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CHAPTER 1 : INTRODUCTION

Wetlands are among the most important and valuable natural resources in the world, but they are fast disappearing due to many human activities, namely agriculture and urbanization. In 2002, the World Conservation Union (IUCN) reported that 50% of the world's wetlands had suffered losses during the previous decade. To replace the lost wetlands, experts such as wetland scientists, planners, and natural resources managers have introduced wetland restoration programs in strategic locations, such as urban green natural open spaces. However, this noble effort has been opposed by certain segments of society. Clearly, conservationists need to discover why some people oppose wetland restoration in urban natural spaces if they are to have any hope of restoring these wetlands. The key to answering this question might lie in the fact that the public and wetlands experts have vastly differing perceptions of wetland characteristics, values and benefits. Understanding these varying perceptions, and the factors that influence the public's concept of wetlands, is a vital step in ensuring the preservation of this fragile and important resource.

1.1 BACKGROUND

They are many definitions of wetlands, but the general definition is a type of landscape often found within an ecotone zone, an area between dry terrestrial systems or uplands and permanently flooded deepwater aquatic system such as rivers and lakes (Mitsch & Gossenlink, 2000). However, according to the RAMSAR convention 1971[1] wetlands are:

Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt including areas of marine water, the depth of which at low tide does not exceed 6 meters[2] (Mitsch & Gossenlink, 2000, p. 31).

The RAMSAR definition includes almost all bodies of water under the broad heading of "wetlands," but the most commonly cited examples of wetlands are

[1] RAMSAR is the name of the city in Iran where the first international convention on wetlands was held in 1971.

[2] This study will use the RAMSAR definition of wetlands because Malaysia uses this definition to identify and classify wetlands.

mangrove swamps, marshlands, bogs, and peat lands. According to Mitsch and Gossenlink (2000), wetlands occur on every continent; they estimate that more than 6%, or 8.6 million km^2 of the earth's surface is covered with wetlands.

Scientists agree that wetlands are precious natural resources because they benefit both people and the environment. Wetlands act as flood control agents by storing storm water, thus slowing down storm water flows. At the same time, they help purify water, especially surface water. Additionally, the consistently saturated condition of wetlands and their location between uplands and bodies of water make them important habitats for wildlife. Furthermore, wetlands also are valuable for recreation and education; people can use wetlands for fishing, hunting, and as a place to learn about natural environments, ecosystems, and biodiversity.

However, despite their values and important functions, wetlands are threatened by many human activities. Around the world, people have filled, destroyed, and permanently altered wetlands. According to the Office of Technology Assessment (1984), in the United States alone and over the last 200 years, more than 30% of the original wetlands have been converted into other uses; 95% of these loses are due to human activities. As a result, many related environmental problems have occurred, including flash flooding, a rapid decline in biodiversity, and a decline of water quality. Currently, many conservation and restoration programs are being implemented across the world. In Malaysia, for example, wetland conservation is becoming a vital concern, as the next section will demonstrate.

1.1.1 Wetlands in Malaysia

According to D'Cruz (1999), wetlands cover 3.3 million hectares, or almost 10%, of the total land area, in Malaysia. According to the Malaysian Wetland Working Group (1989), ten different types of wetlands occur in Malaysia, including mangroves, mudflats, nipa swamps, freshwater swamp forests, peat swamp forests, lakes, oxbow lakes, river systems, marshes, and wet rice paddies. Wetlands in Malaysia are valuable for ecological, economic, and socio-cultural reasons and as such, they serve as important tourism and recreation resources.

From an ecological values and benefits perspective, D'Cruz (1999) argues that wetlands in Malaysia are important for their hydrological and biogeochemical

processes, helping to control erosion and flooding in coastal and riverine areas by storing fresh water and trapping sediments. Furthermore, wetlands in Malaysia provide important habitats for native flora and fauna. For example, Malaysia's mangrove forests have been identified as a global center for mangrove diversity, with over 60 recorded species (D'Cruz, 1999). Additionally, wetlands in Malaysia also are regarded as important sites for maintaining global diversity and as carbon sinks.

In addition to their ecological value, wetlands in Malaysia have considerable economic value. The most notable economic activity in the wetlands areas in Malaysia is logging. Mangroves trees, such as *Rhizophora mucronata*, *Rhizophora apiculata* and *Brugeira gymnorhiza* have been logged for years. The mangroves produce valuable timber for construction, as well as for charcoal woods. According to Howes (1999), 500 tons of fresh timber and 100 tons of charcoal wood are produced each year just to meet the local demand. In addition to logging, Malaysia's wetlands also benefit the fishing industry. Shellfish, prawns, mudskippers, and fresh water fish are among the important products available in or ready to be harvested from Malaysian wetlands.

Malaysia’s wetlands also have considerable social and cultural significance. They have long been associated with the culture and people of Malaysia, especially the native people who live within these wetland areas. These native people, such as the Semelai tribe, depend on wetlands for survival because the wetlands are a precious source of water, food, and wood. Wetlands are part of Semelai life and the tribal members consider themselves as part of the wetland ecosystem. Archaeologists and anthropologists have noted that wetland areas in Malaysia, notably at Kuala Selinsing in the Perak state, have been used by native people since the third century B.C. (Nik Hassan, 1999). Many native folk arts and cultural touchstones, such as handicrafts, songs, and even language, have developed in concert with wetland areas.

Finally, due to increasing interest in wilderness spaces and culturally significant landscapes, wetlands in Malaysia have been, for the last decade, a focus of attention for tourism and wildland recreation. A few wetlands areas, such as Tasik Bera, have become increasingly popular places for tourists because of the Semelai tribe that lives in these areas. People come to see the Semelai tribe's unique culture. These wetlands became more popular after they were listed as RAMSAR sites. Other RAMSAR sites, such as the Kuala Gula and Matang Forest reserves, are becoming popular for bird

watching and attract bird watchers from all over the world during the birds' migration seasons

As the previous discussion demonstrates, wetlands are very important natural resources because they have multiple functions. They are valuable, not only for the diverse ecosystems that they support, but also because of their irreplaceable contribution to the economy and culture of Malaysia. For these reasons, wetlands experts argue that wetlands need to be restored, especially in urban areas where wetlands ecosystems have been severely disrupted or replaced by other land uses. However, it is unclear if the public perceives that wetland functions and values are important; for that matter, it is unclear if they realize that restoring wetlands in urban areas will restore the ecosystem, enabling many of these functions and values to return.

1.1.2 The Problem with Wetlands in Malaysia

Even though wetlands are very valuable for Malaysia, they face considerable degradation and destruction; this is true particularly of freshwater wetlands. Many of these wetlands in Malaysia have been drained and filled for agricultural use and urbanization. According to Sham Sani (1998), the problem began in the 1970's and became rampant in the 1980's. Conversion of wetlands for other uses has resulted in natural disasters, especially downstream from wetland conversion where severe flooding and soil erosion have occurred. In addition to conversion, wetlands also are vulnerable due to the destruction of their contributing watersheds due to changes in land use above where they lie in the landscape. For example, the increase amount of pollution in Tasik Bera and the increase in acidity levels in Tasik Cini are related to the conversion of adjoining forests for agriculture uses.

The destruction of wetlands in Malaysia has not gone unnoticed. Local newspapers such as The Star and The New Straits Times, and non-government organizations such as the World Wildlife Fund (WWF), and the Malaysian Nature Society, have rallied to create an awareness campaign, environmental education program, and fundraising to preserve wetlands throughout the country. This resulted in the listing of the Tasik Bera wetlands as a RAMSAR conservation site in 1994, which was followed by the listing of the Tanjung Piai, Pulau Kukup and Sungai Pulai wetlands as RAMSAR sites in 2003, and Kuching Wetlands National Park in 2005.

These four areas constitute approximately 60,000 hectares of lands (Wetlands International, 2006)

In Malaysia, conservation of wetlands is one of the primary management strategies currently employed to control wetlands losses. However, this strategy, particularly the listing of large natural wetland areas as the RAMSAR sites principally involves wetlands that are located in the rural areas where few people live. As conservation attempts move into urban areas, questions arise. First, how will people in urban areas react to wetland conservation? Second, are urbanites willing to live near wetland areas? Finally, if they aren't willing to live next to wetlands, are there other, more effective ways to restore wetlands ecosystem?

1.1.3 The Problem with Wetland Restoration in Malaysia

In Malaysia, in addition to rural wetland protection and conservation efforts, wetland scientists, foresters, planners, and landscape architects also have attempted to restore wetlands in urban natural open spaces,[3] such as urban parks. Planners have introduced wetlands into urban parks and other urban open spaces to control flash floods, to cleanse surface water and recharge ground water, to increase urban biodiversity, and to increase the aesthetic conditions of urban natural areas. In 1998, the first wetland restoration project was completed in Putrajaya; the Putrajaya wetland covers 197.5 hectares and contains 70 indigenous plants. The Malaysian government has used the Putrajaya wetland as an example of how wetlands can be integrated into urban areas for ecological, flood control, and open space purposes (Perbadanan Putrajaya & Putrajaya Holdings, 1999).

At the same time, Malaysia has experienced rapid urbanization in the past few decades, causing an increase in the demand for recreation and leisure-oriented urban natural open spaces. People need urban natural open spaces for recreation and leisure activities and these needs are particularly pressing in urban areas where the amount of open space is limited. Suhardi (2002) demonstrated that the demands for urban open spaces for recreation activities in Malaysia are increasing, and Ryan (1997) argued that people use urban natural open spaces in many ways, which enhances their attachment to and love for nature. Both studies demonstrate that natural areas are important part of

[3] Urban natural open spaces include those in both urban and suburban areas.

urban natural open spaces, and that natural area should be preserved, restored or re-created because people use these spaces in a wide variety of ways, many of which rely upon nature. Additionally, rapid urbanization in Malaysia in the past few decades has created an emphasis on using green areas to help resolve or minimize urban environmental impacts.

Although the existing urban natural open spaces offer landscaped setting with trees and grass, reducing environmental impact frequently requires a more "natural" form of parkland. Many planners are touting wetlands as a form of parkland that is more integrated with the environment. Thus, these parkland and underdeveloped open spaces can host important environment restoration activities. According to Jordan (2000) and Light (2000) restoration is related to the idea of forming a community with nature, in which restoration provides a unique way to "re-wild" landscapes in a very pragmatic sense.

Because of the differing demands, urban natural open spaces have become battlefields between the needs for more recreational areas, sites for more environmental mitigation and wilder natural and nature preserves. The problem worsens when natural areas and other open spaces in urban setting become limited and, thus become, highly valuable targets for more intensive and traditional recreation developments (frequently accompanied by large areas of mowed turf grass, structure of many types and parking lot). As a result of these competing demands, wetland restoration efforts are threatened by a lack of support from segments of the population who demand that wetlands existing or proposed) be replaced with traditional parklike landscapes with requisite supporting built infrastructure. The introduction of wetlands in urban areas thus becomes a competition between those who want to have natural wetlands and those who want to have nurtured or manicured nature, notably natural areas that can support leisure and recreation activities.

The negative perception of wetlands in urban public spaces has become a major setback for environmental protection and conservation efforts in Malaysia. Consequently, planners, designers, and natural resource managers are trying to understand why the introduction of these wetlands seems to be perceived negatively by some members of population and has become a source of controversy and conflict. One theory is that, because most people perceive the environment differently than landscape

architects and land managers, a conflict has arisen between these two groups. In order to better understand and resolve such conflict, it is necessary to understand the public's perceptions of wetlands, as well as the factors that affect these perceptions. This research will attempt to examine this research problem. It is deemed very important to understand the public perception of wetlands because the findings from this research can be used to guide planners and designers as they seek to create wetlands restoration programs or an environmental educational programs that are consistent with public values

1.2 THE SIGNIFICANCE OF AND NEED FOR THIS STUDY

Planners and designers, such as landscape architects, generally seem to support the use of wetlands in urban open spaces; their argument is based in the idea that wetlands potentially can serve ecological, aesthetic, and recreational purposes. The question, then, is how city planners and designers can integrate these varied purposes. Ryan (1997; 2000) argues that different types of users prefer different types of nature, depending upon their motivations. Kaplan and Kaplan (1989; 1982) argue that preferences for nature vary between people, depending to ethnicity, familiarity, and knowledge.

Clearly, the restoration of wetlands is not a straightforward procedure, especially in areas that are highly contested between the traditionalist recreational public and ecological restoration advocates. Therefore, it is vital to understand the varying desires of potential users of wetlands to be restored in urban areas. This problem becomes particularly pressing when one considers the dangers facing wetlands that are restored in a manner not in accord with user needs and preferences. If only a few segments of the population gain a perceived benefit from the project, then the long-term survival of the restored wetlands will be at risk due to a lack of support from the general public. Obviously, to have a successful wetland restoration project, decision makers need to take into account the need for both environmental protection and recreational spaces. Therefore, to help civic leaders, designers, and planners make decisions that are more effective, base line data is needed on people’s perceptions of wetlands in comparison to the perceptions of planners and landscape architects.

Research on environmental perceptions and preferences can help us understand relationships between human behavior and the environment. As such, the objective of my study is to provide insights on how people view wetlands. This type of research also will reveal information on people's reactions to different environments in terms of their contents and spatial arrangements, thus providing useful information for the design and planning of environments. In Malaysia, very few studies have examined the relationship between people and the environments they use, so there is considerable need to enrich our knowledge of people-environment relationships in this country. This is a pioneering study that can establish a basis for developing practical solutions, as well as pointing out future research needs. In summary, my research will:

1. Identify and provide base line data pertaining to public perceptions of nature, specifically wetlands in urban areas of Malaysia;
2. Provide the needed understanding of the problems that influence public perceptions of wetlands, as well as those of planners, landscape architects, and park managers, and;
3. Provide an information base to develop better planning and design procedures for urban natural open spaces, particularly in Malaysia.

1.3 THE GOAL AND OBJECTIVES OF THE STUDY

The goal of this study is to gain an understanding of people's perceptions of different types of wetlands, the factors that affect people's perceptions of wetlands, and the differences between the perceptions of park managers, landscape architects, and the public. The following study objectives are necessary to achieve this goal:

1. Identify and compare the public's and landscape architect's preferences for wetlands and the introduction of wetlands into urban natural open spaces;
2. Identify and compare factors that significantly influence the public's and landscape architect's preferences for wetlands and the introduction of wetlands in urban natural open spaces;

3. Determine whether policy makers are able to predict public preferences for wetlands and the introduction of wetlands in urban natural open spaces, and;
4. Propose implications, based on this research, for the future planning and design of wetland restoration efforts in urban natural open spaces.

The information derived from this study will help those involved in the designing, development, and management of wetlands in urban natural open spaces, particularly in Malaysia. In addition, the results of this research also will help expand the cumulative knowledge related to the relationship between people and the environment, especially regarding people's preferences for their natural environment.

1.4 ORGANIZATION OF THIS DISSERTATION

This dissertation is organized into seven chapters. This first chapter describes the background and importance of wetlands and wetland restoration, with a focus on Malaysia. The first chapter also provides a statement of the research problem and the significance of the problem; finally, it outlines the need for and importance of the study. The second chapter provides a review of the literature that has helped to define the research direction by providing a theoretical and methodological understanding of landscape assessment and perceptions. The literature review also helps to identify factors that potentially affect people's preferences for wetlands.

The third chapter describes the methods used, why they were used, how the study was designed, and how the data was analyzed. Chapter four describes the findings of the research related to the public and the landscape architects' preferences for wetlands. In addition, this chapter discusses the similarities and differences between the preferences of these two groups. Chapter five presents the analysis of findings regarding significant factors that affect the varying perceptions of the public and landscape architects.

Chapter six discusses the significant predictors for public preferences, as well as park managers' anticipation of public preferences. This chapter also discusses the results of interviews with park managers. Finally, chapter seven summarizes the significant findings of this project and discusses the implications of the findings for

wetland restoration planning and design in an urban context. This chapter also recommends potential avenues for future research.

CHAPTER 2 : LITERATURE REVIEW

This dissertation aims to answer research questions related to public perceptions of wetlands; hopefully, a deeper understanding of these perceptions will help landscape architects and park and land managers better manage conserve and restore wetlands in urban areas. However, to answer these research questions, it is vital to begin with a thorough understanding of the theory and methodology underlying research on landscape assessment and perceptions. To better understand the body of this research, this literature review chapter is divided into five sections. The first section discusses landscape assessment paradigms relevant to this study. The second section discusses landscape preferences methodology and its significance to this study. The third section discusses theories that explain people's environmental preferences. The fourth section discusses factors that have been found to significantly affect public preferences for environment. Finally, the fifth section discusses previous research findings related to public perceptions of and preferences for wetlands.

