are busy hours for dog parks. The findings from behavioral mapping also showed that 72.7% of park use was on weekends, and 27.3% on weekdays. Due

to the warm climate in which the studies took place, peak use of dog parks was during evenings. The slow hours were in the afternoons between 1:00 PM and 5:00 PM. A small number of the respondents use dog parks in the morning or during lunchtime and more elderly persons were observed in the morning hours. Dog park use times depend on users' work hours as well as weather condition. Almost half of dog-park users (47.0%) stay for thirty minutes to one hour and nearly 29% usually stay in the park for one hour to two hours during their visits.

One important observation was that DJBP has a significantly larger number of users even in mid-day compared to Cattail. The difference can be explained by the popularity of water play in DJBP. Interviews with DJBP users revealed that they came to the dog park particularly for dog swimming. Most dog owners visit the dog park primarily for their dog's exercise and socialization, but meeting other dog owners and relaxing outdoors are also part of why they visit the park. Among dog owners who visit dog parks less often, the commonly cited constraints to visiting included hot weather, lack of time, and long distance from home. Other reasons expressed by the respondents included concern for other dogs' behaviors, crowdedness, and a lack of preferred facilities. Hot weather was the most common constraint to dog-park users, but geographical location was stated most often for MBBP users (36.5%). Nearly 18% of Cattail users also responded that distance is a constraint.

Proximity was expected to influence frequency of park use and satisfaction level of users. It was measured in this study by comparing the responses of Harmony dog-park users and other park users regarding their use patterns and satisfaction level with the dog park. A chi-square analysis of survey responses revealed that there were significant differences among the selected park users in their travel time to dog park, frequency of visit ($x2=40.82$ $df=21$, $p=.006$) and travel mode (190.723, $df=6$, $p<.001$). Also a correlation test showed that travel time is negatively associated with frequency (Pearson's $R=-.361$, $p<0.01$). That is, more dog owners

frequent dog parks when they are located within close proximity to residential communities. This confirmed the previous research findings that sites situated near residences commonly receive heavy use (Hayward and Weitzer, 1984), while increasing distance to green spaces discourage daily use for recreation (Tyrvainen & Miettinen, 2000).

Park location (proximity) was ranked high in the survey responses to the important factors to use a dog park. Accessibility of Harmony dog park was a distinctive feature among the four park sites. The majority of Harmony dog owners (95.6%) usually walk to the park and nearly 63% of Harmony dog-park users responded that it takes them five minutes to walk to the dog park from their home. Most Harmony residents live within walking distance[3] to the dog park and their average travel time to Harmony dog park was 6.5 minutes by walk. On the contrary, other dog-park users need to drive to visit the dog park due to their locations. Millie Bush Park, especially, is remotely located and can be accessed only by automobile. The survey results showed that Harmony residents' satisfaction level with park location was higher than other dog-park users. In this regards, the design intent of Harmony dog park, accommodating outdoor recreation activity for dog owners and their dogs 'within' the community, has been successfully achieved.

The research findings show several rationales for locating dog parks closer to residential areas. First, closer proximity to residential areas encourages residents to visit frequently and to engage in walking and exercising with their dog. Dog parks have a potential for increasing human physical activity in a relatively easy and convenient way. Second, nearby dog parks allow dog owners to stay near their home and within their community, which can give dog owners a sense of security within their familiar community. Third, as shown in the

[3] Average 2000 foot radius is intended to represent a comfortable walking distance (+/- 10 minutes) for a majority of people (Calthorpe, 1993). (defined as a ½ mile radius)

survey, ‘lack of time’ topped the list of constraints to dog park visit. In order to accommodate dog-park users’ lifestyle, dog parks should be provided in a more accessible location. Last, a dog park within a community would provide a meeting place for residents to know their neighbors, and thus promote sense of community. With these benefits in mind, it would be ideal to integrate accessible dog parks in the overall design of outdoor recreation spaces for the community.

The results of behavioral mapping showed that the activities of dog-park users are related to park size, layout, and design features. The most common types of activities were social and stationary activities. Typical social and stationary activities include sitting on benches or standing and talking with other users. Single park users would often sit alone reading or watching dogs’ play. Generous size and walking paths of dog parks appeared to encourage dog owners to walk around and to be more physically active. The linear shape of DJBP, also provides park users with path for exercise walking.

2. SATISFACTION OF DOG PARKS

Most dog owners prefer closely located dog parks, however, satisfaction level with dog parks is not associated with travel time. Dog owners prefer visiting the dog park closest to their home, but some owners drive to a dog park with amenities that best support their activities and needs. MBBP is located in a remote area but its location does not seem to discourage regular use because of its sufficient open space and diverse amenities for both dogs and dog owners. This implies that it is important to provide the amenities and design features which accommodate diverse users and their various activities. The study on user satisfaction with dog parks identified the critical design and environmental factors to be considered for improvement or new design.

Dog park satisfaction was measured using fourteen questions regarding dog park design and amenities (i.e., park size, location, site layout, recreational facilities, parking, maintenance, and safety). The overwhelming number of respondents (96.4 %) were satisfied or very satisfied with their dog park. Despite some complaints, generally they are satisfied with the 'existence' or 'availability' of dog parks where they can let their dog run, exercise freely, and socialize with other dogs. With regards to the design aspects of dog parks, satisfaction with size, location, site layout and operation time received high mean ratings, whereas five items including parking, maintenance, lighting, shade, and seating received low mean ratings.

More shade and seating topped the list of things to be improved. Since the parks in the study have been built for only three to five years newly planted trees which do not provide enough shade are possibly the reason. During the summer when temperatures reach over 90 degrees and humidity levels are high, use of dog parks are inhibited without enough shading. More mature trees or shade structure would create a more pleasant microclimate for park users during mid-day. Adding more seating and arranging them to support social interactions was another important consideration. Movable chairs for self-structured social environments would enhance social interaction and allow users to have more control over their own comfort. Picnic tables inside dog parks would provide settings suitable for socializing as well as for reading or relaxing.

The results of the survey and interviews suggested that the parks need to offer a diverse experience with a variety of design features. The desire for water play area and agility equipment was emphasized by the dog-park users in the study. There was also mention of amenities like trails or walking paths. Swimming ponds are the most popular design features at DJBP and MBBP and the most wanted features at Harmony and Cattail Park. Dog swimming is one of the more popular dog activities, particularly in summer. It not only helps cool off dogs

but also provides dogs and their owners with fun. Both DJBP and MBBP users mentioned the swimming pond as their favorite amenity and often dog swimming is the motive to visit the park in the summer. The difference of park use as influenced by dog ponds was also found in the behavioral mapping. The dog parks which have dog ponds have a larger number of users even on a hot summer day while the other parks are often empty for long periods of time when the weather gets too hot. The desire for a water play area was emphasized by the Harmony and Cattail park users in the survey and interviews. Along with a dog swimming pond, dog showers were evaluated as an important amenity of dog parks.

The satisfaction with maintenance and sanitation received high mean ratings and were mentioned by users as important factors of dog park design. People perceived that the dog parks are clean and well-maintained. However, a small proportion of dog-park users expressed their concerns regarding drainage, worn-out grass, and water quality of swimming ponds.

A proportion of dog-park users wanted extended park hours and lighting for evening uses due to their work schedule and hot temperature during daytime. It appeared that lighting is an important aspect in a dog park, especially during the winter season when daylight time is limited. Other features the respondents want to improve or add included parking, restrooms, and drinking fountains.

3. PERCEPTIONS OF DOG PARKS

The respondents were asked about their perceptions of the dog parks in order to identify perceived benefits of a dog park. Health benefits for dogs and opportunities to develop a feeling of community received high mean ratings. Over 77% of respondents “strongly agreed” or “agreed” that a dog park provides opportunities to meet neighbors and build a sense of community by socializing with others. Three quarters of the respondents (including non-dog owners) expressed the view that it is important for communities to include a dog park (mean =

4.2, S.D. = 0.9).

The respondents were asked about their perceptions of the dog parks regardless of dog ownership in order to identify residents' perceived benefits of a dog park. The majority of respondents (85.1%) are satisfied with living in their community and 45% of respondents "strongly" agreed that the dog park increased their overall satisfaction with their community. In addition, a substantial proportion of respondents (85.6%) agreed with the view that it is important for communities to include a dog park. However, relatively few people perceived that a dog park has an influence on the physical health of dog owners, public safety, or property value (mean ratings were 3.44, 3.51, and 2.90 respectively).

The substantial number of respondents perceived the benefits of a dog park for the dogs' social and physical well-being. Exercise and interaction between dogs were mentioned as important aspects of a dog park. Noticeably, Harmony dog-park users perceived more benefits of human health, social interaction and property value than other community residents. It appeared that proximity of dog parks is associated with not only frequency of visit, but also users' perception of benefits. The majority of Harmony residents were aware that the dog park was included in the community before they moved to Harmony, and over 67% stated that the presence of the dog park added to property appeal. Interviews with dog owners underscored the fact that a dog park is a good selling point and that it affected their decision to buy their property.