2.1 LANDSCAPE ASSESSMENT

Landscape assessment involves the evaluation of the visual and scenic character of landscapes; which, according to Unwin (1975), can be divided into three phases of evaluation. The first is landscape measurement, a survey of what actually exists in landscapes. The second phase is investigation and measurement of values judgment or preferences regarding visual landscapes. The final phase is landscape evaluation, an assessment of the quality of the visual landscape in terms of individual or societal preferences for landscapes.

Many landscape assessment techniques have been developed in the past 30 years. These techniques have been developed for educational purposes, as well as to assist land management offices such as the US Bureau of Land Management and the US Forest Service in their attempts to develop scenic values on public lands in ways that are consistent with public values (Miller, 1984). Over time, these techniques began to be used for purposes other than landscape management. For example, landscape assessment techniques have been used for historic and vernacular architecture preservation (Lekagul, 2002), commercial development (Woods, 1995), and the management and preservation of rural areas (Ryan, 2006). Therefore, it is worth noting

that the body of literature for this field is large; furthermore, there are many reviews of the literature, including, for example, those of Daniel and Vining (1983), Zube et al. (1982), Lothian (1999), Thomson (2000), and Daniel (2001). Thus, my review restricted to those sources pertinent to the research questions and problems undertaken in this dissertation.

Previous reviews of the literature acknowledge that there are two major landscape assessment paradigms; the expert and non-expert evaluation. The expert evaluation paradigm can be divided into two categories; physical and ecological feature approaches. The non-expert evaluation paradigm also can be divided into two categories; experiential and psychological approaches. However, due to the multidisciplinary nature of landscape assessment research, a study may fit into more than one category if more than one approach is applied. Below is a discussion of each paradigm.

2.1.1 The Expert Evaluation Paradigm

The expert evaluation paradigm refers to all landscape assessment techniques that rely on experts to perform the evaluation. Experts, in this context, refer to trained professionals in the field of environmental and visual management (Zube et al., 1982). The expert evaluation paradigm is based on the evaluation of the landscapes regarding to the intrinsic quality of landscapes properties, and it assumes that these professionals objectively can analyze and synthesize the landscapes, formulating landscape qualities into guidelines or frameworks for landscape planning, design and management.

Lothian (1999) argues that the expert paradigm also can be referred to as an "objective model," in which the "objective account of the aesthetic quality of a thing can be found in the properties of the thing" (Daniel, 2001, p. 270). The objective account of the thing's physical properties as the basis of aesthetic quality can be traced back to the philosophies of Socrates, Plato, and Aristotle (Lothian, 1999). For the purpose of my literature review, the experts' evaluation paradigm is divided into two categories: a physical features approach and an ecological features approach.

2.1.1.1 The physical features approach

Proponents for the physical features approach have based their landscape assessment on the inherent quality of the physical components of a landscape. The method has been adapted to inform the visual management system of government agencies such as the U.S. Forest Service and Bureau of Land Management. The assessment relies heavily on physical factors because the conceptual basis of this approach is derived from fine art and architectural theory. This is not surprising, as the proponents of this approach are design professionals, such as fine artists, architects, and landscape architects. These professionals believe that the aesthetic quality of nature lies in the formal properties or quality of the landscape, such as line, color, form, and texture, and their interrelationship is assumed true for all types of landscapes such as forest, jungle, desert, and ocean (Daniel & Vining, 1983).

Litton's (1968) work is considered the classic for this approach. He argues that the formal quality or properties of a forest should be used as a basis for land planning and design. Laurie (1975) furthers the argument that nature's (forest) aesthetic values lay in its formal quality and Crowe (1978) uses the theory as a basis to develop a forest visual management system in Britain. She proposes the careful utilization of line, texture and shape to blend human alteration of the forest with natural patterns of the landscape (Miller, 1987).

However, because the physical approach assessment is based solely on expert judgments, the results of landscape assessment using this approach have been criticized for their failure to account for public opinion; in other words, because this type of assessment fails to address non-expert perspectives, it lacks validity and reliability (Daniel & Vining, 1983). Further, because this approach assesses the landscape based on geographical features, such as mountains, canyons, and rivers, many argue that it is the least valuable in providing a meaningful idea about overall scenic values (Miller, 1984).

2.1.1.2 The ecological approach

While proponents of the physical features approach base their assessments on the inherent quality of physical factors of landscapes, such as line, color and texture, proponents of the ecological approach believe the inherent aesthetic quality of the

landscapes lies in its naturalness and ecological integrity. Consequently, complexity and diversity are two major variables considered important by proponents of the ecological approach. The underlying assumption is that there is a linear relationship between naturalness and ecological integrity with landscape complexity and diversity. Therefore, natural and unmodified landscapes presumably have the highest aesthetic values, whereas landscapes that reveal human influence and modification have the lowest aesthetic values.

Because of its heavy reliance on the assessment of biological quality, the ecological approach is used mostly by ecological experts such as ecologists and biologists. Among them are Smardon (1975; 1976) who studied wetland visual quality, primarily in New England's states, and proposed a visual-cultural model for wetland assessment. Leopold (1969) studied rivers and suggests a "uniqueness ratio" in which he illustrates a landscape assessment technique based primarily on ecological measures.

One important aspect of the ecological approach is that it separates humans from nature, and posits that human intrusion into the landscape contributes to the negative quality of the landscapes (Daniel & Vining, 1983). The major underlying assumption for this approach is that landscape quality is related directly to its naturalness and ecological integrity, so areas undisturbed by humans have the highest landscape quality (Daniel & Vining, 1983). Therefore, Daniel and Vining (1983) argue that the ecological approach is concerned "with the protection and preservation of natural environment" (p. 44).

Criticism of this approach primarily is directed toward its implicit assumption that there is a linear relationship in between a landscape's aesthetic and its complexity, diversity, and degree of naturalness. Nassauer (1980) argues that, if the model of landscape assessment is linear in nature, it has limited ability to explain interactions among components. In addition, research has shown over time that people don't prefer natural, messy ecosystems (Nassauer, 1997a). Like the physical approach, the studies suggest this approach is unreliable because assessment relies heavily on the accuracy of expert ecological assessments, and most studies were place specific. Furthermore, several studies have shown that landscape quality measurements by several experts vary, even though they assessed the same landscape (Craik & Feimer, 1979).

Finally, the method lacked precision because it always divided the landscape into three broad categories: high, medium and low, and a substantial amount of the landscape fell under medium. Therefore, aesthetic quality remains unchanged within any landscape management plan and strategy (Daniel, 2001). However, despite these criticisms, the ecological approach can be useful because it can be done easily by one person, an expert.

2.1.2 Non-Expert Evaluation Paradigm

In contrast to the expert evaluation paradigm, the non-expert evaluation paradigm, as reflected in its name, relies on average people to evaluate landscapes. The public's responses or evaluations are analyzed and synthesized for the understanding of human-landscape interaction or the meaning of the landscapes to individuals or society. According to Lothian (1999), the non-expert paradigm follows "subjective modes that assumed that the aesthetic is in the mind of people (beauty in the eye of beholder)" (Daniel, 2001, p. 270). Lothian (1999) also argues that subjective models parallel the modern philosophy of aesthetic arguments, especially those from the German philosopher Immanuel Kant, who regarded beauty as "a quality able to evoke an aesthetic response or experience in the observer" (p. 191). Like the expert evaluation paradigm, the non-expert evaluation paradigm also is divided into two categories; experiential and psychological approaches.

2.1.2.1 Experiential approach

The experiential approach is an environmental assessment technique that focuses on the holistic experience of users of a particular place. The approach usually is employed by human geographers such as J.B. Jackson (1970) and Tuan Yi Fu (1977); it attempts to understand the complex human – landscape interaction. Proponents of the approach believe in the subjective quality of the landscape and suggest that aesthetic qualities lie in both the landscape and its meaning to the people who view it. This approach also is concerned with the factors that can contribute to a "sense of place."

Because researchers focus on the understanding of people's holistic experience of landscapes, they generally use qualitative research methodology such as personal interviews, observations, and place descriptions. Therefore, most studies were done on

site and participants were asked about their personal relationship with the environment, interpretation of the places, and motivation to use the places.

The experiential approach is sensitive to a holistic consideration of environmental factors, but has been criticized because it is limited to individual idiosyncratic perceptions. The subjective nature of this approach makes the results of the study difficult to apply to other settings as well as to demonstrate feasible utilization (Daniel & Vining, 1983). However, studies using experiential approaches have been useful to expand our understanding of experiences of interacting with landscapes and their importance to people (Miller, 1984; Xu, 1993).

2.1.2.2 Psychological approach

Proponents of the psychological approach are concerned with the feelings and perceptions of people who inhabit, visit, use, and view the landscapes. This approach emphasizes “the cognitive and affective reactions evoked by the various landscapes” (Daniel & Vining, 1983, p. 65). According to Zube et al. (1982), the psychological approach, or cognitive approach as they called it, measures human responses by using holistic judgment criteria such as preferences and the dimensional analysis method in an exploratory model.

To assess people's feelings or perceptions for the environment, proponents of the psychological approach use the psychological model and empirical research as their basis of methodology. The environment is regarded as a stimulus that people respond to; therefore, study participants often are shown slides, photographs, or sketches of the environment and asked to rate, sort, or rank their preferences. The relationship between people's preference scales and perceptual, cognitive, and affective scales often are used as a basis for hypotheses and constructs.

This approach involves assessment through analysis of the general public's or selected population's evaluations of environment properties based on their natural reactions or preferences (Lekagul, 2002). Therefore, the psychological approach has high reliability and sensitivity because it uses multiple observers. Examples of studies using the psychological approach are by Ulrich (1977; 1983), who studied the affect of various urban scenes on physiological well being, and Herzog (1995), who looked at preferences for urban nature. R. Kaplan and S. Kaplan (1989) exemplify the wide range

of studies using this method. They worked, together with their students and research colleagues, to understand factors affecting people's preferences for nearby nature.

Criticism toward this approach is that it is concerned primarily with people's perceptions and less about the physical environment. According to Daniel and Vining (1983), for the psychological approach to be practical, the complex array of cognitive, affective, and other psychological dimensions "must be systematically related to indices of landscape quality or preferences" (p. 79). However, the problem should be reducible by using a "content identifying method" (CIM). CIM procedures will extract landscape dimensions that are responsive to people's preferences, and that includes physical, spatial, and other qualitative variables. These landscape dimensions can be analyzed according to each psychological trait or participant group. The landscape preferences approach, using CIM, will be discussed at length later.

2.1.3 Conclusion Regarding to Landscape Assessment Literature

The expert paradigm proponents believe that a landscape's quality is inherent in its physical quality; thus, the physical approach assesses landscape quality by analyzing its features, such as line, color, form and texture. The ecological approach bases its assessment on the complexity and diversity of the biological and ecological elements of the landscapes.

In contrast, the non-expert approach assesses landscape architecture based on people's perceptions. The experiential approach is concerned with the relationship between people's experience with nature and the affects of the experience on a sense of place. Meanwhile, the psychological approach is concerned with people's feelings toward the environment and how their perceptions, affect or are affected by psychological behaviors.

According to Daniel and Vining, (1983) "all the approaches acknowledge the role of environment in determining landscape quality but there are differences about the importance of human contribution to determining landscape quality" (p. 77). The physical and ecological approaches place humans in a peripheral position, in which people come in as users or intruders. Meanwhile, the experiential and psychological approaches place humans in the central position; landscape quality is determined by the effects of the landscape on people. Despite the differences among these approaches, the

research findings from studies using these various methods all have helped expand our knowledge about landscape quality and its relationship to human beings.

For my study, the psychological approach is the best method, because it is concerned with understanding people's perceptions and feelings toward wetlands. The approach also is suitable for my study because the answer for the research problem is derived from people's responses; the study involves multiple users and rigorous empirical research. These factors are very important for planning and managing an environment that is compatible with the public's values and needs.

One of the psychological approach research methods, the preference method or CIM (Kaplan, 1977; Kaplan & Kaplan, 1989) has been chosen for use because in addition to quantifying visual responses, it tolerates qualitative judgment, which is important in identifying the physical and spatial characteristics of the preferred visual environment. The next section will discuss landscape preferences and the CIM at length.

2.2 LANDSCAPE PREFERENCE

This dissertation aims to examine and understand people's perception for wetlands; the results will improve wetland restoration programs. Accordingly, wetlands restoration projects must be ecologically functional and socially accepted to be successful. While efforts to get an ecologically functional ecosystem restored can by and large be attained by technical means and competencies, it is much more difficult for these projects to gain social acceptance. To do so, a wetland restoration project needs to acknowledge the public's preferences for wetlands and attitudes regarding wetland restoration and management plans.

An environmental perception study can provide insight into how people react to or perceive a particular environment, the meaning that is conveyed by the environment, and how people relate to it. The most important thing is to understand how people determine their preferences for a particular environment. According to Rapoport (1977), people evaluate environments based on overall affective response and judgment. According to S. Kaplan (1979), this behavior can be measured through the use of a preference rating or CIM. According to S. Kaplan and R. Kaplan (1982), preference is a result of perception. It is the result of acquired knowledge, innate reaction, and

cognitive processing. According to Hammit (1978), preferences are a model representation or schema of environment in the human brain that results from visual perceptions but many other modes of information (motivation, emotion, and impression) are coded into it. Therefore, the preference result (the result of perception) is the collection of information about how people experience their environment. Clearly, therefore, the landscape preferences approach is a form of psychological approach.

The preference approach has been widely used to assess the popular perception of a particular environment because people make preference judgments every day, to the extent that making preference judgments is almost second nature (Kaplan & Kaplan, 1989). Studies about popular perceptions of the environment have shown that the preference method is a valid and reliable measurement for acquiring data about what kinds of landscapes are acceptable and preferable for people (Kaltenborn & Bjerke, 2002). Preference can be used to answer questions about both magnitude and type of reaction to a particular environment. Preference magnitude and pattern can reveal aspects of underlying perceptions, providing valuable information about popular attitudes toward the environment, including the individual's reactions to content and spatial configuration (Kaplan & Kaplan, 1989). According to S. Kaplan (1979; 1982) and R. Kaplan and S. Kaplan (1989), the preference approach clearly is useful as a research tool for expanding the understanding of environmental perceptions through identification of factors that influence preference.

2.2.1 Content Identifying Methods

The preference approach uses a survey method to obtain information about preference for a particular environment. Specifically, this method is called the content identifying method or CIM, and was developed by S. Kaplan, R. Kaplan, and Wendt (1972), R. Kaplan (1977), and R. Kaplan and S. Kaplan (1989). The method is drawn from empirical psychological research methods, but relies on a preference rating that is lightly intuitive and image-dependent (Woods, 1995).

Participants are asked to rate photographic scenes using a preference rating. Photographs are used to assess preference on the basis that “much of the way humans experience the environment is visual” (Kaplan & Kaplan, 1989, p. 207); in this case,

photographs are used as surrogates for an environment or a scene (Hull & Revell, 1989; Kaplan & Kaplan, 1989). The wide use of photographs is due to the limitations of bringing participants to the site (Kaplan & Kaplan, 1989).

There are criticisms regarding the validity of using photographs or slides in the preferences studies, but it has been shown that the use of photographs poses no problems for the preference rating (Pitt & Zube, 1987). A study by Shuttleworth (1980) shows that there are no significant preference rating differences between photographic scenes and actual scenes. Further, Wherrett (1999) argues that there is also no significant preference rating differences between preference surveys using the internet and those that use photographs.

However, Scott and Canter (1997) argue that there is distinction between the content of and the place in the photographs. They based their argument from the result of their study that shows 41 participants, when asked to sort 20 photographs, they sorted them based on the content. However, when the participants were asked to sort the same photographs based on their past experience of the place, they sorted them according to the attributes not presented in the photographs, such as sound, people and activities. In addition, Steinitz (2001) argues that there are differences between memorable and preferable scenes. However, it can be argued that the concept of place and memorable scenes rely heavily on memory and people experience of the scene rather than physical attributes of the scenes (Lekagul, 2002). Therefore, it is very important to distinguish, what is being studied, whether; the contents of the scenes which can be captured in photographs or other factors, such as the memories of previous experience of the place. Lekagul (2002) advise that researchers to be cautious when using photograph as landscape surrogates. Photographs are able to serve as surrogate for actual landscapes as long,

- adequately capture all landscape contents being studied;
- variation of the landscape elements or content that are not part of the study are controlled;
- technical quality of the photographs are controlled across the entire samples; and

- participants are advised about what it is that they are evaluating; that is, the environment represented by the photographs, not the memory or experience of a particular place (Lekagul, 2002 p. 57)

Preference ratings of the scenes used in the survey are analyzed using data reduction techniques. To reduce the data, R. Kaplan (1977), S. Kaplan, R. Kaplan and Wendt (1972), and R. Kaplan and S. Kaplan (1989) suggest the use of a non-metric factor analysis techniques such as ICLUST or the Guttman-Lingoes Smallest Space Analysis (SSA III). However, recent studies by Mustafa Kamal (1994), Lekagul (2002), Kaltenborn and Bjerke (2002), Nassauer (2004), and Ryan (1998) have shown the usefulness of the factor analysis procedure, available through the Statistical Package for Social Scientist (SPSS) computer program, to extract preference dimensions.

Data reduction techniques, such as non-metric factor analysis and factor analysis, generate groups or dimensions of the scenes, and each dimension is expected to contain scenes that consist of similar stimuli, to which people will react similarly. Therefore, the data reduction techniques do not group scenes by the scene ratings, but rather by environmental stimuli to which people react similarly. The dimensions of the scenes can be analyzed later and interpreted to reveal patterns of perception that people have in response to an environment.

S. Kaplan (1979) and R. Kaplan and S. Kaplan (1989) suggest that interpretations can be made regarding the content and spatial quality of scenes. Others, such as Ulrich (1983), have found landscape spaciousness and ground texture to be important stimuli. All the findings from the data analysis can reveal underlying factors that affect preference for a particular environment. In addition, besides identifying the contents and spatial qualities of the scenes, scenes dimensions can be ranked according to their mean scores to reveal the magnitude of preferences. Further, preference dimensions also can be analyzed in terms of their relationship to other variables. For example, Hammit (1978) examined the relationship between bog scenes and recreation use, and Herzog (1995) examined the relationship between urban scenes, perceived danger, and perceived vertical depth. Further analysis also can be done to examine if group differences exist for a particular preference dimension. For example, Yang and R. Kaplan (1990) conducted a study to determine if Western tourists and Koreans had similar or different perceptions of landscape styles.

2.2.2 Conclusion Regarding Review of Landscape Preference Methodology

In conclusion, it is important to understand how people perceive wetlands in order to develop an acceptable wetland restoration project. The preference approach and CIM are the most useful and suitable for my study because they can provide insights into how people perceive wetlands, and the information obtained from the spatial quality and content of scenes can aid the decision- making process. In addition, the preference approach also can provide an understanding about the relationship of preferences to other independent variables. The preference approach also is useful for identifying if two groups have different preferences. The identification of differences and similarities between preferences is important for my study because it aims to identify if the public's preferences for wetlands are similar to or different from those of landscape architects.

2.3 THE THEORETICAL BASIS FOR LANDSCAPE PREFERENCES

Many studies related to a person's environmental preferences have been conducted and several important theories have been developed to describe the logic underlying these preferences. Balling and Falk (1982) argue that preferences for visual environments are shaped partly by human biological development and evolution. According to this theory, when the first people came down to earth, they looked for fulfillment of the basic human needs such as shelter and food; therefore, they looked for trees, which could provide shelter, and water, which was an important source for food. Consequently, over time, humans tended to show preference for these two basic environmental features. Knopf (1987) further argues that water is always important, as humans have been in contact with it since they were in their mother's womb. This, he argues, is why water has considerable religious significance. His argument asserts that water is not only important because of biological but also because of spiritual factors.

Appleton (1975) argued that people prefer scenes or environments that provide a prospect and a refuge. He based his argument on biological and evolution theories, arguing that panoramic (prospect) environments provide places to see, while enclosed (refuge) environments provide places to hide. This is an important concept because it explains why people prefer environments in which they can see (prospect) without being seen (refuge), they are concerned with their safety when they use a particular

place. A person with the ability to see and hide has great advantages over a person who cannot do so. However, the theory of prospect and refuge lacks reliability because most of Appleton's arguments are based on his study of paintings, and are not supported by empirical research.

Gibson (1979) suggests a theory of environmental affordance, which argues that people's perceptions of environments are influenced largely by the scene's ability to cater to human activity. In the other words, he argues that humans perceive an environment's suitability for action. For example, when humans see a surface, their preference judgments regarding that surface are influenced largely by its ability to support human activities, such as walking.

Based on Gibson's (1979) theory, S. Kaplan and R. Kaplan (1982) suggest the information processing theory, which argues that the environment is a source of information, and people prefer environments that can provide information for an "opportunity for involvement," and that they can "make sense of." They further argue that "[making] sense of" has something to do with humans understanding certain scenes and comprehending their surroundings. Meanwhile, "opportunity for involvement" relates to the potential of an area to support exploration for more information and new challenges. R. Kaplan and S. Kaplan (1989) and S. Kaplan and R. Kaplan (1982) suggest that the ability of scenes to fulfill these needs lies in the environmental characteristics of the scenes, especially their content and spatial quality.

2.3.1 Content of the scenes

The content of a scene is one environmental characteristic that is important for preference. According to R. Kaplan, S. Kaplan, and Ryan (1998), the content of a scene is important for describing the purpose of a scene to viewers. Research findings over the years have suggested that water, nature, signs of human influence and ground textures significantly affect people's preferences.

2.3.1.1 Water

Research findings suggest that people prefer scenes with water. As per the earlier discussion, people prefer scenes that contain water because it is a source of food, a necessary element for survival (Balling & Falk, 1982). Further, water is preferable

because of its ability to fulfill biological and spiritual needs (Knopf, 1987). In a study of people's preferences for recreational areas, Carls (1974) found that people prefer recreational areas with streams, waterfalls, and lakes and dislike areas of high development.

Herzog (1985) studied people's preferences for waterscapes; using the CIM method, he categorized waterscape scenes into four type of dimensions: mountain waterscapes; swampy areas; rivers; lakes; and ponds; and large bodies of water. He found out people prefer mountain waterscapes the most; interestingly enough, his findings showed that swampy areas are the least preferred scenes. Regarding swampy areas, he suggested that people least like swampy areas because the water is stagnant and irregular, in comparison to mountain water that is rich with gushing sounds and is highly visible.

Hammit (1978) also associates the presence of water with people's preferences for wetlands; in his study about preferences for bog[4] wetlands, he found that people prefer bog wetlands only if water is visible. In addition to waterscapes types, R. Kaplan, S. Kaplan, and Ryan (1998) suggest that the water's edge also plays an important role. They found that people least prefer water scenes with overflowing water, eroded edges, and edges with concrete lining; people prefer water scenes that follow natural forms and gradients. The quality of the water also has been found to affect people's preferences. R. Kaplan's study of swift drains in Ann Arbor, Michigan (Kaplan & Kaplan, 1989) found that people least prefer waters scenes that contain polluted water, trash, and dirt.

In conclusion, although people prefer scenes with water, they necessarily do not like all kinds of water. They may dislike water if it is of low quality (dirty, unkempt, polluted, stagnant, or not clearly visible).

2.3.1.2 Nature

People prefer natural scenes to urban ones (Kaplan & Kaplan, 1989). Examples of this finding include one by S. Kaplan, R. Kaplan, and Wendt (1972),[5] in which the authors used CIM procedures to divide scenes into two different dimensions: natural and urban. They found that people rated natural scenes higher. One of the reasons that

[4] Bog is a type of wetlands found predominantly in Northern and boreal regions of the world
[5] Even though the CIM extracts scenes into an urban/nature dichotomy, in this study Kaplan et al (1972) found that other factors also affect people's preferences.

people preferred natural scenes is because these scenes have more vegetation than urban ones. In particular, people prefer scenes with the trees because, as was discussed earlier, trees are perceived as important for shelter and as a potential food source.

According to R. Kaplan (1983), the term "natural scenes" does not refer necessarily to expansive natural areas, but can indicate open yards, scenes with trees, and play areas. This is not to say that people enjoy all forms of nature. R. Kaplan (1983), and R. Kaplan and S. Kaplan (1989) suggest that, in general, people prefer natural scenes, but they are likely to prefer scenes in which nature is tamed[6] and well-maintained (no litter). Nassauer (1997a; 1997b) suggests that people prefer tamed nature over messy natural areas, even though natural areas possess higher ecological values. He argues that one of the factors that influence people's preferences for tamed nature is that people culturally are used to this form of nature. Furthermore, people also become involved in keeping nature tamed, and it becomes a matter of pride for them (Kaplan et al., 1998). Nassauer, Kosek, and Corry (2001) argue that this perspective (people's preference for tamed and controlled nature) also holds true for riparian landscapes, including riparian wetlands.

In conclusion, nature significantly can affect people's preferences. However, people prefer nature that is tamed, controlled, and highly maintained. Scenes of tamed and controlled nature always are preferable to natural nature because, culturally, people are used to tamed and controlled nature. The above review poses an important question for my study regarding the kind of wetland scenes that people prefer. In other words, this study will seek to discover if the public prefers natural undisturbed wetlands scenes or wetlands that are tamed and controlled. My study will also seek to understand if these preferences are like or dislike those of landscape architecture professionals and park managers.

2.3.1.3 Human influences on the landscapes

If people prefer natural scenes to urban scenes, does it mean that they least prefer scenes that display evidence of human influence? The answer is yes and no. R. Kaplan and S. Kaplan (1989) argue that scenes that show evidence of human influence,

[6] Tamed nature refer to the nature that have been groomed to look organized, such as, trimmed trees, hedges and mowed lawn

such as buildings, roads, and utility elements tend to receive lower preference ratings. In his study about urban nature, Herzog (1995) found that people may less prefer structures in landscapes because of their age and perceived physical and social danger (safety issue)

However, in his study of people's preferences for shoreline in British Columbia, Miller (1984) found that people prefer scenes with some evidence of human influence, such as small structures. Wohlwill (1979) argues that people's preferences for human influences might be affected by the structure's fitness, and Wohlwill and Harris (1980), argue that congruity and contrast also may affect people's preferences for human influence in landscapes.

In conclusion, evidence of human influence in landscapes, such as the presence of buildings and structures, affects people's environmental preferences. However, the affect is influenced further by the degree of human influence, style of the design, fitness, and contrast with the landscape.

2.3.1.4 Ground texture

Another scenery aspect that affects people's environmental preferences is ground texture. Ryan (1997) found that people prefer scenes with smooth and fine ground texture, and Kaplan and Talbot (1988) reported that people prefer open landscapes with smooth and fine textures to arid landscapes with coarse textures.

Ulrich (1983) argues that ground texture is very important for perceived depth. According to him, fine textures provide a sense of continuity between the observer and the environmental elements; on the other hand, coarse textures give the impression of discontinuity, obstacles, and difficulties. Ulrich (1983) also argues that fine textures provide order and consistency. R. Kaplan, S. Kaplan, and Ryan (1998) argue that scenes with fine grass and evenly spaced trees are highly preferable because they provide a strong contrast between the trees and the ground.

In conclusion, ground texture affects people's preferences. It is interesting to note that different types of wetlands each display type of wetlands has a different type of ground texture. This would suggest that people ought to prefer marshlands, which have smooth and fine textures, to mangrove scenes, which have coarse textures.

2.3.2 Spatial Quality

R. Kaplan and S. Kaplan (1989) argue that, in addition to the content of a scene, information about an environment also depends on its spatial qualities. R. Kaplan, S. Kaplan, and Ryan (1998) argue that the ability of an environment to make sense and provide opportunities for involvement “has a great deal to do with how the space is organized” (p. 11). They suggest a functional approach to landscape aesthetics, arguing that people need to make sense out of the environment and find opportunities for involvement in it.

S. Kaplan and R. Kaplan (1982), R. Kaplan and S. Kaplan (1989) and R. Kaplan, S. Kaplan, and Ryan (1998) propose a preference framework that explains the way people perceive and interpret images. This preference framework argues that people perceive scenes or images in two and three dimensions.

“The "picture plane" or two dimensional patterns represent the "surface" of the picture. At this primary level, perception involves a very rapid assessment of the picture of light and dark. Elements and texture in the scene, including their grouping and location, are extracted from this more primary information. The three dimensional aspects involve the inference of what is deeper in the scene, despite the fact that the actual image is on the flat surface. This inference about the third dimension occurs rapidly and unconsciously, although it may take a few milliseconds longer than the rapid processing of the two dimensional aspects” (Kaplan et al., 1998, p.13).

The preferences framework can be summed up in a preference matrix (Table 1). Complexity and coherence are based on a two dimensional plane and they involve indirect perceptions of elements in the scenes; these perceptions are quantifiable in terms of their number, grouping and placement. By contrast, legibility and mystery involve an inference of the third dimension. While seeing the scenes, people not only infer but also imagine themselves in the scene. The table also suggests that coherence and legibility provide information about the environment that makes sense. Meanwhile, complexity and legibility provide information for potential exploration on the basis that there are varieties of information or a promise of more to be seen. Below are detailed explanations of coherence, complexity, legibility, and mystery:

Table 1: Preference matrix

	Make sense/Understanding	Involvement/Exploration
2 dimensional	Coherence	Complexity
3 dimensional	Legibility	Mystery

- **Coherence:** A coherent scene is one in which the elements in the scene are in order and organized. Viewers can make distinctions about different spaces in the areas.
- **Complexity:** A complex scene is one in which there are a lot of distinct elements in the scene. These elements contribute to the variety and richness of the scene. Viewers can be intrigued by the richness and variation of the scene.
- **Legibility:** A legible scene is one whose elements are distinct. R. Kaplan, S. Kaplan, and Ryan (1998) argue that, for the scene to be legible, some of the elements that are distinct also should be memorable. In the presence of distinct, memorable elements, people better understand a place because they can better orient themselves within it.
- **Mystery:** A mysterious scene is one that promises the opportunity to see and wander further. Viewers are inspired to wander further because there is a suggestion that there is more to see. Curved lines, openings in the woods, and elements that partially block the view often enhance the quality of mystery.

R. Kaplan and S. Kaplan (1989) suggest that, if one of these spatial qualities is present in a scenes then viewers will prefer the scene, but if all these qualities and visual characteristics are present in a scene, then viewers will prefer it highly. Mystery is the quality most commonly found in preferred scenes, followed by legibility. Meanwhile, complexity and coherence are interchangeable, but the high quality of another does not cause high preferences. S. Kaplan and R. Kaplan (1982) argue that scenes with high coherence but lower complexity will cause people to feel bored

Another spatial quality that affects people's preferences is spaciousness, a degree of which the space open or enclose. A study by Herzog (1984; 1985; 1987) about different types of landscapes shows that people react to spaciousness.

Spaciousness is found to be both a positive and negative predictor for landscapes. Spaciousness is found to be a positive predictor for preferences when the scenes are panoramic and unique, such as mountain water and canyon scenes. However, spaciousness becomes a negative factor for preferences when the scene is highly coherent and less complex, as is the case with deserts and open fields.

According to R. Kaplan, S. Kaplan and Ryan (1998), a vast view can be attractive and interesting, but it also can be quite intimidating. This is because people do not know to whom the spaces belong; as a result, visitors may feel unsafe and unwelcome and may confine themselves to the edges of the spacious areas. In conclusion, the spatial quality of scenes affects people's preferences, and the preference framework elements are important predictors for these preferences.

2.3.3 Conclusion in Regarding the Review of Landscape Preferences Theoretical Basis

In conclusion, biology and evolution have become the basis for theories related to human environmental preferences. Over time, human beings have become information-hungry creatures that keep looking for information in the environment in order to guarantee their survival.

Among the contents that influence people's preferences are water, naturalness, human influences, and ground texture. Spatial qualities include coherence, complexity, mystery, legibility, and spaciousness. Therefore, with respect to this dissertation, it is important to determine if the aforementioned environmental characteristics affect people's preferences for wetlands. In other words, do the research findings of my project yield the same results as previous studies?

Very few studies have examined the perceptual quality of wetlands. Examination of wetland scenes' contents and spatial quality will further expand our understanding of people's environmental preferences. This review suggests that environmental characteristics (the content and spatial quality of the scenes) potentially affect people's environmental preferences but there may be other factors might influence preference and these are discussed in the following section.