Although a relatively small proportion of dog owners recognize the benefits of dog parks to their owners and to the wider community. In informal interviews and open ended question surveys, many dog owners agreed that a dog park is necessary for dog owners and their dogs. A number of respondents stated that they want to be closer to a dog park and will consider a dog park to select a community.

4. ESTIMATION OF DOG PARK VALUE

In spite of the increasing popularity of dog parks, there has been little research into the valuation of this recreational resource. The purpose of the CVM study was to measure the benefits of dog parks in monetary terms. An open ended contingent valuation model was used to elicit users' willingness to pay for dog parks in order to estimate the perceived benefits. The high response rate on WTP of dog-park users indicated high appreciation of their dog parks. Of the 302 participants including non-dog owners, 71.9 % expressed a willingness to pay for dog parks and among the 268 dog owners, 80.1% stated they would pay an annual fee. This percentage is high compared with previous CV studies. The most commonly cited reasons for WTP were to guarantee an opportunity to use the sites and to ensure the preservation of the off leash recreation sites for potential future use. Some dog owners answered that they are willing to pay for the sake of dogs' health and well-being. A substantial number of the respondents who were unwilling to pay responded that the costs for dog parks should be covered by tax or homeowner association fee.

The average willingness to pay of $64.18 was derived from the survey data and it was trimmed by 5% to $56.17 to adopt a conservative approach. Stepwise regression analysis identified five variables including income, education level, number of people in family, satisfaction with maintenance, and satisfaction with facilities as important variables for predicting. Similar to results of previous WTP studies (Breffel et al., 1998; Huhtala, 2004; Jim and Chen, 2006), respondents with high incomes were more willing to pay for the use of a dog park. Also high satisfaction levels with maintenance and facilities were associated positively with the WTP as predicted. On the other hand, family size and education were negatively related with the WTP. Education level has often been found to have a positive effect on WTP (Carson et al. 1996), but the results of this study showed an inverse relationship in the

regression model. The frequency of use and distance were not significantly correlated to WTP levels.

Distance has been recognized as a major determinant in economic benefits estimations (Brown & Nawas, 1973; Zalatan, 1992). Zalatan (1992) found that respondents living closer to the Rideau Canal are willing to pay a higher fee for skating than those living farther away. Zalatan explained that long distance discourages payment of a higher fee due to travel costs. Therefore, it was expected that distance to a dog park is a factor influencing the WTP but it was not statistically significant in this study. However, a number of patrons of DJBP and MBBP, who need to drive long distance to the dog parks, expressed their desire for a closer dog park and responded that they are willing to pay for it.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

1. CONCLUSION

There are almost 700 dog parks in the country and the numbers are expected grow annually. Dog Parks in Houston, for example, are becoming very popular. Since the first dog park opened in December 2003, thirteen dog parks have been built in Houston and the surrounding areas and more parks are in the construction or planning phases. Harris County Precinct 3 Commissioner Steve Radack said in an interview with a local newspaper (Thai, 2006) that "some people think it's a complete waste of money, but the time and use that goes into the dog parks prove otherwise.…Mille Bush and Danny Jackson are probably our busiest day-by-day locations; they get more use than our parks with picnic tables and playgrounds or spray parks." As dog parks have become popular, a new issue is crowdedness of dog parks, especially on weekends, The Houston Dog Park Association, 2006. One future park under construction is planned to accommodate about 234 vehicles –more than twice the number as can MBBP. Crowdedness can cause lots of concerns about heavy traffic, worn-out grass, potential dog fights and smaller running space per user.

The present study suggested that locating dog parks closer to residential areas would likely help relieve crowded park condition, heavy traffic, and demands for parking spaces. Besides, proximity of dog parks can be beneficial to dogs, dog owners and the community as a whole in multiple aspects as shown in the study. First, closer proximity to residential areas encourages residents to visit frequently and to engage in walking and exercising with their dog. Dog parks have a potential for increasing human physical activity in a relatively easy and convenient way. Proximity of dog parks helps people to integrate physical activity and active

living as part of their lifestyle. Second, nearby dog parks allow dog owners to stay near their home and within their community, thus dog owners can feel a sense of security within a familiar community. Third, as shown in the survey, 'lack of time' topped the list of constraints to visiting the dog park. In order to accommodate users' lifestyle, dog parks should be provided in a more accessible and walkable location. Last, a dog park within the neighborhood would provide a meeting place for residents to know their neighbors, and thus promote sense of community.

The study found that dog parks serve very diverse users and they have various preference and needs. The majority of survey respondents expressed that they are willing to pay for dog parks which are well maintained and have facilities to meet their needs. It is evident that dog parks are not only a place for dogs to exercise but a place for people to exercise, socialize, relax and enjoy greenery just like other parks. Beyond its basic function as a place for dogs to exercise, dog parks should provide dog owners with diverse experiences and aesthetics. However, a single dog park can not have all park features and condition to satisfy users' needs. Just like the park system, more dog park options with various sizes and amenities should be provided to meet their needs. Therefore, it is important to consider dog parks as part of a recreational master plan and residential development plan.

In addition, considering local conditions and identifying the specific needs of users are very critical to developing a successful dog park in a community. One design standard can not be applied to all dog parks and region-specific design standards should be developed to reflect different physical, social, cultural, and environmental characteristics. In addition, a partnership with users, developers, planners, landscape architects and municipality is indispensable.

With cities becoming more and more crowded and leash laws becoming more restrictive, many dog owners are looking for a place to spend quality time with their pets

within their community. It is clear from this survey that dog parks are a critical component of community and urban environment. The results of this POE study confirmed that the design goals of the Harmony Dog Park were largely met. The efforts to accommodate outdoor recreation activity for dog owners and their dogs within the community are successful. Dog parks should be considered as a community feature like other community amenities, such as parks, playgrounds, tennis courts, swimming pools, and trails. It is concluded that incorporating a dog park into a community is beneficial to residents who use them and developers because it can appeal to potential homebuyers as a selling point.

The importance of responsible ownership cannot be overemphasized for a successful dog park. Most dog parks are established on the concept that dog owners would police themselves and each other rather than by law enforcement. Each dog owner is expected to understand and comply with rules such as picking up after their dog or supervising/controlling their dog. Although few respondents reported dog fights or annoying behaviors by dogs or dog owners in the survey, concerns about irresponsible owners and other dogs' behaviors were identified as a constraint to visiting a dog park. Some dog owners, who are not familiar with dog parks and are unaware of the rules, may unintentionally violate the park rules. Investing time and money in user education and sponsoring events that help dog owners understand the rules and learn dog park etiquettes would likely help reduce conflicts in a dog park and increase satisfaction.

2. LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

Although the present study has demonstrated the value of dog parks to those who use them, several limitations require explicit consideration.

First, observations were conducted during the months of July and August, thus, the extreme summer temperatures in Texas and Florida may cause some biases in dog park uses.

Dog parks may be underused and users may be more sedentary than during other seasons. Also participants may have been biased to request more shade elements and show the preference of swimming pool. Use is more frequent with cooler temperatures, which might influence users' activities and use patterns. The observation data collected in this study are likely indicative of summer use, which may limit generalizing across the seasons. Further observations will be required during other seasons to obtain a more complete picture of year-round use.

Second, the present study initially intended to include non-dog owners hoping to understand the general perception of community residents about dog parks. Unfortunately, people who do not have a dog were not interested in the study and refused to participate in a survey. Due to this sampling limitation, most of the data in this study are from dog owners and people who are interested in dog parks. Also there was insufficient representation of individuals who do not use dog parks or are not aware of the existence of dog parks. Studies are needed that collect general opinions of community residents to address the issues and concerns of non-dog owners about dog parks in the community.

Third, the respondents of the study survey were more likely to be relatively affluent, highly educated, white females. The higher than average levels of income and education may cause bias in the amount of willingness to pay. Though results of this study provides a general indication of the WTP to dog parks, a more thorough study with a much larger sample size would give a more accurate indication of WTP. Given that there has not yet been an effort to estimate the value of dog parks, this study may be seen as a first step toward more refined studies. Future research can use an interactive bidding sequence by interview methods to elicit more accurate WTP from the respondents.

Forth, dog-park users include diverse population subgroups in terms of age, gender, race, education, and income. Dog parks provide them with convenient and relatively

inexpensive recreation opportunities. In particular, dog parks can be a good recreation place for the elderly and women whose recreation activities mostly occur close to home, Hutchison, 1994. Since population subgroups have different subcultures and preferences for recreation activities, understanding these groups' use of dog parks is important. Future research regarding diverse dog-park users will be needed to establish accessible dog parks. It is now important to establish studies with population groups that are composed of different kinds of background characteristics.

Fifth, this study is a start in determining the explanatory variables of willingness to pay for dog parks and identified some significant factors determining WTP. Though the R^2 for the regression is higher than results of other studies that have attempted to model WTP as a function of socioeconomic variables, much of the variation in WTP for dog parks is left unexplained. Further research is necessary to conclusively determine the factors influencing users' willingness to pay for dog parks. A more thorough study with a much larger sample size and more appropriate independent variables would give a more accurate indication of WTP for dog parks.

Finally, additional empirical research is necessary regarding health benefits of dog parks. There are a few studies on the positive relationship between dog walking or dog companionship and physical health, but no research has been done regarding how dog parks influence dog owners' lifestyle and physical health. More study is also needed on the role of dog parks as a social hub in providing social interaction and a sense of community.

3. DESIGN RECOMMENDATIONS

The evaluation of four dog parks through survey and observations provided insights on important park features and environmental factors influencing users' activities and satisfaction. Each park has its own characteristics with successful and unsuccessful features.

The successful features across the selected parks included sufficient size, proper separation from traffic, proper separation of large dog area from small dog area, and sanitation. The survey results indicated that both functional and aesthetic components of dog parks should be considered in designing a dog park to satisfy the needs of park users. In this section, the design features most commonly mentioned across the parks are discussed and design recommendations were suggested.

1. The study indicates that shade has an important impact on the use of the dog park, especially in hot and humid weather. Trees in most parks are too young to create shade and shade structures are limited. More trees near benches will not only provide shade for dogs and dog owners, but also add aesthetic appeal to the park.
2. Observation data showed that the majority of park users engage in sitting and socializing with other dog owners. Plenty of seating and their proper arrangements must be provided to support social interaction. Two benches arranged at right angles or movable chairs for self-structured social environments enhance social interaction, in addition to allowing users to have more control over their own comfort. Multipurpose tables inside dog parks could provide settings suitable for socializing as well as for reading or relaxing. However, a few single benches should be provided at some distance from active areas for quiet sitters who want to play with their dogs alone.
3. Many dog owners expressed an interest in play obstacles for their dogs, and a water area for wading or cooling off. The larger dog parks can accommodate ramps, hurdles and agility exercise equipment for dogs and their owners to have fun together. A substantial number of users of Harmony and Cattail Park requested dog swimming pools or a small water play. When a swimming pond is planned, good drainage

system, dog shower facility, and maintenance should be considered.

4. Decomposed granite and grass are the most common and popular surfaces in dog parks. Grass is preferred to wood chips surface but many complained that grass gets thin due to traffic and becomes muddy after it rains. Different surfacing materials including concrete, decomposed granite, grass, and flagstone paving can be used for different areas. The carefully selected materials with proper drainage and maintenance would be functional as well as aesthetic. Millie Bush Park provides durable decomposed granite trails and they encourage people to walk around the park.
5. Lighting is recommended in order to allow dog owners to use the park in the evening, as well as improving safety. Lighting is important during the winter season when daylight is limited as well as summer nights because more people visit dog parks after sunset.

The following are more comprehensive and detailed dog park design guidelines based on the findings from the surveys and observations (Table 33). The application may be limited to certain areas due to different local conditions, weather, and social contexts. In addition, a dog park shall be developed through a public involvement process and evolve along the developmental needs of the users. Nevertheless, the following guidelines can provide designers and planners with general ideas about basic design features to be considered for existing or new dog parks.

Table 33
Dog park design guidelines

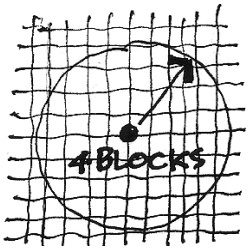
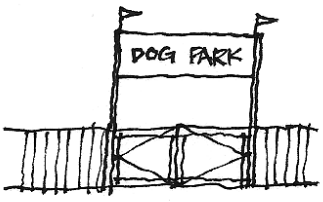
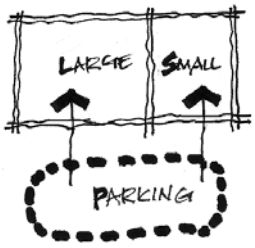
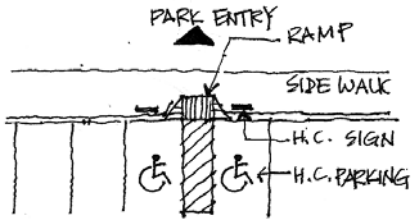
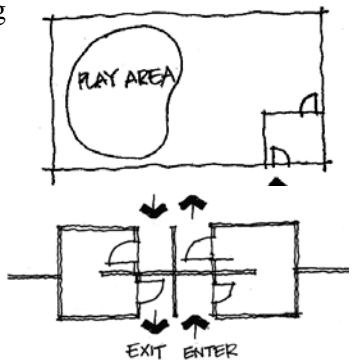
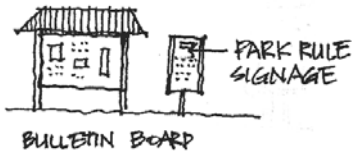
Items	Design Guidelines
Location and Size	• Locate a dog park within walking distance of potential dog users. Cooper Marcus, 1998) suggested that a four block radius is the maximum distance people will normally walk to the park. Potential users within a four block radius should be able to walk to the park without crossing a major road.  • Select the sites along street routes that are already popular as walking routes for dog owners. • Consider the population density of neighborhood, the number of dogs and owners, which are expected to use the park, and provide enough space to reduce crowdedness.
Site Layout	• Provide one main park entry, which gives a sense of arrival, and entry to the park. • When a dog park is built within an existing park, provide a separate entry for dog park users to avoid potential conflicts with other park users.  • At the dog park entry, provide the park name sign so that people are able to readily recognize the dog park. • Where applicable, connect a dog park with the community trail system. • Locate the main entrance into the park near a crosswalk. • Provide separate fenced-in areas for small dogs and large dogs. • Provide direct access to each dog area from the parking lot. • Parks are to be designed with an emphasis on conjunctive use and multi-use recreation areas and facilities to efficiently utilize park resources. 

Table 33
Dog park design guidelines (continued)

Parking	• Adequate parking shall be provided to minimize parking problems on residential streets. • Place parking areas close to the entrance for convenience. • Include security lighting for the entrance and parking area. • Provide accessible parking spaces, designated by signs and pavement marking entrances. • Provide concrete sidewalks with ramp from parking areas to the entrance.
Entrance	• Site the entrance far from the main area of dog activity to prevent fights between newcomers and the dogs inside the park. • Provide a double-gated entry for security, however, the gate safety latch should be easy to open with one hand. • Provide separate gates for entry and exit. • Provide paved entrances with ledges for resting keys, coffee cups, etc. while opening gate. • Provide a signage at the entrance informing users of safety regulations and park hours. • Provide a bulletin board for sharing information and communicating among dog owners. • Provide a separate entry for maintenance vehicles away from the main gate. • Bike racks shall be provided near the park entrance where appropriate to allow bicycles to be parked and locked. .







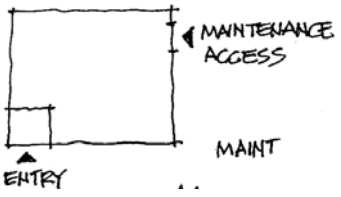


Table 33
Dog park design guidelines (continued)

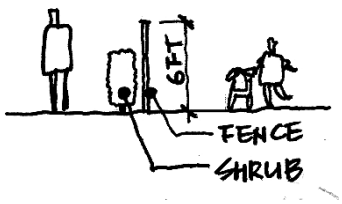
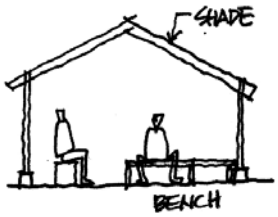
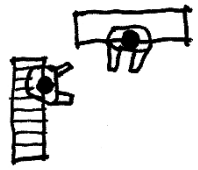
Open lawn area	• Provide 6' high fencing and shrubbery around the park to enclose and screen it from adjacent neighbors.  • Provide large contiguous turf areas for dog to play and fetch. • Incorporate a very gradual slope and avoid any abrupt changes in grade. • Adequate drainage shall be provided so that the lawn does not become a swamp in rainy weather • Provide concrete or decomposed granite pathways for walking inside the dog park, where space allows. • Place benches or seating areas with shade along the walking path where appropriate.
Site furniture	• Provide trees creating pleasing ambiance and summer shade  • Provide shade structures • Benches shall be placed to maximize shade in the summer and sun in the winter. • Place a number of single benches at some distance from active areas for non-socializing sitters.  • Provide light, movable seats so they can be moved to the desired location for sun, shade, or a comfortable conversational distance. • Fixed seating should both enable right-angle conversation and offer activity-oriented seating opportunities.  • Provide multipurpose tables to support conversation and gathering.