2.4 POTENTIAL FACTORS AFFECTING LANDSCAPE PERCEPTIONS AND PREFERENCES

Apart from the influence exerted by the contents and spatial qualities of scenes, people's environmental preferences also can be affected by other independent variables, such as cultural backgrounds and gender. This is because preference is a result of perception and a reflection of a person's acquired knowledge, innate reactions, and cognitive processing (Kaplan & Kaplan, 1989). This literature review discusses a few factors that potentially affect people's preferences. These are familiarity with nature, group variations, and the motivation for leisure and nature.

2.4.1 Familiarity with Nature

One factor that has been found to significantly affect people's environmental preferences is familiarity with nature. This is a product of experience, so people with different experiences may have different environmental preferences (Kaplan & Kaplan, 1989). Familiarity with nature can be enhanced by many factors, including education about the environment and experience with nature (Ryan, 1997). Education about an environment can elevate people's knowledge about it; thus, the more a person learns about an environment, the more knowledgeable the person becomes. However, knowledge about an environment cannot be acquired only formally from schools and colleges. People also can acquire this knowledge from reading and observation. Consequently, people can experience nature in many ways, including through the view from their homes, the use of nature areas, by volunteering in environmental stewardship programs, and through active involvement in outdoor recreation activities.

However, despite the fact that familiarity is multifaceted, it is argued that people who are familiar with nature may have different environmental preferences than those who are not. R. Kaplan and Herbert's (1987) findings in a study of the preferences of American students, Australian students, and Australian Wildflower Society members for natural settings demonstrates the role of familiarity in developing preferences. In the study, R. Kaplan and Herbert (1987), found that both Australian groups prefer Australian wildflowers more than the American students do. The effect of familiarity was demonstrated further in this study when the Australian Wildflower Society members were found to have higher preferences for scenes containing eucalyptus trees

than Australian and American students; they knew that eucalyptus trees are native to Australia.

The finding shows that familiarity is enhanced when viewers have knowledge about a particular landscape. The relationship between knowledge and familiarity and their effect on preference also was explored by Yu (1994), who found that people with a higher level of education had a higher preference for nature (park in China) because they were more familiar with and knowledgeable about it. Ryan's (1998) study of people's preferences for a Midwestern river corridor found that farmers prefer farm landscapes more than other participant groups. Meanwhile, the local residents were found to have a higher preference for the types of landscapes that surrounded them. Even though Ryan (1998) does not explain specifically the effect of familiarity upon preferences, the findings clearly demonstrate that people prefer scenes with which they are familiar.

People prefer familiar environments because they understand these scenes and are not afraid to enter and become involved with these environments. According to R. Kaplan, S. Kaplan, and Ryan (1998), when people do not understand scenes, they may feel frustrated and threatened, which lowers their preference. However, people may also prefer scenes with which they are unfamiliar. In her study of people's preferences for Swift Drain, R. Kaplan and S. Kaplan (1989) found that the residents who lived near the river (Swift Drain) had lower preferences for Swift Drain’s scenes. This was due to the fact that the river contained litter and had eroded banks.

In summary, familiarity affects people’s preferences for environments, but familiarity can have both negative and positive effects upon preferences. For my study, it is important to determine if familiarity with wetlands or nature affects participants' preferences for wetlands. This is particularly important, given that wetlands rarely are found in the city, and thus might be somewhat exotic for the participants in this study.

2.4.2 Group Variations

Numerous preference studies have examined group similarities and differences with regard to environmental preference. Tuan (1977) argues that natural environments hold different values for people with different life experiences. Based on the arguments

above, it seems likely that group variables, such as cultural background, sub-culture (gender, age and income), and expertise potentially affect people's preferences.

2.4.2.1 Cultural background

S. Kaplan (1979) argues that perception includes cognitive processing; therefore, perception and interpretation can be separated and will be influenced by cultural experiences. Nasar (1997) argues that people from the same cultural background are likely to have similar preferences because of their similar experiences. Culture is, arguably, the most influential factor affecting preference because people grow up in a particular culture, which provides informal lessons on how one should perceive the world. People rely on information about the world, often bounded by the norm of their particular culture.

According to R. Kaplan and S. Kaplan (1989), “people who share a system of thoughts or perhaps language and pass these along from generation to generation would presumably experience the environment similarly and might have some common preferences” (p. 86). This, in turn, would cause different preferences among culture groups. Consequently, Tuan Yi Fu, a human geographer, said “if nature has meaning, it is because society has conditioned us to ascribe meaning to it” (Knopf, 1987, p. 785). This shows how powerfully cultural background can influence people's preferences.

Several findings from preference studies have supported the assumptions above. R. Kaplan and Herbert (1987) found that there are preference differences between Australian students and American students regarding Australian nature. The study showed that Australian students grouped scenes according to the Western Australian character, whereas the American students grouped the scenes according to ground texture and spaciousness. Meanwhile, R. Kaplan and Talbot (1988) found that there are significant preference differences between Black and White Americans regarding to nature. Black Americans least preferred scenes that were untamed. The differences between the two groups also were related to spatial quality, in that White Americans preferred semi-enclosed spaces, but the Black Americans preferred spaces that are more open. Meanwhile, Yang and R. Kaplan (1990) compared Koreans and Western tourists' preferences for landscape style, and found that Koreans preferred

western-style landscape, whereas the western tourists preferred the Korean style; however, both groups preferred Japanese-style water-laden landscapes.

In conclusion, cultural background has a considerable effect upon preferences. For my dissertation, it is vital to examine the relationship between culture and preferences for wetlands, as Malaysia is a multi-racial country with three major ethnic groups: Malay, Chinese, and Indian. The effect of culture on Malaysians' preferences should be more prevalent because these three ethnic groups differ not only in culture, but also in language and religion.

2.4.2.2 Subculture

In this literature review, "subculture" refers to gender and age. There is not a great deal of literature dealing specifically with these variables. However, R. Kaplan and S. Kaplan (1989) reported that one of their students found differences between male and female preferences regarding nature. Male participants preferred open and spacious scenes that offered panoramas from which they could survey the surrounding countryside. On the other hand, female participants preferred more scenes, as they offered refuges, in which they could hide. S. Kaplan and R. Kaplan (1982) argued that this is because human beings, during the early days, were involved in hunting and gathering activities. Males liked to see because it made it easier for them to hunt, whereas the females became more comfortable with woods and enclosed spaces, where gathering activities usually occur. Over time, human beings evolved, but the traits related to hunting and gathering activities permanently became embedded in their mental schema.

Zube, Pitt and Evans (1983) found that age significantly affects people's environmental preferences. They found that children, youngsters, middle-aged people, and the elderly have different preferences for scenic qualities. They also found that the youngster and middle age groups had higher preferences for more “natural scenes,” while children had the highest preferences for scenes with water.

As this review shows, sub-cultural dividers, such as age and gender, potentially can affect preferences. However, few studies have studied the relationships between these variables and preferences; more studies clearly need to be conducted. The effects of gender and age on wetland preferences is not the major focus of this study, but it is

important to collect some data and assess the effect that gender and age, together with income, have on people's preferences for wetlands. The data can enrich our understanding of the roles of gender, age, and income on preferences.

2.4.2.3 Experts versus non-experts

My dissertation focuses on the differing wetland preferences of experts (landscape architects) and non-experts (the public). Presumably, experts have different views or preferences for wetlands than the public because they are more familiar with wetlands and nature. Thus, they can see and assess wetlands from an angle, scope, and perspective that differ from that of the public.

Several studies have been conducted to determine if differences exist between the perspectives of experts and those of non-experts. R. Kaplan (1973) found that designers, such as landscape architects, have different environmental preferences than lay people or "clients." In a study about a restoration conflict in an urban park in Chicago, Gobster (2001) found that landscape architects view nature differently than do other stakeholders, including the public, restorationists, and birders. Landscape architects viewed the park as a design landscape, the public saw it as a recreation landscape, birders saw it as a habitat, and restorationists saw it as a pre-European settlement. However, Yu (1994) found that people with a high level of education have higher preferences for nature (parks in China) but that there is no significant preference difference between those with landscape education and the public. Yu (1994) argues that this result is due to the fact that cultures and living conditions are much more influential in affecting preferences.

Although numerous studies have found differences between experts and non-experts, no study has examined if there are differences within groups that have similar expertise or professions. For example, do landscape architects have different preferences among themselves? There is a need to probe this question. One factor that potentially affects landscape architects' preferences is the particular landscape architecture design approach they learn in school and/or as professionals. This is likely because landscape architects are trained in different colleges and offices, which may have different philosophies, approaches, and ways of doing things. My hypothesis

promoted by Kaltenborn & Bjerke (2002) is that people with different environmental ethics or values have different landscape preferences.

According to Crewe & Forsyth (2003), landscape architects' approaches to landscape design can be broken down into six categories, which they call SCAPES. This refers to (1) synthesis, (2) cultivated experience, (3) analysis, (4) plural design, (5) ecological design, and (6) spiritual design approaches. Every design approach has a different philosophy and way of doing things. Crewe and Forsyth (2003) argue that the variables factored into formulas to construct landscape architectural design approaches are the outcomes of a design, the process of design, the type of client, the scale of the project, the intellectual base of the designer, the designer's environmental ethics, the designer's approach to nature, and the designer's analysis of power. It has been suggested that Crewe and Forsyth's (2003) landscape architectural design approach can be used to determine if landscape architects have varying wetland preferences.

In conclusion, my review of the literature shows that there is some consensus about preferences differences in between the experts and the public. Yu's (1994) study particularly is enlightening because her results show that participants with landscape education do not have different environmental preferences than the public. The question arises as to whether the differences between experts and the public only exist in western society. The study in my dissertation is conducted in Malaysia, an eastern hemisphere country, so it will be interesting to see if Yu's (1994) findings will be further validated there. In addition, if there are disparate preferences among landscape architects, this might become an important tool to help improve landscape architecture education in Malaysia.

2.4.3 Motivations for Leisure and Nature

Another factor that possibly affects people's preferences for wetlands is the use of urban open spaces. People use urban open spaces in many different ways. Some may used the spaces passively through observation from houses and cars, or by just sitting and contemplating the park. Some people might prefer to experience the park actively by jogging or walking in it.

According to Driver et al. (1991) and Driver and Manfredo (1996), people's use of the environment is based on their desire or motivation to seek benefits that it offers.

For example, people who want to become healthy may be motivated to jog, so they might want to go to the urban open spaces that have jogging facilities, whereas people who want to meditate and relax might want to go to parks that have benches and nice views. Therefore, according to Driver et al. (1991), park and recreation areas must be planned and designed according to people's desire or motivation.

In their theory about people's needs for urban spaces, Carr et al. (1995) suggest that people use urban open spaces for comfort, relaxation, passive engagement, active engagement and discovery. Therefore, urban open spaces must be planned and designed to cater to these needs. Following Carr et al.'s (1995) classification and Driver et al. (1991) and Driver and Manfredo (1996) motivation scales, Suhardi (2002) found that users of an urban park in Malaysia prefer to use the park for passive and social engagement such as observation and family related activities. However, his study did not relate the type of activities with types of settings; thus, the relationship between setting and type of use remains unclear.

The importance of motivation to use landscape settings was enhanced further when the US Forest Service adapted Driver et al. (1991) idea of motivation, setting, and leisure benefits to develop the Recreational Opportunities Spectrum (ROS). ROS suggests that the closer the recreational facilities are to urban areas, the more urbane the landscape and activities should be. Urbane landscapes are park-like spaces with manicured plants and mowed grass. Therefore, with the current trend to use natural looking landscapes in urban areas (i.e., wetlands) a question arises: can users accept the introduction of wetlands in a park? Do motivation, desire and use of the park affect preferences for wetlands? In conclusion, motivation for leisure and nature has the potential to affect people's preferences for wetlands, and my dissertation examines the role of motivations in people's preferences for wetlands.

2.4.4 Conclusion Regarding Factors Affecting Preferences

Several factors have been identified that potentially affect people's preferences for wetlands. These factors are familiarity with nature, group variations, and motivations for leisure. It is acknowledged that familiarity relates closely to knowledge about and experience with nature. Group variations include cultural backgrounds, sub-culture (age, gender and income), and expertise.

Examination of experts and non-experts' preferences is particularly important because the assumption that preferences will differ is the central tenet of this study. Further, this study also acknowledges that different preferences might exist among the landscape architects based on different landscape architecture design philosophies and approaches. Lastly, motivations for leisure also are worth examining to see their effect on people's preferences.

2.5 REVIEW OF PREVIOUS WETLAND ASSESSMENT AND PERCEPTION STUDIES

This section reviews literature pertaining to previous research related to wetlands assessment and perception studies. According to Mitsch and Gossenlink (2000), wetlands, despite having abundant water and panoramic views, are perceived negatively by people. Wetlands are considered wastelands, and have had little economic value throughout human history. Further, the perception of wetlands gets worse when people associate them with negative things, such as the place for the monstrous, if helpful, creature depicted in the movie *Swamp Thing*. Further, words that relate to wetlands, such as "bogged down" and "get swamped," often are associated with negative meanings.

When Europeans first came to North America, the Eastern seaboard of America partially was covered with wetlands, which made the early settlers' lives difficult. As a result, they often wrote negative things about wetlands (e.g., *The Great Dismal Swamp* by Colonel William Byrd III). However, few studies tried to understand people's perception of wetlands until the 1970's, even though people's efforts to understand the beauty of natural environments can be traced back to the classical Greek era.

Smardon (1975) was among the first researchers to study people's perceptions of wetlands; he argued that wetland beauty relies on their biodiversity, complexity, and naturalness. Using his finding, he developed a wetland assessment model called the "visual-cultural sub-model for wetland evaluation" (Larson, 1975; Smardon, 1976). Smardon's (1975) wetland assessment model follows the expert paradigm, in which he relies on expert judgments to assess the visual quality of wetlands. However, as was concluded in a discussion about landscape assessment paradigms, the expert technique lacks precision, validity, and reliability (Daniel & Vining, 1983).

One of the first studies to use a non-expert paradigm was conducted by Hammit (1978), who explored people's preferences for bog wetlands and their relationships with recreation. Using the preference method, or CIM, he found that people's preferences for bogs were relatively high, but their preference was higher for the preference dimension that consisted of bog scenes with water. Further, he also found that differences exist within the type of recreational use. He found that people who came for social activities tended to prefer more orderly and well-maintained scenes, such as scenes with boardwalks. In contrast, visitors who came for nature-oriented activities were likely to prefer the natural appearance of the bog.

In conclusion, the study by Hammit (1978) provided some insight into the possibility that wetlands are perceived positively by people, indicating that preferences for wetlands might be different for different type of users. However, Hammit (1978) focused solely on rural bog environments, far from urban areas. Further, it could be expected that people would come to the Hammit's study site because it was a state park, where people come with the intention of experiencing bog wetlands. Therefore, it is expected that the preference rating would be rather high. Therefore, the natural question is if people perceive wetlands in urban areas differently, especially when the urban spaces also have to cater to recreation and leisure activities. My study is necessary to clarify the ambiguity concerning the relationship between preferences and use.

Herzog (1985) studied people's preferences for waterscapes, and the CIM procedures extracted four preference dimensions: mountain waterscapes; rivers, lakes and ponds; large bodies of water and swampy areas. He found that swampy areas (wetlands) received the lowest preferences rating, with coherence as the only positive predictor. His finding about preference for wetlands was similar to that of R. Kaplan and S. Kaplan (1989), suggesting that people's preferences for wetlands always rated lower than other types of natural environments.

Nassauer (2004) studied people's acceptance of and preferences for a completed wetland restoration project in Minnesota, and she hypothesized that people would accept, and even prefer a wetlands if the spaces were picturesque, natural, perceived as

safe, displayed cultural cues[7], and were large (more than 8 hectares). Besides exploring the public preferences, she also compared the public preferences with the experts' (maintenance staff, designers and administrators) preferences. She found significant preference differences between the public and the experts. Further, she concluded that people preferred restored wetlands that have cultural cues, signs of care, and are perceived as safe. He also observed that people placed high values on and preferences for the wetlands because of the presence of birds.

It is notable that the studies described above used photo questionnaires and CIM to understand people's preferences for wetlands, but the study discussed below only used conventional survey questionnaires to understand people's perceptions of wetlands.

In another study, Winter (2005) found that people in Australia prefer forests over wetlands. As a result, people prefer the conservation of forests to the conservation of wetlands. Winter (2005) also found that people's preferences for preservation relate to intrinsic values, in which they regard natural resources as having values only for themselves rather than for other people (instrumental values). Meanwhile, Kaplowitz and Kerr (2003) did a study to understand people's perceptions of wetlands in Michigan. They found that people are familiar with wetlands and they think that it is important to mitigate wetlands loses. Further, they found that younger, more educated, and wealthier participants placed greater important on wetlands than did other participants groups. Interestingly they also found that people who considered themselves Republicans valued wetlands less than did those who considered themselves Democrats or Independents.