Table 33
Dog park design guidelines (continued)

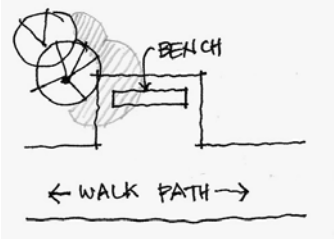
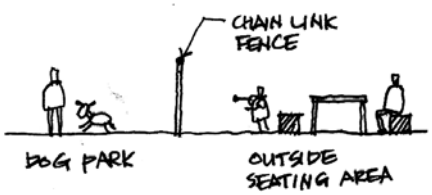
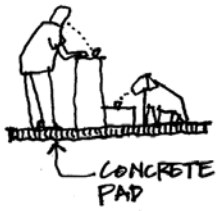
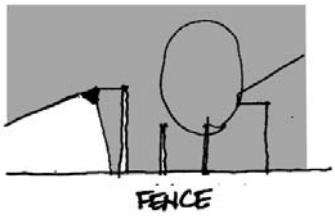
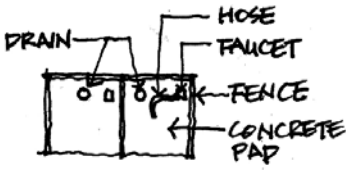
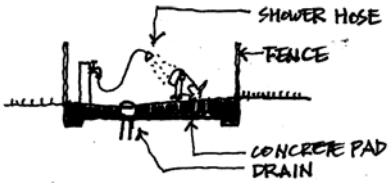
Site furniture	• Set benches back from walking paths so that pedestrians do not disturb bench sitters.   • Tables and benches along the park perimeter allow non dog park users watching dogs' play.  • Provide waste bag dispensers and covered receptacles for dog waste bags.  • Drinking fountains shall be accessible by dogs and people.  • Restroom facilities shall be provided in heavily used dog parks. • Provide lighting for night use and safety, as appropriate. Limiting glare impacts on nearby residential areas should be considered. 

Table 33
Dog park design guidelines (continued)

Site furniture	• Provide doggie shower to wash off dogs after playing at the park.   • Provide water play facilities such as a swimming pond, water fountain, and cool off showers. • An agility course will enhance dog's exercise.
Planting	• Plant trees to buffer the street frontage, to provide protection from wind and sun, and as a visual amenity to the park. • Use native groundcover, shrubs and/or trees in order to reduce maintenance wherever possible and appropriate.

REFERENCES

American Animal Hospital Association (AAHA), 2004. Pet Owner Survey. Retrieved April 28, 2006 from www.aahanet.org.

American Kennel Club, 2004. Establishing a Dog Park in Your Community. Retrieved March 30, 2006 from www.akc.org/canine_legislation/dogpark.cfm.

American Pet Products Manufacturers Association (APPMA), 2005. Industry Statistics & Trends. Retrieved January 25, 2006 from www.appma.org/

Argyrous, G., 2002. Statistics for Social and Health Research: With A Guide to SPSS. Sage Publications Ltd., Thousand Oaks, CA.

Award-winning Town of Harmony Welcomes Its First Family ("Award"), 2003, June 18. E-Wire. Retrieved September 15, 2005 from www.ewire.com/display.cfm/Wire_ID/1647.

Batch, E., Hale, M., Palevsky, E., 2001. The Case for Space: Expanding Recreational Opportunities for Dog Owners and Their Pets. Retrieved September, 12, 2005. from www.freeplay.org/casefo.html

Bateman, I.J., Carson, R.T., Day, B., Hanemann, M., Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Mourato, S., Pearce, D.W., Sugden, R., Swanson, J., 2002. Economic Valuation with Stated Preference Techniques: A Manual. Edward Elgar, Cheltenham, UK, pp. 458-476.

Bechtel, R.B., Marans, R.W., Michelson, W., 1987. Methods in Environmental and Behavioral Research., Van Nostrand Reinhold Company, New York.

Beck, A.M., Meyers, N.M., 1996. Health enhancement and companion animal ownership, Annual Review of Public Health, 17, 247-257.

Bennett, R.M., Tranter, R.B., Blaney, R.J.P., 2003, September. The value of countryside access: A contingent valuation survey of visitors to the Ridgeway National Trail in the United Kingdom. Journal of Environmental Planning and Management, 46(5), 659-671.

Berrens, R., Bergland, O., Adams, R.M., 1993. Valuation issues in an urban recreational fishery: Spring Chinook salmon in Portland, Oregon. Journal of Leisure Research, 25(1), 70-83.

Between Friends! The Joy of The 'Bark' Park: FIDO Makes It Happen, 2003, June. Best Friends Pet Care Newsletter. Retrieved November 13, 2005 from www. bestfirendspet-care.com

Bishop, R.C., Heberlein, T.A., 1979. Measuring values of extra-market goods: Are indirect measure biased? American Journal of Agricultural Economic, 61(5), 926-230.

Bourbeau, J., 1998. Dog parks: Can a place that lets rover roam help your shelter? Animal Sheltering, May-June, 19-21.

Boyle, K.J., Bishop, R.C., 1988. Welfare measurements using contingent valuation: A comparison of techniques. American Journal of Agricultural Economics, 70(1), 20-28.

Breffle, W. S., Morey, E. R., Lodder, T. S., 1998. Using contingent valuation to estimate a neighborhood's willingness to pay to preserve undeveloped urban land. Urban Studies, 35(4), 715-728.

Brown, W.G., Nawas, F., 1973. Impact of aggregation on the estimation of outdoor recreation demand functions. American Journal of Agricultural Economics, 55, 246-249.

Building Research Board, National Research Council, 1987. Post-Occupancy Evaluation Practices is The Building Process: Opportunities for Improvement. National Academy Press, Washington DC.

Burkett, J., 2006. City of Rome Bark Park, Among the Nation's 10 Best Dog Parks. Rome News and Press Releases. Retrieved May, 1, 2006 from www.romenewyork.com/ detail.asp

Calthorpe, P., 1993. The Next American Metropolis: Ecology, Community, and the American Dream. Princeton Architectural Press, New York.

Cameron, T. A., James, M.D., 1987. Efficient estimation methods for "closed-ended" contingent valuation surveys. Review of Economics & Statistics; 69 (2), 269-277.

Carson, R.T., 2000. Contingent valuation: A user's guide. Environmental Science Technology, 34, 1413-1418.

Carson, R.T., Flores, N.E., Martin, K.M.,, Wright, J.L., 1996. Contingent valuation and revealed preference methodologies: Comparing the estimates for quasi-public goods. Land Economics, 72(1), 80-99.

City of Regina, Park & Recreation, 2005. Dog-Friendly Parks in the City of Regina. Retrieved December, 12, 2005 from www.regina.ca/content/parks_and_rec/dogpark

Community Association of the Woodlands, 2006. General Information. Retrieved April 12, 2006 from http://www.thewoodlandsassociations.org/welcome/index.php?page=31

Cooper Marcus, C., Barnes, M. (Eds), 1995. Gardens in Healthcare Facilities: Uses, Therapeutic Benefits, and Design Recommendation. The Center for Health Design, Martinez, CA.

Cooper Marcus, C., Francis, C. (Eds), 1998. People Places: Design Guidelines for Urban Open Space. John Wiley, New York.

Dale, S., 2005. Establishing a Dog Park: A Chicago Success Story. Good News for Pets. Retried May 12, 2006 from http://www.goodnewsforpets.com/Articles.asp?ID=111

Darling, A.H., 1973. Measuring benefits generated by urban water parks. Land Economics**,** 49 (1), 22–34.

Davis, R.K., 1963. The value of outdoor recreation: An economic study of the Maine Woods. Ph.D. Dissertation, Harvard University.

Deeb, A., 2004. No More Homeless Pets Forum: Creating a Dog Park for Your Community. Best Friends Animal Society. Retrieved October 13, 2001 from www.bestfirends.org

Dicker, R., 2005. A Day in the Park. Retrieved October 13, 2001 from www.beneful.com/dogslife/day_in_park.aspx

Dodman, N., 1999. Dogs Behaving Badly: An A-To-Z Guide to Understanding and Curing Behavioral Problems in Dogs. Bantam, New York.

Dog PAC SB, 2002. Meeting the Need: Providing Off-leash Recreational Space in Santa Barbara, Retrieved September, 12, 2005 from www.dogpacsb.org/position2.html.

Dog Park National News, 2005. Dog Park Yahoo Group. Retrieved November, 12, 2005 from http://groups.yahoo.com/group/Dogpark-National-News/

Draker, D. A., 1997. Recreational valuation: A dichotomous choice approach. Master thesis, University of New Brunswick. New Brunswick, Canada.

Dyke, P., Phillips, M., 2000**.** Illinois dog park survey, Parks & Recreation, 35(9) 34-38.

Ewing, J., 1999. Managing Off-leash Recreation in Urban Parks. Retrieved August 12, 2005 from www.sfdog.org

Federal Facilities Council (FFC), 2002. Learning from Our Buildings: A State-of-the Practice Summary of Post-Occupancy Evaluation. National Academy Press, Washington, DC.

Fix, P., Loomis, J., 1998. Comparing the economic value of mountain biking estimated using revealed and stated preference. Journal of Environmental Planning and Management, 41(2), 227-236.

Forster, B.A., 1989. Valuing outdoor recreational activity: A methodological survey. Journal of Leisure Research, 21(2), 181-201.