In conclusion, my review of the literature related to wetland assessment, perception, and preferences shows that very little have been discovered about people's perceptions of and valuation of wetlands; therefore, there clearly is a need to further explore people's wetland preferences. There have been attempts to assess wetland qualities using the expert paradigm, but as this review of the literature has shown, studies using the preferences approach (Hammit, 1978; Herzog, 1985; Kaplan & Austin, 2004; Kaplan & Kaplan, 1989; Nassauer, 2004) have shown more promising

[7] Nassauer (1997) found that people prefer landscapes that have “cultural cues”, meaning landscapes that possess qualities that are the norm for certain cultures, such as mowed lawns, rolling landscapes, and manicured spaces.

results. The review of literature also shows that very few factors have been identified as predictors for preferences for wetlands but some may include recreational use, the presence of cultural cues, the presence of wildlife, and people's backgrounds and political affiliations. In addition, only Herzog (1985) and Hammit's (1978) discovered content and spatial qualities are important to people's preferences. Therefore, there is a need to validate the findings above while discovering new factors, particularly regarding the content and spatial qualities that shape people's preferences for wetlands.

2.6 CONCLUSION FOR THE LITERATURE REVIEW

Two landscape assessment paradigms, the expert and the non-expert, have been identified in my literature review. In addition, discussion about the preference approach or CIM and a theoretical understanding about human preferences also have been reviewed. Finally, this literature review discussed factors that have been identified as affecting people's preferences for nature, and it has reviewed previous studies related to people's perception, preferences, and attitudes toward wetlands.

My literature review has provided a methodological and theoretical basis for this study. The non-experts' paradigm, specifically, will be used in this study because it has been found reliable and valid for measuring human preferences for wetlands. This is important because I aim to identify public preferences for wetlands, and the results will be used to inform design and management plans that reflect public values. CIM procedures involving a preference survey in which photographs are rated has been found suitable for identifying people's preferences for wetlands.

My literature review also revealed factors that significantly affect people's preferences; these factors will be examined in this study to determine if they significantly affect people's preferences for wetlands. These factors are environmental characteristics, participants' background, motivations for open spaces, and landscape architectural design approach. In addition, familiarity with nature also is suggested to be an important factor affecting people's environmental preferences and familiarity related to their knowledge of and experience with nature. Therefore, because preferences rely heavily on the learning process, familiarity is one of the important variables to be closely examined.

Last, my review considered certain theories related to peoples' preferences for nature; this will be the basis for explaining the findings of this study. The next chapter, Methodology, will discuss specific methodological issues related to this study. It will explain what has been done to collect the data and why the methods have been chosen.

CHAPTER 3 : METHODOLOGY

The restoration of wetlands in urban green areas is not simply a technical problem; it is also a socio-political one. According to the literature, a potential for disagreement exists between users and experts regarding whether wetlands should be restored. In addition, the potential for disagreement also exists between users and park managers. This leads to two overarching questions: first, should wetlands be restored; second, if they should be restored, *how* should they be restored? If these questions are not resolved, the government's ability to make a significant contribution to wetland restoration may be jeopardized by a lack of support from the public and open space users. The first step toward resolving this issue lies in conducting research to identify factors that provide a potential source of disagreement between the public, open space users, landscape architects, and open space managers.

My dissertation identifies potential user and public preferences for wetlands in urban natural open spaces. It then contrasts these preferences with those of landscape architects and open space managers. The study location is Kelana Jaya Municipal Park in Malaysia, where planners are working to restore natural wetlands. This chapter describes the methods used to identify potential users' preferences for and attitudes regarding wetlands. After considering the rationality of these preferences and attitudes, it then compares them to those of the landscape architects.

This chapter is organized into five sections. The first section reiterates the study objectives and research questions described in Chapter 1. The second section provides the rationale for the study location. The third section describes the research design, including a discussion of the methods used to measure the public's and landscape architects' preferences for wetlands, as well as factors that potentially affect their preferences. This section also discusses the pre-test of the preferences survey, the sample population, the data collection procedures, and the data analysis. The fourth section discusses the method used to interview the park managers, and describes the interview participants, interview procedures, and interview data analysis. The fifth section summarizes and concludes the chapter.

3.1 STUDY OBJECTIVES AND RESEARCH QUESTIONS

In any given restoration project, one may assume that there may be a potential conflict between the opinions of the public (or potential users) and those of the designers, such as landscape architects. This potential conflict, which relates to the type, purpose, and use of wetlands restoration in urban natural open spaces, also can extend to disagreements between the public and park managers. To resolve this problem, it is important to compare the public's preferences for wetlands with those of landscape architects. In addition, it also is important to examine park managers' expectations regarding the public's preferences for wetlands. In Chapter 1, I outlined several research objectives. It is important to revisit these objectives so the researcher can determine exactly information needs to be obtained and, consequently, the best method to obtain this information. The objectives are:

1. To identify and compare the public's and landscape architect's preferences for wetlands and the introduction of wetlands into urban natural open spaces,
2. To identify and compare the factors that significantly influence the public's and landscape architect's preferences for wetlands and the introduction of wetlands in the urban natural open spaces,
3. To determine whether policy makers can accurately predict public preferences for wetlands and the introduction of wetlands in the urban natural open spaces, and,
4. To propose implications, based on this research, for the future planning and design of wetland restoration in urban natural open spaces.

To resolve the problems addressed by this research and fulfill the research objectives, 12 types of information need to be gathered.

1. The public's and the landscape architects' perception of wetlands

As planners and designers of landscapes, landscape architects have certain beliefs regarding how a landscape should be shaped; meanwhile, as users of these landscapes,

the public has certain needs and desires. Therefore, it is important to know the perceptions of both of these groups, as these perceptions ultimately will shape landscapes. Consequently, both participants' perceptions must be compared and contrasted. By knowing both groups' participants, one can develop a strategy that addresses the needs of both groups; this can reduce the problem of conflicting visions of wetland restoration. The participants' perceptions of wetlands can be revealed with the use of a wetland photo preference rating survey. The photo preference ratings can determine the most and the least preferred scenes. In addition, CIM procedures also use wetland photo preference ratings to group wetland photos into several preference dimensions, in which scenes that share similar environmental characteristics or patterns can be grouped together. The preference dimensions also are ranked according to their average mean score to reveal the most and the least preferred dimensions.

2. **The effect that environmental characteristics have on preferences for different wetland landscapes**

To further understand people's preferences for wetlands, it is important to identify the environmental characteristics or stimuli that affect these preferences. Previously, it was mentioned that the CIM procedure groups wetland scenes with similar environmental characteristics. According to theory, as discussed in the literature review, environmental characteristics can be related to the content and the spatial quality of the scenes. These factors are identified using the content analysis method, and the results are triangulated with participants' verbal commentary on the representative scenes.

3. **The effect that knowledge about wetlands' functions and benefits has upon the public's and the landscape architects' preferences**

One of the factors that potentially affect disagreement on wetland preferences is the participants' knowledge about the environment. Knowledge about wetland functions and values is a particularly important factor in the exploration of preferences. Given that landscape architects formally learn about natural resources, they presumably have a greater preference for wetlands. One also might argue that participants' preferences for wetlands vary depending on their level of knowledge and lead to differences within a particular group. To test the effect of knowledge about wetlands upon participants'

preferences, the variance of participants' level of agreement on wetland functions and benefits is tested against their preferences dimensions. To examine the effect of knowledge upon preferences, it also is necessary to determine if participants' feelings regarding wetland functions change when they are educated about these areas. To answer this question, the study will examine the mean of rating of participants' agreement on wetland functions and values before and after they are exposed to information about wetlands.

4. **The degree to which public preferences regarding urban natural open spaces is motivated by their potential use of these spaces**

One of the factors that potentially affects public preferences for wetlands is their motivation to use urban natural open spaces. The public only uses these open spaces if they see that the areas can meet their desires or motivations for leisure and recreation. To understand the degree to which motivation to use urban natural open spaces affects preferences; the variance of the public motivation to use urban natural open spaces must be tested against different public preferences dimensions.

5. **Which is a more significant predictor for public preferences, knowledge about wetland functions and values or the motivation to use urban natural open spaces?**

Assuming that both knowledge of wetland functions and values and the motivation to use urban natural open spaces affect the public's preferences, a question arises: which has a more significant impact upon these preferences? The answer to this question will further explain any differences between the public's preferences for wetlands and those of landscape architects. To answer this question, it is vital to examine the strength of relationships between the particular variables (knowledge and motivation) through the lens of the varying public preferences.

6. **The effect that landscape architecture design approaches has upon the preferences of landscape architects**

One of the factors that potentially affect a landscape architect's preferences for a wetland space is his or her perspective regarding the ideal landscape architecture design approach. Therefore, the landscape architect's preference for a wetland area might vary

depending on the design approach that he or she has decided to use. To understand if the landscape architect's designs influence preferences, the variance of the agreement on landscape architecture design approach is tested against different preferences dimensions.

7. **Which is a more significant predictor of public preferences, agreement regarding wetlands function and values or the motivation to use urban natural open spaces?**

Assuming that both knowledge about wetland functions and values, and agreement on landscape architecture design approaches, significantly affect the preferences of landscape architects, a question arises: which variable is the more significant predictor of landscape architect preferences? To answer this question, it is necessary to examine the strength of relationship between the particular variables (knowledge and design approach) in concert with the preferences of different landscape architects.

8. **The effect that familiarity with nature has upon the public's preferences**

Another factor that potentially affects the public's preferences is familiarity with nature. When members of the public are familiar with nature, they tend to prefer wetlands, as they are comfortable with and used to nature. To gauge the public's familiarity with nature, this project will ask participants to state how often, and on what level, they have contact with nature. Ultimately, by comparing the level of the public's familiarity with nature to its preferences, this project will determine if familiarity with nature influences wetland preferences.

9. **The effect of background upon preferences**

One may assume that, in addition to knowledge about wetlands, motivation for using urban natural open spaces, landscape architecture design preferences, and familiarity with nature, the participants' background (i.e., gender, ethnicity, and income) will affect their preferences for wetlands. This is because people's perceptions of the environment might differ based upon their personal behavior and background. I will examine this by looking at the effect of participants' background has upon the preference dimension, in which the average preference means of different preference dimensions with different

participants' backgrounds are compared to find out which background attribute influences preference for wetlands.

10. Park managers' expectations of public preferences for different wetland landscapes

Much like landscape architects, park managers have a say in how landscapes should be shaped. Therefore, to further determine why the public might oppose wetlands restoration, park managers will be asked to anticipate the public's preferences for wetlands. The purpose of this line of inquiry is to discover if the public's opposition towards wetlands restoration is exacerbated by the inability of park managers to anticipate public preferences. The information generated by this line of inquiry will help to identify if there are any misconceptions among park managers regarding the public's preferences. To answer this question, park managers will be asked to choose wetland scenes that they think the public will prefer. The results then will be compared with the public preferences dimensions.

11. Park managers' opinions regarding wetland conservation and restoration in urban areas

The park managers' opinions regarding wetland conservation and restoration are important because these opinions can provide information about problems related to wetlands conservation and restoration in Malaysia. The data derived from the interviews will make it possible to improve the effectiveness and comprehensiveness of wetland restoration programs.

12. Park managers' opinions on the public participation process

It seems reasonable to assume that varying preferences of the public and designers would underlie public opposition to wetland restoration. If this assumption is true, then it is necessary to know the opinions of park managers regarding the inclusion of the public in the decision-making process. This information will be derived from the interview procedures. The information will help to develop an agenda to advocate public participation in wetland restoration.

These twelve types of information provide an important basis for designing the preference survey and interview instruments. The preferences survey instrument can be separated into two versions: one for the public and one for landscape architects. However, before a discussion about instrument design can take place, it is important to discuss the study location, as the description of the site will provide contexts that are pertinent to the research design.

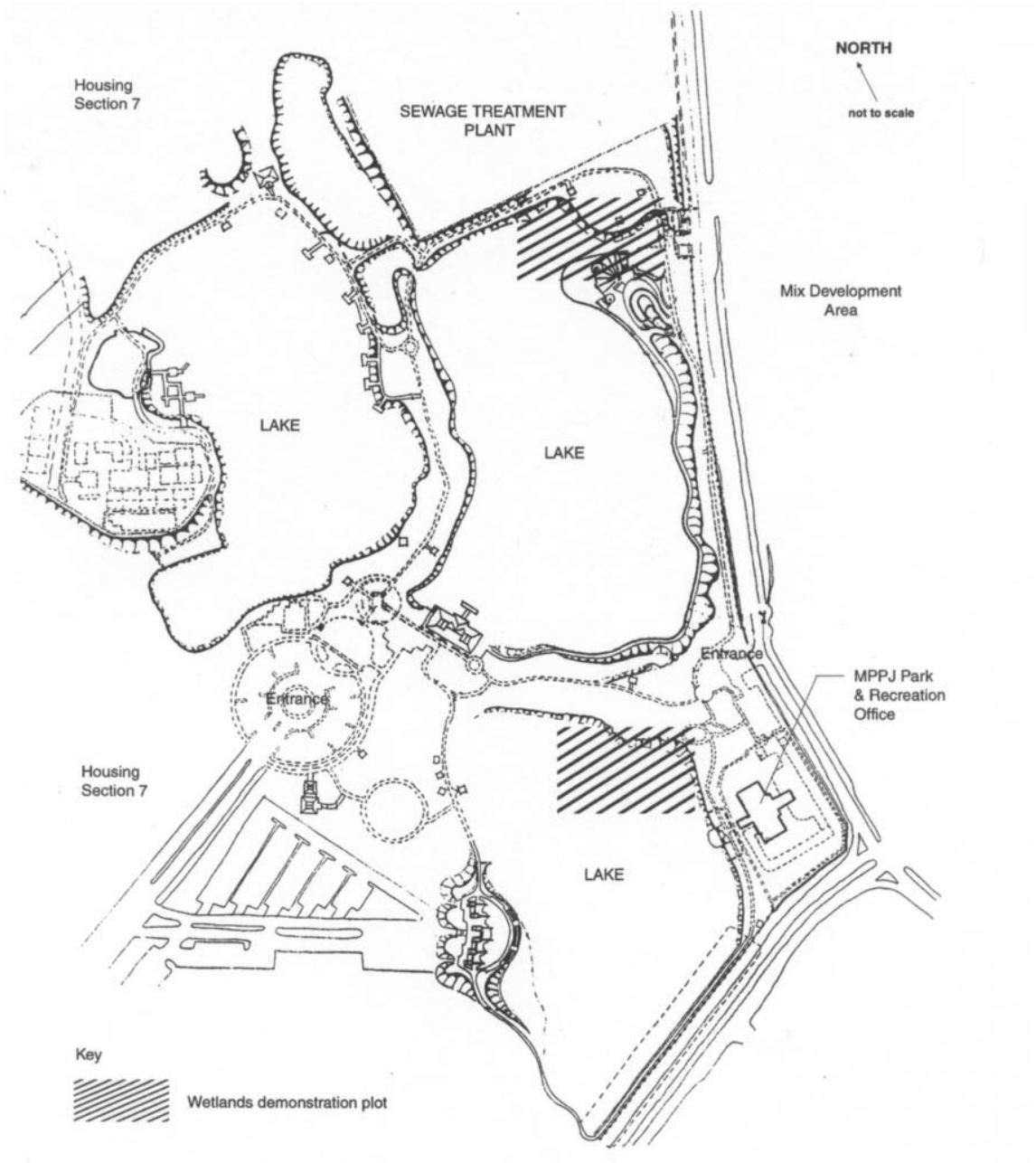
3.2 STUDY LOCATION: KELANA JAYA MUNICIPAL PARK

The location for this study is the Kelana Jaya Municipal Park in Kelana Jaya, Malaysia. The site was chosen because the local government, the Petaling Jaya Municipal Council (MPPJ), is attempting to restore wetlands in this park as part of an effort to resolve problems related to the park's lake water quality. The decision to restore these wetlands has been supported by the Global Environmental Center, an NGO that is concerned about the quality of the park. The Global Environment Center has even built several wetlands demonstration plots around the lake[8].

However, the public seems to be skeptical about wetlands, and a certain segment of the population is openly opposed to the project. Perhaps this is because the public has a negative perception of wetlands, and prefers to have urban green areas that can accommodate active recreation activities, instead of wetlands, which only seem to be suitable for passive activities. What is needed, therefore, is a way to restore the Kelana Jaya Municipal Park wetlands in a manner that is responsive to the public's needs and desires, thus reducing potential conflict between the public and designers. Consequently, the Kelana Jaya is a suitable area to conduct the study because its residents have perceptions toward wetlands that are clearly opposed to those of policy makers and designers. Thus, it offers a useful space for observing the effect of perceptions, land use concepts, and education upon public spaces.

The Kelana Jaya Municipal Park has four lakes (Map 1). The park is managed by the Petaling Jaya Municipal Council. It is located about 12.5 miles (20 kilometers) west of Kuala Lumpur, the national capitol of Malaysia, and 9 miles (15 kilometers) east of Shah Alam, the state capitol of Selangor.

[8] On August 19, 2005, the GEC informed the researcher that they had suspended the wetlands demonstration plot project. The reason for this suspension was undisclosed.



Map 1: The Kelana Jaya Municipal Park

The Kelana Jaya Municipal Park was developed on former tin mining lands in the River Damansara basin[9]. Historically, upon completion of mining activities in the

[9] In Malaysia, it is a common practice to develop parks on former tin mining areas. The concept was introduced by the British Colonial Government. Three of the earliest parks that were developed using this concept were Kuala Lumpur, Taiping, and the Seremban Lake Garden.

area, the lakes would fill with sediment. Over time, wetlands formed along the lake's periphery. The wetlands, together with natural vegetation and landforms, provided an important habitat for wildlife. Additionally, the wetlands became natural flood retention areas for Kelana Jaya. Finally, because of its seemingly "pristine condition," the lake became a popular spot for anglers and a natural open space for Kelana Jaya residents.

The park was upgraded in 1996; however, to upgrade the lake and its surroundings as a public park, most of the wetlands and natural vegetation were removed to make way for concrete pathways, exotic landscape plants, and other park amenities. The removal of wetlands caused the water quality of the lake to deteriorate. Petaling Jaya Municipal Council, the local authority responsible for the lake, is very concerned about lake conditions and local residents are pressuring the council to rectify the problem.

It has been suggested that one way to improve the lake's condition is by restoring wetlands along its periphery, a plan that certain segments of the public oppose. The question, then, is how the wetlands should be restored in the face of this opposition; specifically, can the wetlands be restored in a way that conforms to the public's values and preferences? This study will attempt to answer this question by surveying the public's and landscape architect's preferences for wetlands. In addition, park managers also will be interviewed to determine their expectations regarding the public's preferences for wetlands.

3.3 STUDY DESIGN

This section discusses the methods used to elicit the information to answer the research questions. This study was conducted in Kelana Jaya, Malaysia; its purpose was to determine the public's and landscape architects' preferences for wetlands, as well as park managers' expectations of the public's preference. Therefore, there are three major parts of the study, 1) a preference survey of the public, 2) a preference survey of landscape architects, and 3) interviews with park managers. It should be noted that the public and the landscape architect preference surveys are almost identical. Both survey instruments measure the preferences for wetlands as a dependent variable, as well as a few similar independent variables. Below is the discussion of the public and landscape architects' preference surveys, data collection, and data analysis.

3.3.1 The Public Preferences Survey

Among the data collected in the public preferences survey are preferences for wetlands, opinions on wetland management, perceptions of wetland activities and safety, agreement on wetland functions and values, motivations to use urban open spaces, familiarity with nature, participants' backgrounds, and information about wetlands. Please refer to Appendix A to see the Public Preferences Survey form.

3.3.1.1 Preferences for wetlands

Public preferences for wetlands were surveyed and the data were examined to answer questions related to the participants' perceptions of wetlands. Information about the public's preferences is important, in that it can guide landscape architects' plans and designs for wetlands restoration projects. The preference approach was chosen because it is the most suitable concept of measurement for understanding people's perceptions regarding natural environments, including wetlands.

Preference is a cumulative reflection of one's knowledge, innate reactions, and the cognitive processes taking place in the human mind (Kaplan & Kaplan, 1989). Furthermore, preference judgments are easy for people to make; in fact, preference judgments, such as what to wear, eat, and which route to travel are an almost automatic part of everyday life (Kaplan & Kaplan, 1989) Perceptions, in turn, are a very complex influence upon preferences, but are much harder to identify. Hopefully, studying the pattern of preferences can shed light on the underlying perceptions that people have about a particular type of landscape. In addition, many researchers have used preference approaches to understand people's reactions to natural environments. According to Daniel and Vining (1983), the preference approach has been proven to be reliable and valid.

The content identifying method (CIM), which was developed by R. Kaplan (1977) and S. Kaplan, R. Kaplan, and Wendt (1972) was used to measure public preference for wetlands[10]. CIM involves the presentation of photographs or slides to the participants; for this study, I asked the participants to view 64 wetland photographs and to rate their preferences for the wetland scenes using a 5 point Likert scale (1 = dislike,

[10] For a detail discussion about CIM, please refer to Chapter 2: Literature Review.

2 = somewhat dislike, 3 = neither dislike nor like, 4 = somewhat like and 5 = like). Below is a discussion of the scenes preparation procedures.

Scenes preparation procedures

This section discusses the procedures used to select the wetland photographs for the survey. There were three procedures: scene collection, scene selection, and scene presentation.

1. Scene collection

The focus of this study is people's perceptions of wetlands; therefore, it was important to photograph a wide range of wetland and lake types, as wetland restoration is not specific to one type of wetland. Furthermore, a wide range of wetland types provides the opportunity to study participants' reactions to different types of wetlands. Among the types of wetlands included in this test were mangroves, marshlands, and natural lacustrine wetlands. In addition, the study also included natural lakes, traditional manicured lakes, and hard edging lakes. The traditional manicured lakes and hard edging lakes were included because they currently exist in urban open spaces, and some of them are about to be replaced with natural wetlands. Therefore, it is also important to examine people's reactions to these types of environment. Over 200 photographs of wetland landscapes were taken in urban natural open spaces in Malaysia, particularly the Kelang Valley[11]. The scenes were photographed using a digital camera with 2.0 mega pixels and a 3x optical zoom lens because it provided clear images of each scene. Furthermore, the digital camera facilitated easy storage and transfer of images to the computer for photo editing. To ensure that the scenes taken represented typical views that people could easily see, the photographs were taken from public-access walkways.

2. Scene selection procedures

To select wetland scenes that were suitable for the study, a sampling selection technique was used; this technique sampled the wetland photographs based on a wide range of stimuli. This, in turn, made it possible for the analysis to identify numerous patterns of

[11] The Kelang Valley Region, located in central Malaysia, is the most urbanized area in Malaysia. Kelana Jaya Municipal Park is located in the Kelang Valley Region.

preference, which are groups of scenes that people reacted to in a consistent manner. If only one or two scenes contain a particular stimulus, it will not show up as a pattern or group, even if it is an important stimulus. Therefore, a random selection of scenes is not appropriate because a random selection will not include important but rare (infrequently occurring) landscapes. For this study, scenes were selected to represent a range of conditions, such as naturalness, openness, condition of the edge, structures, presence of water, type of wetlands, and level of maintenance. Second, photographs that included content that could induce bias, such as people, were excluded, as were photographs that were over-exposed or blurred. Third, to ensure that the survey included a wide range of conditions, the remaining scenes underwent a stratification process. The stratification process ensured that all conditions (stimulus and sub-stimulus) were represented adequately and repeated in the survey. In the end, this process produced 64 scenes that could be used in the survey.

3. Scene presentation

It was important to properly present the 64 scenes to survey participants. Using a random number table, each scene was assigned a number and then ordered according to the following rules:

- No more than two consecutive scenes from the same categories or conditions were adjacent to each other.
- Sequential scenes from the original order were not placed together.

These rules were vital to ensure that participants did not become familiar with the scenes, which might have resulted in deliberate attempts to consistently rate certain places based upon prior experiences. Thus, I believe this procedure reduced bias. After the presentation order was set, three extra scenes were placed at the beginning of the presentation for participants to familiarize themselves with the rating procedure before they rated the first real scene. Further, three additional scenes were added at the end of the presentation to prevent participants from anticipating that the survey was about to end. To prevent the "order effect," a second presentation booklet was created in which the scenes were rearranged in reverse order. Approximately half the participants were

shown the original presentation order and half were shown the reverse order. Finally, the scenes were arranged in an 8.5” x 11” booklet (landscape oriented). Each page contained six 3” x 5” color photographs with a corresponding number on the bottom right of each scene. According to R. Kaplan and S. Kaplan (1989), six scenes per page is acceptable; the maximum number of scenes on a page should be no more than eight. Lastly, the booklets were printed with a color laser jet printer, and bound.

3.3.1.2 Scene description survey

In addition to rating the wetland scenes for preference, participants also were asked to describe selected wetland scenes in their own words. Specifically, they were asked to describe the scenes in only one or two words. My purpose was to obtain objective interpretations of common characteristics of the scenes representing the sub-categories. This, in turn, would make it possible to triangulate findings from the content analysis of the scenes later. In other words, public participant descriptions were used later to determine what participants were reacting to when rating their preferences for the wetland scenes.

Fifteen scenes were chosen for this exercise. They were selected to represent different categories and sub-categories of the wetland scenes. They were ordered randomly for presentation purposes and were printed in the same six-scenes-to-a-page format that was used for the scenes in the preferences survey. Finally, they were placed at the end of the booklet.

3.3.1.3 Opinion on wetland management

People perceive wetlands in many ways, and their perceptions might influence their preferences for wetland usage. One factor that might affect perception is opinion regarding wetland management. Some people may see wetland areas as only being suitable for education and passive recreation, whereas other people might want wetlands used for agriculture and fishing, purposes that are more utilitarian in nature.

To measure participants’ opinions on wetland management, they were asked to indicate their agreement with the possibility of wetlands being developed. For example, they were asked to respond to the statement "wetlands should be used for farming activities and should be left as natural open spaces" using a 5 point Likert scale

(1=disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree and 5=agree).

3.3.1.4 Wetland activity and safety

Another factor that might affect people's preferences for wetlands is perception about activities that they can do in wetlands, as well as the safety aspect of the wetlands. In other words, people may like wetlands if they see them as places that can be enjoyable, but they may dislike them if they believe that wetlands are hazardous.

Therefore, it was important to gauge people's perceptions regarding wetlands enjoyment and safety. To do this, I asked participants to indicate their agreement with statements about wetlands. For example, they were asked to use a 5 point Likert scale (1=disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree and 5=agree) to evaluate the statements "wetlands are places for tranquility and peace," "wetlands are easy to get lost in," and "wetlands are not good for your health."

3.3.1.5 Revealing the most and the least liked aspects of wetlands

Because all of the variables described above were predetermined by the researcher, it was necessary to examine whether there were unanticipated factors affecting people's preference; consequently, the survey used an open-ended question. Participants were asked to indicate what they liked the most and the least about wetlands. This allowed the researcher to determine whether there were other, unforeseen, factors shaping their perceptions and preferences.

3.3.1.6 Knowledge about wetlands functions and values in urban areas

One reason people may object to wetland restoration in urban open spaces is that they are unaware of the functions and values of wetlands. To account for this problem, I attempted to educate participants about the functions and values of wetlands. For example, participants were asked about their agreement regarding wetlands functions and values in urban areas rather than their objective knowledge about those functions and values. They were asked to rate their agreement with certain statements, like "the wetlands presence in urban areas will increase fish and wildlife populations and enhance the aesthetic values of the park." Participants responded by using a 5 point

Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree and 5 = agree).

3.3.1.7 Motivation to use urban natural open spaces

People use urban open spaces (i.e., urban parks) for many reasons. Their motivation for using open spaces is based on their expectations of the landscape and the extent to which it will meet their needs. Therefore, people may have particular preferences for park settings, depending on their particular needs and motivations. If people perceive wetlands as being inconsistent with their expectations for using an open space, then they may oppose the introduction of wetlands into urban open spaces. Therefore, there is a need to determine if participants' motives to use urban open spaces affect their attitudes and preferences for wetlands in these spaces.

To measure the public's motivation for using urban open spaces, participants were asked to use a 5 point Likert scale (1 = not important, 2 = somewhat not important, 3 = neither not important nor important, 4 = somewhat important and 5 = very important) to indicate how important it is for them to participate in different park activities (example: watching people play ball and picnic with family). The items were divided into four broad categories of needs and motivations: active, passive, exploration, and socialization. They also were asked to indicate other activities or facilities that they would like to see provided in open urban spaces.

3.3.1.8 Familiarity with nature: proximity to and contact with nature

Other factors that might affect people's preferences for wetlands include the proximity to their residence and the frequency of their involvement with nature. For example, people who live close to nature and frequently are involved with it might be more familiar with nature, which would affect their preferences. As my literature review noted, familiarity with nature is a significant predictor for preference.

To measure participants' proximity to nature, they were asked how far they live from Kelana Jaya Municipal Park, and their answers were plotted on an interval scale (less than a mile, 1-2 mile, 3-4 miles and more than 5 miles). To measure the frequency of their contact with nature, participants were asked how often they used Kelana Jaya Municipal Park; these answers also were plotted on an interval scale (never, once every

6 months, once every 3 months, once a month and several time a month). They were asked if they actively were involved in outdoor and water recreation activities; this question used a categorical scale (yes and no). Finally, participants were asked if they ever did volunteer work in the park. This question also used a categorical scale (yes and no).

3.3.1.9 Participants' background

Because different socio-economic levels and socio-cultural backgrounds provide different ways of learning and seeing the world, these factors may affect participants' preferences regarding wetlands. Furthermore, Malaysia is a multi-ethnic country, with three distinct ethnicities: Malay, Chinese and Indian; this, too, might affect participants' perspectives. The relationship between culture and preferences in Malaysia is a crucial factor in developing landscapes that respond to all segments of society; if they start using different places for different purposes, public spaces could, ironically, jeopardize national unity and harmony.

For this part of my study, the participants were asked to indicate their ethnicity, gender, and age, as well as their monthly income and education level. Participants' ethnicities and gender were measured using a categorical scale; I used interval scales to plot ages (below 20 yrs old, 21-30 yrs old, 31-40 yrs old, 41-50 years old, 51-60 years old, and more than 60 years old) and monthly income (less than RM1000, RM1000-3000, RM3000-5000, RM 5000-7000, and more than RM7000). Regarding education level, participants were asked to indicate their highest education level using a categorical scale (secondary school, certificate, diploma or STPM[12], bachelor/college degree, and above).

3.3.1.10 Information about wetlands

To further explore the impact of knowledge upon people's preferences toward wetlands, participants were asked to read a statement that was produced by Malaysian universities and the Forest Research Institute of Malaysia. This document described wetland functions and values. After reading the statement, participants again were

[12] In Malaysia, certificate, diploma**,** and STPM (High School Certificate Examination) are pre-university level programs

asked to use a 5 point Likert scale (1= disagree, 2 = somewhat disagree, 3 = neither disagree nor agree, 4 = somewhat agree and 5 = agree) to indicate their agreement with the statements regarding wetland functions and benefits in urban areas. Additionally, participants were asked to use a 5 point Likert scale (1= disagree, 2 = somewhat disagree, 3 = neither disagree nor agree, 4 = somewhat agree and 5 = agree) to gauge the extent to which they agreed with government efforts or policies to introduce wetlands into urban natural open spaces. To ensure that these questions did not affect responses to other questions, they were placed at the end of the survey.

3.3.2 Landscape Architects' Preference Survey

The purpose of the landscape architects' preferences survey was to determine if the landscapes architects' preferences were similar to those of the general public. Previous studies had uncovered differences between the preferences of experts (i.e., landscape architects) and those of the public. If this was true for wetland landscapes, it could mean that wetlands that landscape architects designed as desirable places for people may not be desirable after all. Among the data collected in the landscape architects' preference survey were preferences for wetlands, opinions on wetland management, perceived wetland enjoyment and safety, feelings regarding wetland functions and values, landscape design approaches, education background, type of landscape architecture practice, personal background, and general information about wetlands.

The list of information to be collected to examine landscape architects' preferences shows that several of the variables were similar to those of the public preferences survey. The variables were designed to be similar so comparisons and contrasts between the two surveys easily could be made. The variables that were similar were assumed to contain differences within the landscape architects' preferences. Below is the list of the variables that were similar to those of the public preference survey. Additionally, the method that was used to measure the variables that were not similar to the public preferences survey is discussed. Please refer to Appendix C for the landscape architect's preferences survey form.