Friedmann, A., Zimring, C., Zube, E., 1978. Environmental Design Evaluation. Plenum Press, New York.

Friedmann, E., Katcher, A.H., Lynch, J.J., Thomas, S.A., 1980. Animal companions and one year survival of patients after discharge from a coronary care unit. Public Health Reports, 95, 307-312.

Friedmann, E., Katcher, A.H., Lynch, J.J., Thomas, S.A., 1983. Social interaction and blood pressure: The influence of animal companions. Journal of Nervous and Mental Disease, 171, 461-465.

George, D., Mallery, P., 2001. SPSS for Windows: A Simple Guide and Reference. Allyn & Bacon, MA.

Gillette, F., 2004. Who let the dog parks out? Landscape Architecture, January, 70-73.

Guion, L. A., 2002. Triangulation: Establishing the Validity of Qualitative Studies. Retrieved December 21, 200 from http://edis.ifas.ufl.edu/pdffiles/FY/FY39400.pdf

Harlock Jackson Ltd., 1995. Public Open Space and Dogs: A Design and Management Guide for Open Space Professionals and Local Government. A Report for Petcare Information & Advisory Service, Australia. Retrieved October 10, 2005 from www.petnet.com.au/ openspace.

Hayward, D.G., Weitzer, W.H., 1984. The public's image of urban parks: Past amenity, present ambivalence, uncertain future. Urban Ecology. 8, 243–268.

Hayward, M. D., Zhang, Z., 2001. Demography of aging: A century of global change, 1950-2050. In: R. H. Binstock,, L.K. George, (Eds.), Handbook of Aging and the Social Sciences, fifth ed. Academic Press, New York, pp. 69-85.

Heath, Y., Gifford, R., 2001. Post-occupancy evaluation of therapeutic gardens in a multi-level care facility for the aged. Activities, Adaptation & Aging, 25(2), 21-43.

The Houston Dog Park Association, 2006. The Houston Dog Park Association Forum. http://houstondogpark.org/hdpaforum/index.php

Huang, M. B., 1996. Public Perception and Social Value Estimation of Urban Parks in Taipei City, Taiwan. Ph.D. Dissertation, University of California Los Angeles.

Huhtala, A., 2004. What price recreation in Finland? A contingent valuation study of non-market benefits of public outdoor recreation areas. Journal of Leisure Research, 36, (1), 23-44.

Hutchison, R., 1987. Ethnicity and urban recreation: Whites, Blacks, and Hispanics in Chicago's public parks. Journal of Leisure Research, 19, (3), 205-22.

Jim, C.Y., Chen, W.Y., 2006. Recreation-amenity use and contingent valuation of urban greenspaces in Guangzhou, China. Landscape and Urban Planning, 75, 81-96.

Kaiser, H.F., Brown, P.J., Davis, R.K., 1988. The need for values of amenity resources in public natural resources management. In: Peterson, G..L., Driver, B.L., Gregory, R., (Eds.), Amenity Resource Valuation: Integrating Economics with Other Disciplines. Venture Publishing, State College, PA, pp. 7-12.

Kaplan, R., 1980. Citizen participation in the design and evaluation of a park. Environment and Behavior, 12(4), 494-507.

Kawczynska, C., 1999. Dog Power. Retrieved July, 28, 2004 from www.thebark.com/ community/advocacydogparks.html

Kerr, G..N., Manfredo, M.J., 1991. An attitudinal based model of pricing for recreation services. Journal of Leisure Research, 23, 37-50.

Klocek, C.A., 2004. Estimating the economic value of Canaan Valley National Wildlife Refuge: A Contingent Valuation Approach. Ph.D. dissertation. West Virginia University. Morgantown, WV.

Kopp, R. J., Smith, V. K., 1993. Valuing Natural Assets: The Economics of Natural Resource Damage Assessment. Resources for the Future, Washington, DC.

Kwak, S. J., Yoo, S.H., 2003. Estimating the Public's Value for Urban Forest in the Seoul Metropolitan Area of Korea: A Contingent Valuation Study. Urban Studies. 40 (11), 2207-2221

Lee, C.K., Han, S.Y., 2002. Estimating the use and preservation values of national parks' tourism resources using a contingent valuation method. Tourism Management, 23, 531-540.

Leschin-Hoar, C., 2005. Fighting for FIDO , Parks & Recreation, 40 (1).

Lindsey, G., Knaap, G., 1999. Willingness to pay for urban greenway projects. Journal of American Planning Association, 65(3), 297-313.

Lockwood, M,, Tracy, K., 1995. Nonmarket economic valuation of an urban recreation park. Journal of Leisure Research, 27 (2), 155-167.

Loomis, J.B., Walsh, R.G., 1997), Recreation economic decisions: Comparing benefits and costs., 2nd ed.. State College, PA: Venture.

Lorenzo, A.B., Blanche, C.A., Qi, Y., Guidry, M.M., 2000. Assessing residents' willingness to pay to preserve the community urban forest: A small-city case study. Journal of Arboriculture 26(6).

Machado, K.B., 2000. Willingness to pay for conservation programs: A contingent valuation study of the Galapagos National Park. Ph.D. Dissertation, Cornell University. Ithaca, NY.

McCollum, D. W., Gilbert A. H., Peterson, G. L., 1990. The net economic value of day use cross country skiing in Vermont: A dichotomous choice contingent valuation approach. Journal of Leisure Research, 22(4), 341-352.

McConnell, V., Walls, M., 2005. The Value of Open Space: Evidence from Studies of

Nonmarket Benefits. Resources for The Future. Retrieved October 20, 2005, from http://www.rff.org/rff/Publications/Reports.cfm

McLaughlin, C.R., 2005. They All Bark for Dog Parks. New York Council of Dog Owner Groups. Retrieved July 13, 2006, from http://www.nycdog.org/animalnetwork.html

McNicholas, J., Collis, G..M., 2000. Dogs as catalysts for social interactions: Robustness of the effect. British Journal of Psychology, 91, 61-70.

Mitchell, R.C., Carson, R.T., 1993. Using Surveys to Value Public Goods: The Contingent Valuation Method. Resources for the Future, Washington, DC.

Moore, C., 2001, August 5. In harmony with nature Osceola developer takes the green approach. Orlando Sentinel.

The Off-Leash Park Proposal Committee, 2004. Proposal for an Off-Leash Dog Area in the Wyomissing Park System. Retrieved October 11, 2005 from http://www.co.berks.pa.us/parks/

Pate, J., Loomis, J., 1997. The effect of distance on willingness to pay values: A case study of wetlands and salmon in California. Ecological Economics, 20, 199-207.

Pet Food Institute, 2006. Pet Population Data, Retrieved January, 12, 2007 from http://www.petfoodinstitute.org/reference_pet_data.cfm

Peterson, G..L., Driver, B.L., Gregory, R., 1988. Amenity Resource Valuation: Integrating Economics With Other Disciplines. Venture Publishing, State College, PA.

Pope, C.A., Miner, F.D., 1988. Valuation of improved air quality in Utah County. Environmental Management, 12(3), 381-389.

Preiser, W.F.E., 2002. Continuous quality improvement through post-occupancy evaluation feedback. Journal of Cooperate Real Estate, 5, (1), 42-56.

Preiser, W.F.E., Rabionwitz, H.Z., White, E.T., 1998. Post-Occupancy Evaluation. Van Nostrand Reinhold, New York.

Prince Edward Island Humane Society, 2005. Dog Exercise and Education Park. Retrieved July 25, 2006, from http://www.peihumanesociety.com/park.htm.

Raina P., Waltner-Toews, D., Bonnett, B., Woodward, C., Abernathy, T., 1999. Influence of companion animals on the physical and psychological health of older people: An analysis of a one-year longitudinal study. The American Geriatrics Society, 47(3), 323-329.

Ralston, S.N., Park, W.M., Frampton, E.J., 1991. Contingent valuation and recreational demand. Journal of Applied Business Research, 7, (3), 116-119.

Reaves, D.W., Kramer, R.A., Holmes, T.P., 1999. Does question format matter? Valuing an endangered species, Environmental and Resource Economics 14: 365–383.

Rhoades, M.P., 2004. Creating a Dog Park for Your Community. No More Homeless Pets Forum, September 6. Retrieved November 15, 2005 from www.bestfriends.org/ archives/forums/090604dogpakrs.html

Rollins, K., Wistowsky, W., 1997. Benefits of back-country canoeing in Ontario wilderness park, Journal of Applied Recreation Research, 22(1), 9-31.

Rollins, K., Dumitras, D. E., 2005. Estimation of median willingness to pay for a system of recreation areas. International Review on Public and Non Profit Marketing, 2(1), 73-84.

Sable, P., 1995. Pets, attachment, and well-being across the lifecycle, Social Work, 40(3), 334-341.

San Francisco Society for the Prevention of Cruelty to Animals, 2005. Off-Leash Dog Recreation. Retrieved December 21, 2005 from www.sfspca.org/advocacy/off-leash.shtml

Sellar, C., 1982. The value of recreation boating at lakes in East Texas. Ph.D. dissertation, Texas A&M University. College Station, TX.