3.3.2.1 Preferences for wetlands

Landscape architects are assumed to have certain preferences for wetlands that shape the landscapes they design. Therefore, it is important to examine the preferences of landscape architects in Malaysia. The outcome of this study will help develop design guidelines to aid landscape architects in designing public spaces. Landscape architects' preferences for wetlands were measured in much the same way as the preferences of the public. Please refer to section 3.3.1.1 and 3.3.1.2 of this chapter for a discussion of the methodology used.

3.3.2.2 Opinions on wetlands management

Regarding wetland development, perhaps the most pressing issue is the difference between how landscape architects prefer to develop wetland spaces and how the general public likes to have these spaces developed. The information related to this question is crucial for understanding the factors that affect landscape architects' preferences for wetlands. The landscape architects' opinions on wetland management were measured in much the same way as the public's opinions. Please refer to section 3.3.1.3 of this chapter.

3.3.2.3 Perceptions of wetland activity and safety

Do landscape architects perceive wetlands as more enjoyable and less dangerous than the general public? This question, and its impact upon development, is crucial, in that it may be another cause of the varied land-use opinions of landscape architects and the general public. The survey measured the wetland enjoyment and perceived-danger opinions of landscape architects in much the same way as it measured the public's feelings on this matter. Please refer to section 3.3.1.4 of this chapter.

3.3.2.4 Agreement on wetland functions and values in urban areas

Regarding wetland functions and values, landscape architects are, presumably, more knowledgeable than the general public. Therefore, they are more likely to agree on wetland functions and values in urban areas; this, in turn, is likely to affect their preferences for wetlands. This information will further enhance the role of knowledge in shaping people's preferences for wetlands. Landscape architects' agreement on

wetland functions and values in urban areas was measured in much the same way as that of the public. Please refer to section 3.3.1.6 of this chapter.

3.3.2.5 Landscape architects' backgrounds

Much like the general public survey, the landscape architect survey collected information on the background of each participant. This made it possible to determine if landscape architects' background affect their preferences for wetlands. However, information regarding the landscape architects' level of education was not collected because all landscape architects had to have at least a bachelor degree. Please refer to section 3.3.1.9 for a discussion of the method that the survey employed.

3.3.2.6 Information about wetlands

To further understand the effect of information or knowledge about wetlands on landscape architects' attitudes, they were asked to read a paragraph-length statement related to wetland functions and benefits; afterwards, they indicated their level of agreement with the sentiments expressed in the paragraph. The method used to measure the variable was similar to the method used to measure the public's responses. Please refer to section 3.3.1.10 of this chapter.

3.3.2.7 Landscape architectural design approaches

One of the factors assumed to affect landscape architects' preferences for wetlands is their design approach. This information is important because it can indicate how design approach can relate to the public's needs. For my purposes, a scale based on landscape design approaches suggested by Crewe and Forsyth (2003) was developed. They argue that landscape architecture design approaches can be broken down into six categories: design as a synthesis, cultivated experience, landscape analysis, plural design, ecological design, and spiritual landscapes (SCAPES)[13].

The items for the scales (i.e., designs should be based on art history and art criticism and designs must be grounded in nature) were developed based on factors that influence each of the landscape architectural design approaches. These factors are: outcome of the design, design process, intellectual bases, environmental ethic, approach

[13] For further discussion about the approach, please refer to Chapter 2: Literature Review

to nature, analysis of power, client/audiences, and development scale. However, two of the factors, client/audiences and development scale are excluded because they do not fit into the context of Malaysian landscape architecture practices.

Landscape architects were asked to use a 5 point Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree and 5 = agree) to indicate the extent to which they agreed that the listed items (e.g., design should be based on history and art criticism, and participation of users in the design process is important) would produce or achieve good landscape architectural designs.

3.3.2.8 Landscape architects education and practice background

In addition to the landscape architecture design approach, the educational background of landscape architects also might affect their preferences for wetlands. This information is important because it can indicate if the problems related to the differing preferences of landscape architects and the general public stem from the type of education that they received.

Three variables were used to measure landscape architects' educational background: where they obtained their degrees (local universities: UiTM, UTM, USM, UPM and UIA[14] or foreign universities in the United States, the United Kingdom, Australia, and New Zealand); this was measured using a categorical scale. The survey also used a categorical scale (yes and no) to indicate if landscape architects had any graduate education, and whether, they had degrees related to art, architecture, and town planning.

3.3.2.9 Landscape architects' type of practice

Another factor that might affect landscape architects' preferences for wetlands is their type of practice. This information is important because it can indicate another potential cause of the problem of differing land-use preferences. Two variables were used to gauge the landscape architects' practices: the first was the type of practice (private consultant, academician, civil service), which was measured with the use of a

[14] UiTM refers to MARA University of Technology, UTM refers to the Malaysia University of Technology, USM refers to the Malaysia Science University, UPM refers to the University of Putra Malaysia, and UIA refers to the International Islamic University.

categorical scale; the second was length of practice, which was measured with the use of an interval scale (less than 3 years, 4-6 years, 7-9 years, and more than 10 years).

3.3.3 Pre-test of the Survey Instrument

Before the surveys could be conducted, the survey instrument was pre-tested. The pre-test was necessary to clarify the validity of the survey instruments, which were to be used in two languages: Malay and English. This was necessary because Malaysia is a multi-cultural country and Malay is the national language. The majority of Malaysians can speak and understand the Malay language[15]. English is the official second language, and is used widely in business. Furthermore, the two other ethnic groups in Malaysia, the Chinese and Indians, seem to understand English better than Malay. However, there was no need to survey the landscape architects in Malay, as most of them understand English and use it on a daily basis.

3.3.3.1 Pre-test for the public preferences survey instrument

To determine if the English language used in the public preferences survey instrument could be understood easily, Malaysian students at Virginia Tech (n= 8) and a group of Malaysian Chinese and Indian (n= 5) students from the University Putra Malaysia (UPM) were asked to take the test. Malaysian students at Virginia Tech were chosen because they were assumed to be fluent in English and knew how Malaysians use English. Furthermore, the Malaysian Chinese and Indian students from UPM were asked to take the test because it was assumed that they would prefer the survey instrument in English.

There were only a few typographical errors and no major problems reported by pre-test participants; after this review, the researcher translated the survey instrument into Malay. This translation was checked by two senior researchers in Malaysia who are experienced in Malay-English translation. After this review, the Malay language survey instrument was pre-tested on a group of Malay students (n= 9) from the University Putra Malaysia.

The Malay students were asked to take the pre-test because it was assumed that they would prefer to take the survey in Malay. They did not report any problems or

[15] Most members of the Malay, the largest ethnic group in Malaysia, can only speak Malay.

errors. Consequently, the public survey instruments in both English and Malay were finalized and used for the survey conducted in Kelana Jaya Municipal Park. Please refer to Appendix B for the Malay-language version of the public preferences survey form.

3.3.3.2 Pre-test for landscape architect preference survey instruments

Much like the public preference survey instrument, it was necessary to test the English language used in the landscape architects' preference survey. To test the instruments, graduate students from the Virginia Tech Landscape Architecture Department's Environmental Design and Planning program (n=23) were asked to fill out the survey forms that would be used by the landscape architects. Apart from a few typographical, word choice, and grammatical errors, there were no problems with the survey instrument. The instrument was then revised and finalized, and was used in the preferences survey of landscape architects in Kelang Valley Region in Malaysia.

3.3.4 Sample Population

This study examines public preferences for wetlands and the introduction of wetlands in urban open spaces in Malaysia; specifically, it considers the issue of wetland restoration in the Kelana Jaya Municipal Park. To this end, it compares public preferences with those of landscape architects. To discover public preferences, Kelana Jaya residents and visitors to the Kelana Jaya Municipal Park are suitable survey populations. Below are descriptions of these two population groups.

3.3.4.1 The public population

Kelana Jaya is a large area, consisting of more than twenty residential sections, each of which contains between 3000 and 5000 residents. However, due to the practical problems of this study, specifically the public's opposition to the wetland restoration program in the Kelana Jaya Municipal Park, there was a need to include both people who lived close to the park and those who traveled to it from farther away. The people who live in Section 7, Kelana Jaya, which is close to the park, were selected to become a sample population because:

- Kelana Jaya Municipal Park is located in Section 7, Kelana Jaya.

- The residents of Section 7 are more likely to be the first people affected by any changes to the Kelana Jaya Municipal Park.

In addition to the residents of Kelana Jaya Municipal Park, the visitors to the Kelana Jaya Municipal Park also were selected to participate in the study. Their selection was based on the fact that visitors to Kelana Jaya Park do not come only from Section 7.

3.3.4.2 Sample size for the public population

This study used a non-random sampling technique; therefore, the most important factor to consider in determining sample size was that the number should be large enough for statistical analysis. The larger the sample size, the more robust the statistics would be. A rule of thumb for statistical analysis states that a minimum of 30 participants are needed for each population group (Howell, 2002). For example, if a comparison among six groups is needed, a minimum of 180 participants must be polled. Further, according to Mitra and Lankford (1999), a minimum of 10% of the total population should be surveyed. However, this percentage is only a rule of thumb; to make the study's results more valid and reliable, it was important to look specifically into the two public groups that were involved in the survey, Section 7 residents and visitors to the park.

Section 7, Kelana Jaya residents

Even though this study used a non-random sampling technique, it is important to ensure that the number of participants is large enough to enable a robust statistical analysis. Altogether, 277 residents of Section 7 Kelana Jaya were surveyed in this study. The number was adequate, as it represented about 9.5% of the total population of Section 7, Kelana Jaya. Furthermore, this number was sufficient to guarantee a sampling error of 5.6% at a 95% confidence level.

Visitors to the park

For this study, the survey used the convenience sampling method, also known as the sidewalk survey method (a non-random sampling technique) to survey visitors to Kelana Jaya Municipal Park. The key issue of the convenience sampling method is that

participants are selected based on their ready availability (Rea & Parker, 1997), so every visitor to the park potentially can be a survey participant. Altogether, 120 visitors were surveyed in the park for this study; based on Mitra and Lankford's (1999) formula, this justified a +/- 5% sampling error[16].

In summary, a total of 397 public participants were surveyed for this study. The number exceeded the minimum necessary for robust statistical analyses, such as factor analysis and multivariate analysis. The number also permitted a comparison of preferences between the residents and the visitors, and among ethnic groups.

3.3.4.3 The landscape architect population

One of the research objectives and questions was to determine if preferences and attitudes toward wetlands differed between experts and the public. Landscape architects were selected because they largely are responsible for the planning and designing of urban open spaces in Malaysia. Understanding their attitudes and preferences is important to further improve the processes involved in planning and designing urban natural open spaces.

All together, there are 319 landscape architects in Malaysia, but this study only used landscape architects who live and work in the Kelang Valley area. They were selected because the Kelana Jaya Municipal Park is located in the Kelang Valley region. It was logical to survey landscape architects who work and live in the Kelang Valley, as they would probably know the area better.

Potential landscape architects were contacted with the cooperation of the Institute of Landscape Architects of Malaysia (ILAM). The purposive sampling technique, a non-random sampling method in which the researcher uses his professional judgment in the selection of respondents (Rea & Parker, 1997p. 160), identified a total of 105 landscape architects in the Kelang Valley area. This was a large enough population, as it comprised 33% of the total number of landscape architects in Malaysia. Furthermore, it enabled robust statistical analyses, including factor analysis and multivariate analysis.

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[16] Mitra and Lankford (1992) use this formula: sampling error = square root of [(p) (1-p)/proposed sample size] to come out with 3.5% sampling error for 200 participants**,** in which p is the probability that the condition exist**s**. However, since the actual p value is not known, the p value is assumed to be 50%**.**

3.3.5 Preference Survey Procedures

This section discusses how the preferences surveys were administered to public participants and landscape architects. Below is a discussion of the public and landscape architects' preferences survey procedures.

3.3.5.1 The public preferences survey procedures

The public preferences survey was conducted over a 6 weeks period. Seven assistants, who were students from the Department of Landscape Architecture at UPM, assisted Landscape Architecture professors from UPM in administering the survey. Given their university training, these students already were familiar with the procedures used to administer surveys. However, this was the first time that they had conducted a survey involving photographs, so they were taught how to administer a photo questionnaire survey by the researcher. The lesson was necessary to ensure the consistency, validity and reliability of the survey.

Three days before the survey was conducted, 500 letters of invitation explaining the purpose of the survey and asking for the residents' cooperation were sent to the residents of Section 7, Kelana Jaya (see Appendix D for the letter to the residents of Section 7). The survey was conducted on the following dates: from October 23 to November 10, 2004 and from November 25 to November 28, 2004. The lapse in time in between November 6 and November 28, 2004 could not be avoided because most of the Kelana Jaya residents were out of town due to the long Eidul Fitri[17] Holiday.

The residents of Section 7, Kelana Jaya, were surveyed at their homes. The survey was conducted during the weekend because it was more likely that residents would be at home during this time. Three survey assistants were assigned to administer the survey to residents of Section 7, Kelana Jaya. The survey assistants went from house to house in Section 7, knocked on the door or rang the bell of each home. They were instructed to leave if nobody opened the door after three knocks. When a resident opened the door, survey administrators identified themselves as students from UPM and stated that they were conducting a survey that was pertinent to the Kelana Jaya Park. They then asked the residents if they were willing to participate in the survey.

[17] Eidul Fitri is a holy day for Muslims to celebrate the end of Ramadan (an Islam's month).

Three assistants were assigned to conduct the survey of visitors to Kelana Jaya Municipal Park. The surveys in the park were conducted from October 8 to October 14, 2004, in the morning, late afternoon, and on the weekend. These times were chosen because they are when the park is used most heavily. Survey assistants were stationed at each available entrance to the park, and they approached all people who entered the park, asking if they would be willing to participate in the survey.

Below are the general procedures of the survey as it was presented to residents and visitors of the park. After greeting the potential participants, the survey assistants asked potential participants if they were willing to participate in the survey. After expressing willingness, potential participants were given the following information:

- They were told that the purpose of the survey was educational, and that the survey results would be used only for academic purposes.
- They were given the contact information for the researcher, which enabled them to directly ask the researcher about the survey if they harbored any doubts about its legitimacy or questioned the integrity of the research assistant.
- They were told that participation in the survey was voluntary and that they could decline participation at any time.
- They were assured that their personal information would be confidential and they would remain anonymous.

After ensuring that participants understood the study, survey administrators informed them of the survey procedures and handed them the survey form, along with a pen, the photo booklet, and a writing pad. While the participants took the survey, survey assistants remained next to them, ready to answer any questions or assist with any difficulties that the participants faced. After the participants finished filling out the survey form, administrators thanked them for their cooperation and contribution to the study.

It is worth noting that the study was approved for research involving human subjects by the Institutional Review Board (IRB) Office of Research Compliance of Virginia Tech. Please refer to Appendix G for a copy of the approval email from IRB, Office of Research Compliance, Virginia Tech.

3.3.5.2 Landscape architects' preferences survey procedures

The landscape architects' preference survey was conducted by the researcher, and all surveys were conducted in the offices of landscape architects. The researcher contacted each potential participant and made an appointment. In offices with more than one landscape architect, surveys were administered in group settings. However, because only four booklets were available, only four landscape architects could take the survey at one time. There was no specific time frame for the landscape architect preference survey, but all surveys were conducted between October 4 and November 11, 2004. The procedure used to conduct the survey with landscape architects was similar to that used with the public. Therefore, refer to section 3.3.5.1 of this chapter for an explanation of the general procedures of the survey.

3.3.6 Data Analysis for the Public and Landscape Architects' Preference Surveys

Data from survey questionnaires were entered into a database to be analyzed. The program used for data analysis was the Statistical Program for Social Scientists (SPSS), version 12. The analyses included:

1. An analysis of the public and landscape architects' most and least preferred scenes,
2. A Preferences dimension analysis for the public and landscape architects' preferences ratings,
3. An analysis of variance (t – test) to test differences between the public and landscape architects' opinions on wetland management, perceived wetland enjoyment and safety, and agreement on wetland functions and benefits,
4. A multivariate analysis (MANOVA) and analysis of variance (ANOVA) to identify relationships between the public's preferences and
    i. The type and level of perceived wetland enjoyment and safety,
    ii. The type and level of agreement on wetland functions and benefits,
    iii. The type and level of motivations to use urban natural open spaces,
    iv. The level of familiarity with nature, and
    v. The background of various members of the public.