Serpell, J., 1991. Beneficial effects of pet ownership on some aspects of human health and behavior. Journal of the Royal Society of Medicine, 84(12), 717-720.

Shepley, M.M., 1997. Design evaluation. In: Marberry, S.O., (Ed.) Healthcare Design. John Wiley, New York, pp. 73-104.

Shepley, M.M., Wilson, P., 1999. Designing for persons with AIDS: A post-occupancy study at the Bailey-Boushay House. Journal of Architecture and Planning Research, 16(1), 17-32.

Sherman S.A., Varni, J.W., Ulrich, R.S., Malcarne, V.L., 1995. Post-occupancy evaluation of healing gardens in a pediatric cancer center. Landscape and Urban Planning, 73,167-183.

Siegel, J.M., 1990. Stressful life events and use of physician services among the elderly: The moderating role of pet ownership. Journal of Personality and Social Psychology, 58, 1081-1086.

Siegel, J.M., 1993. Companion animals: In sickness and in health. Journal of Social Issues, 49, (1), 157-167.

Statts, S., Pierfelice, L. Kim, C., Crandell, R., 1999. A theoretical model for human health and the pet connection. Journal of the American Veterinary Medical Association, 214, 4.

Stoll, J.R., Gregory, R., 1988. The amenity valuation problem: Overview. In: Peterson, G..L., Driver, B.L., Gregory, R., (Eds.), Amenity Resource Valuation: Integrating Economics with Other Disciplines. Venture Publishing, State College, PA., pp.3-6.

Thai, K., 2006. New Park with a Bark to Open Soon. Houston Chronicle. December 19.

Tucker, D.F., 1993. Contingent valuation and greenways: Rationalizing the local decision making process, Ph.D. Dissertation, North Carolina State University. Raleigh, NC.

Tyrvainen, L., Miettinen, A., 2000. Property prices and urban forest amenities. Journal of Environmental Economics and Management, 39, 205–223.

Tyrvainen, L., Vaananen, H., 1998. The economic value of urban forest amenities: An application of the contingent valuation method. Landscape and Urban Planning. 43.105-118.

U.S. Census Bureau News, 2005. Families and Living Arrangements. Retrieved December 21, 2006 from www.census.gov/Press-Release/www/releases/archives/families_households.

Walsh, R.G., 1986. The Intelligent Manager'S Guide to Recreation Economic Decisions. Venture Publishing, State College, PA.

White, P.C.L., Lovett, J.C., 1999. Public preferences and willingness to pay for nature conservation in the North York Moors National Park, UK. Journal of Environmental Management, 55, 1-13.

Whitehouse, S. Varni, J.W., Seid, M., Cooper Marcus, C.C., Ensberg, M.J., Jacobs, J.R., Mehlenbeck, R.S., 2001. Evaluating a children's hospital garden environment: Utilization and consumer satisfaction. Journal of Environmental Psychology, 21, 301-314.

Wilson, C.C., Turner, D.C. (Eds.), 1998. Companion Animals in Human Health. Sage Publications, Thousand Oaks.

Wilson, O.E., 1984. Biophilia. Harvard University Press. Cambridge, MA.

Wolch, J. R., Rowe, S., 1992. Companions in the park: Laurel Canyon Dog Park. Landscape, 31(3) 16-23

Zalatan, A., 1992. Willingness to pay: Skating on the Rideau Canal. Journal of Applied Recreation Research, 18, (3), 211-223.

Zeisel, J., 1981. Inquiry by Design: Tools for Environment-Behavior Research. Brooks/Cole Publishing Company, Monterey, CA.

Zimring, C., 2002. Post-occupancy evaluations and organizational learning: In: Federal Facilities Council Learning from Our Buildings: A State-of-the Practice Summary of Post-Occupancy Evaluation. National Academy Press, Washington, DC.

APPENDIX A

INSTITUTIONAL REVIEW BOARD OF TEXAS A&M UNIVERSITY

TEXAS A&M UNIVERSITY
VICE PRESIDENT FOR RESEARCH - OFFICE OF RESEARCH COMPLIANCE

1186 TAMU
College Station, TX 77843-1186
1500 Research Parkway, Suite B-150

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FAX 979.862.3176
http://researchcompliance.tamu.edu

Institutional Biosafety Committee | Institutional Animal Care and Use Committee | Institutional Review Board

DATE: 18-May-2006

MEMORANDUM

TO: LEE, HYUNG-SOOK
TAMU-LANDSCAPE ARCHITECTURE & URBAN PLAN(00059)

FROM: Ms. Angelia M. Raines
Director of Research Compliance

SUBJECT: Initial Review

Protocol Number: 2006-0310

Title: Post-Occupancy Evaluation and Recreation Benefit Estimation of Dog Parks

Review Category: Exempt from IRB Review

The Institutional Review Board (IRB) has determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendment or modification to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Provisions:

This electronic document provides notification of the results of review by the Institutional Review Board.
Contact the IRB Office with questions regarding this document or the review process.

APPENDIX B

SURVEY INSTRUMENT

This questionnaire is part of a study being conducted by Hyung-Sook Lee, a doctoral student at Texas A&M University. The purpose of this study is to learn more about how dog parks are used and how dog-park users and residents perceive about dog parks. Your answers will not be used for specific policy or pricing decision, but will help in understanding your needs and interests.

Your answers are invaluable to this study. Please take a few minutes to complete the questionnaire and return it in the prepared envelope. Participation in this study is anonymous. All data are to be coded by numbers only and no names will be asked in a survey. All responses will be aggregated and analyzed, and cannot be identified to anybody in particular.

You can contact the principal investigator, Hyung-Sook Lee at hslee@tamu.edu, or the advisor of Investigator, Dr. Chang-Shan Huang,, 979) 845-7873, chuang@archone.tamu.edu, with any questions about this study.

I appreciate your help.

Hyung-Sook Lee, ASLA Principal Investigator Department of Landscape Architecture and Urban Planning Texas A&M University College Station, TX 77843 hslee@tamu.edu	Dr. Chang-Shan Huang Professor/ Advisor of Investigator Department of Landscape Architecture and Urban Planning Texas A&M University College Station, TX 77843 (979)845-7873 chuang@archone.tamu.edu

Dog Parks Survey

1. Do you own a dog?

☐ Yes ☐ No **(if no, please proceed to Question 21 on Page 3)**

2. How many dogs you own and their average size?

Under 20 lbs. dog(s) 21-50 lbs. dog(s) 51 + lbs. _____ dog(s)

3. Please answer the following questions regarding your relationship with your dog(s).

	Strongly Disagree	disagree	Somewhat disagree	agree	Strongly agree
I am very attached to my pet.	1	2	3	4	5
I feel that my dog is part of my family.	1	2	3	4	5
Owning a dog adds to my happiness.	1	2	3	4	5
My pet loves me.	1	2	3	4	5

4. How do you provide exercise for your dog (s)?

☐ Walking around neighborhood on leash ☐ Leaving off-leash in backyard

☐ Walking to a nearby park on leash ☐ Taking to an off-leash dog park

☐ No outdoor exercise provided ☐ Other _____

5. How often do you provide exercise for your dog(s)?

Daily	4-5 times per week	2-3 times per week	Once a week	2-3 times per month	Once a month	Less often

6. Do you ever go to a dog park in your community? ☐ Yes ☐ No
If yes, what is the name of dog park? _____

7. If no, what is the reason?

☐ Not aware that there is a dog park in my community.

☐ The dog park is too far from my home. ☐ Not interested in a dog park

☐ My dog doesn't need outdoor exercise ☐ Lack of time

☐ Concern about other dogs' behaviors (e.g., dog fights) ☐ Other _____

(If no, please proceed to Question 21 on Page 3)

9. How often do you and your dog(s) visit the off-leash dog park?

Daily	4-5 times per week	2-3 times per week	Once a week	2-3 times per month	Once a month	Less often

8. How do you get to the dog park most times?

☐ Walk ☐ Automobile ☐ Bike ☐ Other_____

How long does it take? _____ minutes travel time

10. How long do you usually stay in the park during your visits?

☐ 0-30 minutes ☐ 30-60 minutes ☐ 1-2 hours ☐ 2+ hours

11. At what time of a day do you usually visit the dog park? Check all times that apply.

☐ Weekday mornings (6am – 12 pm) ☐ Weekend mornings (6am – 12 pm)

☐ Weekday afternoons (12 pm – 6 pm) ☐ Weekend afternoons (12 pm – 6 pm)

☐ Weekday evenings (after 6pm) ☐ Weekend evenings (after 6pm)

12. Typically why do you visit the dog park? Check all that apply.

- ☐ For dog's exercise
- ☐ For dog's socialization
- ☐ To exercise with dogs
- ☐ To meet other dog owners and socialize
- ☐ To enjoy green space
- ☐ To relax and rest outdoors
- ☐ To participate in dog related events
- ☐ Other _____

13. What factors if any keep you from using the dog park more often? Check all that apply.

- ☐ The dog park is too far from my home.
- ☐ Lack of interest
- ☐ The dog park is too crowded.
- ☐ Lack of time
- ☐ Concern about other dogs' behaviors (e.g., dog fights)
- ☐ Hot weather
- ☐ The park do not offer the preferred facilities
- ☐ Times of park operation
- ☐ None
- ☐ Other _____

14. What type(s) of activities do you do most times while visiting a dog park? Check all times that apply.

- ☐ Sitting
- ☐ Reading
- ☐ Talking
- ☐ Walking around the park
- ☐ Playing actively with dogs (e.g. Frisbee.)
- ☐ Other _____

SATISFACTION OF DOG PARKS USE

15. Generally speaking, how satisfactory do you personally consider the dog park as of now?

☐ Very satisfactory ☐ Satisfactory ☐ don't know ☐ Unsatisfactory ☐ Very unsatisfactory

16. How much are you satisfied with the following characteristic of dog parks?

	unsatisfactory				satisfactory	comments
Park size	1	2	3	4	5	
Park location	1	2	3	4	5	
Spatial design – site layout	1	2	3	4	5	
Recreational facilities (e.g., water play, dog shower , drinking fountains)	1	2	3	4	5	
Parking Availability	1	2	3	4	5	
Access to Parking	1	2	3	4	5	
Operation time	1	2	3	4	5	
Maintenance	1	2	3	4	5	
Safety	1	2	3	4	5	
Enough Seating	1	2	3	4	5	
Lighting	1	2	3	4	5	
Sanitation (Smell)	1	2	3	4	5	
Shade (enough trees)	1	2	3	4	5	

Others, please specify _____

17. What do you like about your off-leash dog park?

_____

18. What do you dislike about your off-leash dog park?

_____

19. Please write the important factors for you to use a dog park. You can refer to the list in question 16.

_____

20. Please write design features you think should be improved or, if not included in the dog park, needs to be included.

_____

PERCEPTION OF RESIDENTS ON THE DOG PARK

21. Were you aware that the dog park is included in your community when you moved to your property?

☐ Yes ☐ No

22. If yes, how did the presence of the dog park affect your decision to buy the property?

☐ Added to property's appeal
☐ Detracted form property's appeal
☐ No effect

23. How do you perceive the benefits of dog parks?

	Strongly disagree				Strongly agree
Dog parks help promote physical health of my dogs.	1	2	3	4	5
Dog parks help promote my physical health.	1	2	3	4	5
Dog parks help people socialize with others and opportunities chance to meet neighbors.	1	2	3	4	5
Dog parks help build a sense of community.	1	2	3	4	5
A dog park is one of the important community amenities.	1	2	3	4	5
Dog parks have values only to the actual users.	1	2	3	4	5
Dog parks enhance public safety.	1	2	3	4	5
Dog parks help improve quality of life.	1	2	3	4	5
I recommend that others visit the dog park.	1	2	3	4	5
It is important for communities to include a dog park.	1	2	3	4	5
I am satisfied with living in my community.	1	2	3	4	5
The dog park increases your overall satisfaction with my community.	1	2	3	4	5
If I were to move to another place, I would consider the presence of dog park in my community or neighborhood.	1	2	3	4	5
Being located near the dog park has affected the resale value of this property	1	2	3	4	5
A dog park influences whether I recommend my community to others.	1	2	3	4	5

The following questions are hypothetical and will be used only for the estimation of economic value associated with dog parks. It will not be used for a specific pricing policy. Suppose the costs for dog park operation, administration and maintenance have become more expensive, thus it become necessary to establish annual permits for the use of dog parks, which will be used exclusively for the maintenance of the dog parks.

24. Would you buy an annual permit or make a donation for dog parks? If yes, how much would you be willing to pay, if it were guaranteed that the revenues would be used for maintenance of the dog park areas?

I would buy an annual permit and be willing to pay $ _____.

25. What is the motive for willingness to pay? Check all that apply.

___ I use the dog park and I want to guarantee myself an opportunity to use the sites
___I want to ensure the preservation of the off leash recreation sites for potential future use
___I want to support the provision of recreation services to all residents.
___I want to support the preservation of cultural and natural values for future generations.
___Other reasons_____

26. If you are not willing to pay for the use of the park, please check one of the following choices that most closely describe your reason, or specify other reasons below.

___ Visiting the site is not important enough to me

___ I would use other sites (on-leash), I don't need these services

___ I cannot afford the fees.

___ The maintenance costs should be covered by current revenues of the association.

___ Other reasons_____

Please answer the following questions about yourself and your household so that we may better categorize and analyze the responses to this survey. All of your answers will remain confidential and you will never be identified in reporting results of the study.

27. What is your gender? ☐ female ☐ male

28. What is your age?

☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65 or older

29. What is your primary racial or ethnic identity?

☐ African-American ☐ Asian ☐ Hispanic/ Mexican American

☐ White/ Caucasian ☐ Other_____

30. What is your marital status?

☐ Single ☐ Married ☐ Separated ☐ Divorced ☐ Widowed

31. How many members are there in your household? _____ Persons (including yourself)

32. How many children 18 or under live at home?

☐ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ more than 5

33. What is the highest year of formal schooling you have completed? Circle only one.

Grade School								High School				College				Graduate School				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	+21

34. Are you …..? ☐ Employed Full Time ☐ Employed Part Time ☐ Self-employed

☐ Retired ☐ A Student ☐ Other _____

35. For statistical purposes only, please tell me into which of the following categories you total annual household income falls?

☐ Less than $20,000
☐ $20,000 - $39,999
☐ $40,000 - $59,999
☐ $60,000 - $79,999
☐ $80,000 - $99,999
☐ $100,000- $119,999
☐ $120,000- $139,999
☐ $140,000 and more

36. Is the type of residence you live in a … ?

☐ Single Family Home ☐ Apartment/Condominium ☐ Duplex ☐ Other

37. Do you own or rent? ☐ Own ☐ Rent

38. How many years have you lived in the community?

☐ less than 1 year ☐ 1-2 years ☐ 2-3 years ☐ 3-5 years ☐ more than 5 years

THANK YOU FOR PARTICIPATING IN THIS SURVEY.

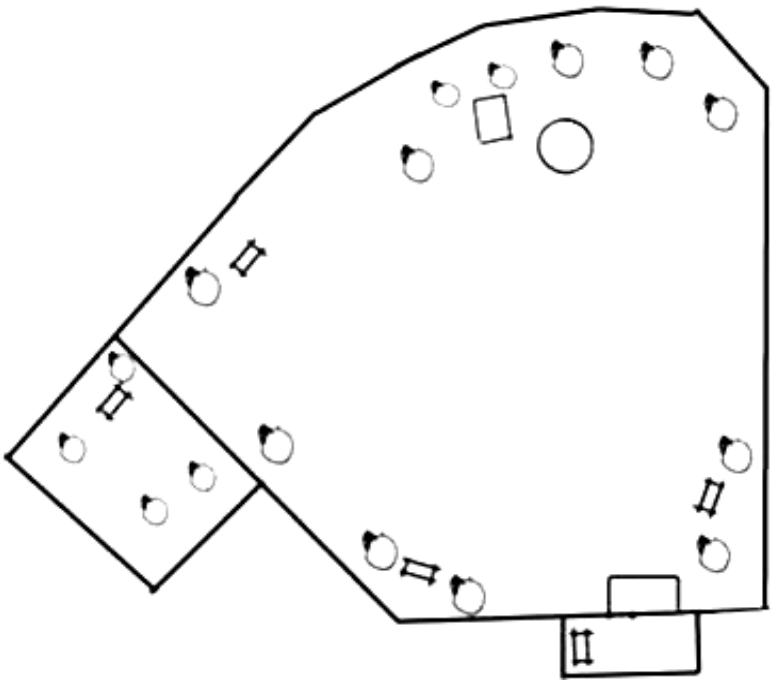
APPENDIX C

BEHAVIORAL MAPPING RECORDING FORM (CATTAIL PARK)

Date: **Time:**

Weather:

			Activities		
Gender	F		Stationary/ Nonsocial	Sit/ read	
	M			Sit/ relax, watch dog play	
Age	< 10			Stand/ watch dog play	
	10s			Phone	
	20-30s		Stationary/ Social	Sit/ talk	
	40-50s			Stand/ talk	
	>60s				
Race	White		Mobile/ Nonsocial	Walk alone	
	Hispanic			Play w/ dog	
	Black				
	Asian		Mobile/ Social	Play / group	
Group type	Single			Walk / group	
	Couple				
	1 Adult + kids		Others		
	Family				
	Mixed, peer)				

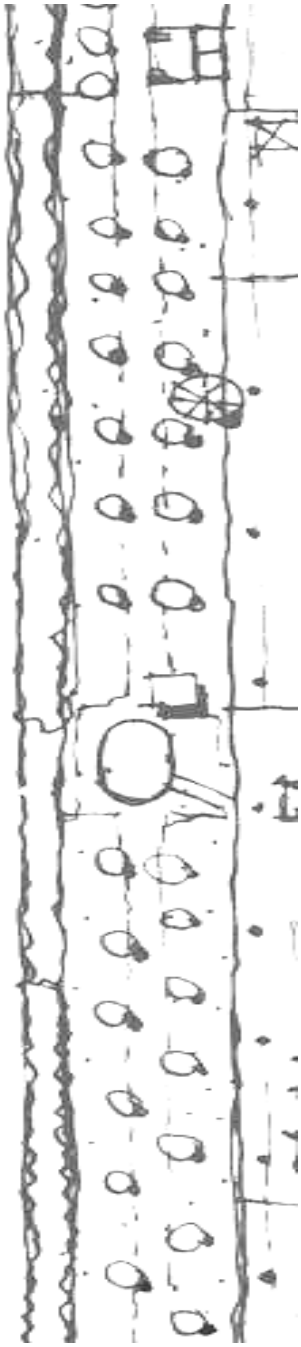


APPENDIX D

BEHAVIORAL MAPPING RECORDING FORM (DJBP PARK)

Date: **Time:** **Weather:**

Gender	F	
	M	
Age	< 10	
	10s	
	20-30s	
	40-50s	
	>60s	
Race	White	
	Hispanic	
	Black	
	Asian	
Group type	Single	
	Couple	
	1 Adult + kids	
	Family	
	Mixed, peer)	
Activities		
Stationary/ Nonsocial	Sit/ read	
	Sit/ relax, watch dog play	
	Stand/ watch dog play	
	Phone	
Stationary/ Social	Sit/ talk	
	Stand/ talk	
Mobile/ Nonsocial	Walk alone	
	Play w/ dog	
Mobile/ Social	Play / group	
	Walk / group	
Others		



APPENDIX E

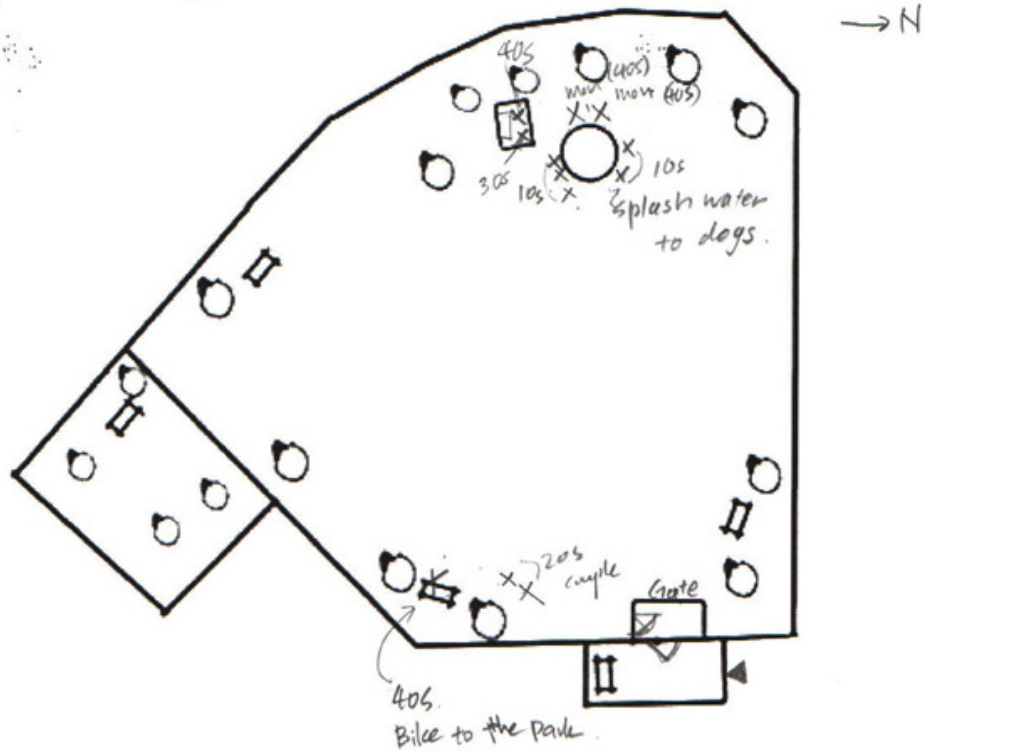
SAMPLE OF BEHAVIORAL MAPPING AT CATTAIL PARK

Behavioral Mapping Recording Form (Cattail)

Date: 7/16/06 (Sun) **Time:** 6pm **Weather:** Hot

			Activities		
Gender	F	5	Stationary/ Nonsocial	Sit/ read	
	M	7		Sit/ relax, watch dog play	1
Age	< 10	1		Stand/ watch dog play	
	10s	4		Phone	
	20-30s	3	Stationary/ Social	Sit/ talk	
	40-50s	4		Stand/ talk	2
	>60s				4
Race	White	12	Mobile/ Nonsocial	Walk alone	
	Hispanic			Play w/ dog	
	Black				
	Asian		Mobile/ Social	Play / group	3 (Waterplay)
Group type	Single	3		Walk / group	
	Couple	2			
	1 Adult + kids	1	Others		
	Family				
	Mixed (peer)				

Total 12



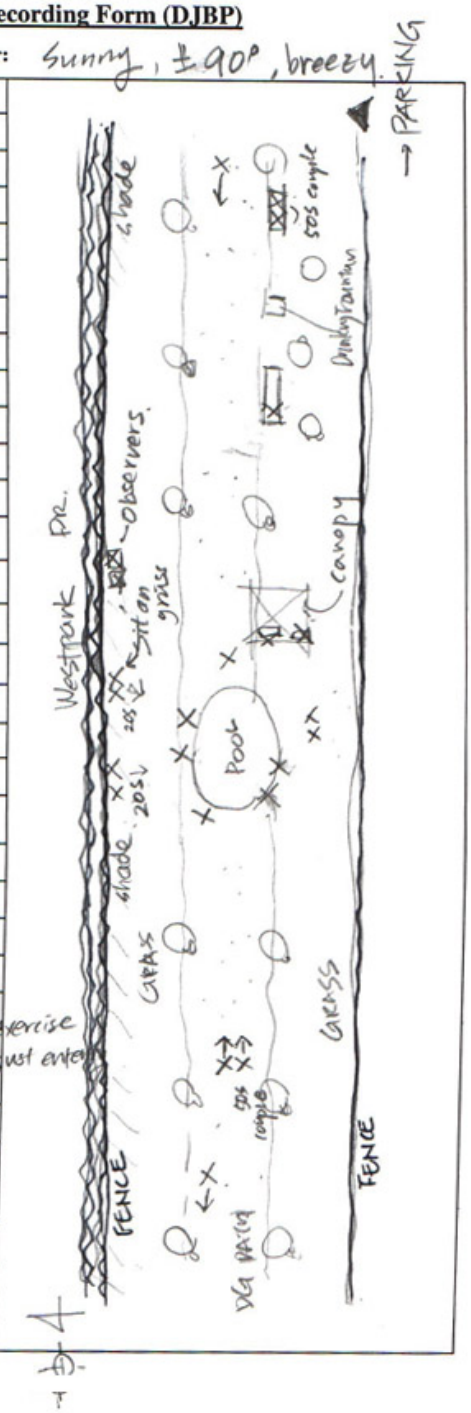
APPENDIX F

SAMPLE OF BEHAVIORAL MAPPING AT DJBP PARK

Behavioral Mapping Recording Form (DJBP)

Date: 6/17/06 (Sat.) **Time:** 7:15 pm **Weather:** Sunny, ±90°, breezy

Gender	F	7
	M	14
Age	< 10	
	10s	1
	20-30s	16
	40-50s	4
	>60s	
Race	White	16
	Hispanic	3
	Black	
	Asian	2
Group type	Single	4
	Couple	12
	1 Adult + kids	2
	Family	
	Mixed (peer)	3
Activities		
Stationary/ Nonsocial	Sit/ read	
	Sit/ relax, watch dog play	4
	Stand/ watch dog play	
	Phone	
Stationary/ Social	Sit/ talk	5
	Stand/ talk	8
Mobile/ Nonsocial	Walk alone	2 (exercise / just enter)
	Play w/ dog	
Mobile/ Social	Play / group	
	Walk / group	2
Others	Throwing a ball in swimming pool	3
Total		21



VITA

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Master of Landscape Architecture, Landscape Architecture and Urban Planning, Texas A&M University, 2001
Master of Science, Interior Design, Yonsei University, Korea , 1997
Bachelor of Science, Home Economics, Housing), Seoul National University, Korea, 1994

PROFESSIONAL EXPERIENCE

Landscape Architect and planner, M2L Associates, Inc. Houston, Texas, July 2001-Present
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Research Assistant, Human Ecology Research Institute, Yonsei University, Seoul, Korea , 1995– 1997
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AWARDS & SCHOLARSHIPS

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Harmony Institute Scholarship, April, 2001
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