5. A multivariate analysis (MANOVA) and analysis of variance (ANOVA) to identify relationships between the landscape architects' preferences and
    i. The type and level of perceived wetland enjoyment and safety,
    ii. The type and level of agreement on wetland functions and benefits,
    iii. The type and level of agreement of landscape architecture design approaches,
    iv. The educational background of the landscape architects,
    v. The landscape architects' type of practice, and
    vi. The background of the landscape architects.
6. A correlation analysis to test the strength of relationships between public agreement on wetlands function and benefits, the public's opinions on wetland management, and the perceptions of wetland enjoyment and safety,
7. A multiple regression analysis to identify the best predictors for public preferences among agreement on wetland functions and benefits, perceived wetland enjoyment and safety, and motivations to use urban natural open spaces, and
8. A multiple regression analysis to identify the best predictors for the landscape architects' preferences among type of agreement on wetlands functions and benefits, perceptions of wetland enjoyment and safety, and landscape architectural design approaches.

All the statistical analyses were tested at the 95% significance level because this provided for a more liberal interpretation of the data: not too lenient and not too strict. For all open-ended questions, data were analyzed using content analysis to identify the themes and frequency of the themes. Altogether, there were five types of data analysis for this study: an analysis of the most and the least preferred scenes, a preferences dimension analysis, an analysis of differences (t- test, ANOVA and MANOVA), an analysis of relationships (correlation and multiple regressions), and a content analysis. Below are the descriptions of each of the analysis methods.

3.3.6.1 Analysis of the most and least preferred scenes

The analysis of the most and least preferred scenes uses the descriptive analysis technique and aims to identify the environmental characteristic that most affects the

participants' ratings for the most and least preferred scenes. For the public participant group, all of the 64 wetland scenes were ranked according to their mean preference score, after which the eight scenes with highest preferences rating were set aside to identify the common environmental characteristics that they shared. These shared environmental characteristics, then, were assumed to induce high preferences ratings. The process was repeated for the eight scenes with the lowest preferences rating to reveal environmental characteristics that induce low preferences ratings. Later, a comparison was made between the most and least preferred scenes to examine for differences or commonalities within each participant group. The analysis of the most and the least preferred scenes procedures above then was repeated with the landscape architects' preferences ratings' mean scores. Later, a comparison also was be made between the public and the landscape architects' most and least preferred scenes. This enabled the identification of differences between the two groups.

3.3.6.2 Analysis of preferences dimensions

The analysis of the most and least preferred scenes reveals the common characteristics of the scenes, based on each scene's magnitude; this is the first step in understanding the public's preferences. To triangulate the findings, an analysis of the preferences dimension was performed. There were four steps involved in the preferences dimension analysis:

1. A factor analysis or category identifying method (CIM),
2. A content analysis of the factor dimensions,
3. A content analysis of the participants' verbal descriptions, and
4. The ranking of the factor dimensions.

The first step was the factor analysis, which grouped the rated wetland scenes into meaningful dimensions based on particular patterns of preference. The grouping of the scenes or dimensions was based on patterns of reaction to stimuli contained in the scenes. This occurred, regardless of the preferences magnitude; the examination of this stimuli could reveal environmental factors that affect preferences (Kaplan & Kaplan, 1989). As discussed in the literature review, R. Kaplan and S. Kaplan (1989) call this

analysis process the "Category Identifying Method" or CIM. Accordingly, to get the best result from the factor analysis, the following guidelines were used:

- The eigenvalue of the factor was set at least at 1.0 to ensure that the solution accounts for an adequate portion of variance (Kaplan & Kaplan, 1989).
- The "maximum likelihood factor analysis would be used to extract the dimensions because the procedure eliminated the indeterminacies and subjective decision required by other extraction method and maximum likelihood estimates contained a powerful invariance property" (Comrey & Lee, 1992, p.92).
- An oblique rotation method, called Promax, was chosen to rotate the dimensions axis because this method yielded more discrete dimensions, meaning less overlapping dimensions among items (or scenes) factored (Hair, Anderson, Tatham, & Black, 1998).
- Loading of at least 3.0 and above was considered significant (Hair et al., 1998) and scenes that did not load significantly were deleted (Kaplan & Kaplan, 1989).
- Scenes that load into more than one dimension were deleted (Kaplan & Kaplan, 1989).
- Factors or dimensions had to have at least three scenes or variables to be interpretable (Kaplan & Kaplan, 1989).

Once the factor analysis finished grouping the scenes into several preferences dimensions, the second step was to analyze each dimension to understand the common characteristic or stimulus present in each scene within a particular dimension. Factor analysis was used widely in this study. It also was used to group other items, such as participants' attitudes toward wetlands, knowledge about wetland functions and benefits, and landscape architects' design approaches. The purpose was to organize the items into statistically meaningful groups so that variables could be anodized easily and related to preference dimensions.

The second step was the preference dimension content analysis, which involved examining the scenes in each dimension for two attributes: content and spatial

organization. After identifying the characteristics common to the scenes in each dimension, the dimensions were given a name based on the apparent preference dimension characteristic.

The third step in the preference dimension analysis was analyzing the participants' verbal descriptions of the scenes. In the survey form, participants were asked to provide a one to two word description of each scene. This was done for fifteen wetland scenes. The questions were open ended, and content analysis was used to analyze the verbal description. However, before the scenes were analyzed, it was important to sort the fifteen scenes according to their dimensions. Content analysis is a "technique for systematically describing the form and content of written or spoken material" (Sommer & Sommer, 1997 p. 169). Using content analysis, data was classified into groups based on broad themes. The frequency of each group or theme provided a basis for understanding the reasons for people's responses and attitudes. Results from the content analysis of verbal responses were used to clarify, validate, and expand the interpretation of the dimensions conducted earlier.

The fourth step in the preferences dimension analysis was the ranking of the preferences dimensions according to the mean score of each dimension. My purpose was to understand the preferences dimensions, and how the characteristics or content of the dimensions affected the participants' preferences. Finally, a comparison of the preferences dimension of the public and the landscape architects was made to understand the groups' similarities and differences with respect to their preferences for wetlands.

3.3.6.3 Analysis of differences

For this study, parametric tests such as the independent T-test, the analysis of variances (ANOVA), and the multi-analysis of variances (MANOVA) were used to test for differences in mean preferences among the independent variable sub-categories. The independent T-test or ANOVA was used if only two variables or two sub-categories were being compared, such as gender. However, if there were more than two independent variables, MANOVA was used. MANOVA is the general linear model procedure that is appropriate when there are relationships among the dependent variables; additionally, MANOVA is an appropriate test for controlling type I errors,

which develop when there are too many dependent variables (Howell, 2002). For this study, when MANOVA was used, there were three procedures involved:

1. The MANOVA test was be conducted in the presence of all dependent and independent variables involved. This made it possible to discover if there were statistical means differences amongst the independent variables sub-groups on the combination of the dependent variables.
2. If the MANOVA results were statistically significant (meaning that differences existed amongst the independent variables sub-groups), univariate analysis was run to explore if the independent variables sub-groups' means differed for each dependent variable.
3. If the univariate analysis results were significant, a multiple comparison analysis was used to identify which groups differed.

The Bonferonni Post Hoc analysis was used for the multiple comparison analysis because it is designed to analyze a small to moderate number of groups and helps control type I errors (Howell, 2002).

3.3.7 Analysis of Relationships

To understand the relationships between the preferences dimensions and a particular independent variable, I used the Pearson correlation and multiple regression analysis. A correlation analysis is important because the result shows the strength of the relationship of the preferences dimensions with particular independent variables. I believe the Pearson correlation is the suitable analysis method because it eliminates the possibility of having a standard deviation effect or covariance on the correlation (Howell, 2002). In addition to the Pearson correlation method, the relationships between the preferences dimensions and the independent variables also were tested with a multiple linear regression analysis. The advantage of using a multiple linear regression analysis is that it:

- Can explain how much a particular independent variable predicts the outcome of a dependent variable,

- Can eliminate the buildup of type I errors that occur because of the need to repeat multiple simple linear regression analyses in analyzing multiple independent variables onto a dependent variable, and
- Can represent a real life situation in which the relationship among variables is assumed to exist and is far more complex rather than a simple linear relationship.

I used a multiple regression analysis with forward method because the method was able to rank the independent variables according to how significantly they predicted the outcome of the dependent variables. Further, to minimize the affect of colinearity, only the independent variables that were correlated significantly to the dependent variables would be used to predict the dependent variable (preferences dimensions).

3.4 INTERVIEWS WITH PARK MANAGERS

This section discusses the third part of the study, the interviews with park managers. The interviews were conducted because one of the study objectives was to understand park managers' expectations of public preferences for wetlands and to determine how their expectations differed from the public's actual preferences.

Park managers were asked about their roles in developing and managing urban open spaces; specifically, they were asked about wetlands and their attitudes about the need to protect, conserve, and restore wetland spaces. They also were asked about their expectations regarding public preferences for wetlands, factors that might affect public preferences, and the role of public input in developing and managing urban natural open spaces.

The interview format was structured, meaning that the same questions were used for all the interviewees, but follow up questions could be asked for clarification and further detail. The list of interview questions is included in Appendices E and F. The following sections discuss the issues that were addressed in the interview sessions.

3.4.1 Wetland Conservation and Restoration in Urban Open Spaces

Interviewees were asked about their attitudes regarding wetland conservation and restoration in urban areas. To further understanding their positions, a statement regarding wetland benefits was read to them and they were asked about their agreement with it. The purpose of the questions was to gauge the interviewees' overall views and attitudes about wetlands and their level of knowledge. In addition, the interviewees were asked about problems or barriers they faced regarding wetland conservation and restoration. Finally, they were asked how they would like to solve these problems.

3.4.2 Anticipation of Public Preferences for Wetlands

This study was interested particularly in learning about park managers' expectations regarding public preferences for wetlands, as these expectations reflected the managers' understanding of people preferences. Presumably, park managers have their own perceptions of wetlands, which underlie their wetland management policies. A problem then arises, as the public sees the wetland restoration programs as out of step with their own needs and values. Consequently, there is a need to validate the assumption above to develop better management strategies that fit the public's values and preferences.

To answer this question, interviewees were shown photographs of 64 wetland scenes, each of which was 3” x 5”. These were mounted on a 2' x 3' board. The size of the photographs and the scenes depicted were similar to those used for the public and the landscape architects' preference surveys. First, interviewees were asked to choose five[18] photographs that they thought the public would like. Second, they were asked to choose five photographs that they thought the public would dislike. Finally, they were asked to choose five photographs that they think the public would neither like nor dislike. Their selection of photographs was recorded, and the results of the ensuing analysis were used to determine to what extent the managers were able to anticipate public preferences. In addition, for all three photographic selections, managers were asked their reasons for choosing the photographs.

[18]To provide consistency and uniformity during data analysis, only five photographs could be chosen by park managers

3.4.3 Factors Affecting the Public's Preferences

To examine their anticipation of potential factors affecting the public's preferences for wetlands, interviewees were shown a list of potential factors that might affect preferences. They then were asked to identify any items on the list that they believed would affect the public's preferences. After choosing the items, they were asked to provide their reasons for believing that the items might affect people's wetland preferences.

3.4.4 Compatibility of Wetlands with Recreational Activities

One of the factors that might hinder an individual's acceptance of wetland restoration is his or her perception that wetlands are not compatible with recreational activities. Therefore, park managers were asked questions regarding the compatibility of wetlands and recreational activities; these questions made it possible to examine the interviewees' attitudes regarding having wetlands in close proximity to recreational areas. This is important because, as park managers, they make decisions regarding the need to restore wetlands in urban natural areas. The interview asked specifically about the types of recreation activities that managers believed were compatible with wetlands and why.

3.4.5 Opinion about Planning Practice and People's Needs

Interviewees were asked if they believe current planning practices adequately account for the needs of the public. The question was asked to determine if park managers believe there was a need to consider the public's needs in the planning process. Furthermore, the questions were asked to evaluate whether the problem posed by the wetland restoration program, which is opposed by the public, stemmed from the fact that the public's needs were not taken into consideration.

The interview also solicited the interviewees' attitudes regarding the planning and design of urban open spaces that would be consistent with public attitudes and preferences. It is important to know park managers' opinions because these revealed if managers were willing to allow the public's opinions to inform the decision making process. In addition, the question was aimed at examining park managers' attitudes toward the public participation process.

Further, managers were asked how planning could simultaneously protect wetlands yet remain consistent with the public's attitudes and preferences. This issue was raised to elicit park managers' opinions regarding how planning can respond to people's needs while protecting the ecological integrity of wetlands.

3.4.6 The Interview Procedures

I conducted all interviews in the interviewees' offices. Before any interviews were conducted, interviewees were informed of:

- The objectives of the study and the purpose of the interview,
- The fact that interview participation was voluntary basis and that they could refuse the interview if they wished,
- That personal information would be handled confidentially and anonymously,
- That a permission form the interviewees were sought to record the interviews and, even though the interviews would be recorded, interviewees would only be referred to as the park manager(s) in the study analysis and report, and
- That the interview procedure was approved by the Institutional Review Board (IRB) Office of Research Compliance of Virginia Tech to conduct research involving human subjects (please refer to Appendix G).

3.4.7 Interview Participants

The interviews involved park managers from five local authorities located in the Kelang Valley Area. Nine park managers were interviewed for this study; this number is sufficient to produce sound, valid, and reliable data. A non-random sampling techniques known as purposive method sampling was used to choose the potential interviewees. This method allows the researcher to use his or her professional judgment to select the potential interviewees (Rea & Parker, 1997). In this study, I based my judgment was based on three factors:

1. The park managers had to work in the local authority offices and oversee park and recreation or park and landscape development in urban areas.
2. The local authorities had to be located in the Kelang Valley region, the region where the Kelana Jaya Municipal Park was located.
3. The park managers from the Petaling Jaya Municipal Council, the authority managing the Kelana Jaya Municipal Park, had to be included.

3.4.8 Interview Data Analysis

For the interview questions, responses from the interviewees were recorded by writing as well as by digital tape recorder. Consequently, all the recorded interviews were transcribed verbatim into the computer. There were three methods used to analyze the interviews responses:

1. Tabulation format
2. Content analysis
3. Frequency analysis

The first method, the tabulation format, is suggested by Silverman (1993); using this format, data is tabulated according to questions. The main purpose of tabulation is to organize the data. The tabulation enables patterns, themes, and categories to emerge from the data according to the questions. As these patterns, themes, and categories emerge, they are interpreted. This interpretation should be done holistically and should be related to the research question (Rossman & Rallis, 2003)

The second analysis method is content analysis. It is worth noting that content analysis is similar to the one used to analyze the open-ended questions of the survey questionnaires (refer to the explanation of the content analysis on page 71).

The third method was the frequency analysis, which was used to analyze the park managers' anticipation of public preferences for wetlands. In the frequency analysis, the researcher counts the frequency with which each scene was chosen by park managers as the most preferred, least preferred, and neither preferred nor disliked. Scenes that received the highest frequency were anticipated to be highly preferred by

the public and vice versa. Information from the interview analysis was used to answer the research questions and to identify strategies for future wetland restoration and conservation efforts.

3.5 SUMMARY

It has been hypothesized that there are differences between the public's opinions regarding wetland restoration projects and those of the experts; this, then, is why there are conflicting views about wetland restoration projects in Kelana Jaya Municipal Park in Kelana Jaya, Malaysia.

To evaluate this hypothesis, preferences surveys were conducted with residents of Section 7, Kelana Jaya and visitors to Kelana Jaya Municipal Park. Besides preferences, survey participants also were asked about their attitudes toward wetlands, knowledge about wetland benefits, opinion about wetland management, and motivation to use urban natural open spaces. Section 7 residents were chosen as participants because their neighborhood surrounds Kelana Jaya Municipal Park. In addition, landscape architects working in the Kelang Valley region also were surveyed. They were asked about their attitudes toward design and planning.

Analyses were done to determine if the variables mentioned above influenced the participants' preferences. To examine the participants' preferences, the category identifying method (CIM) using factor analysis and appropriate statistical procedures, such as ANOVA and regression, were used.

In addition to the survey residents of Kelana Jaya, visitors to the parks, and the landscape architects, the study also included interviews with park managers from several local authorities in the Kelang Valley region. The purpose of the interviews was to examine park managers' attitudes regarding wetland restoration, as well as their attitudes toward the incorporation of the public's needs in the wetland planning and design processes.

The interviews also were used to determine if park managers would be able to anticipate the public's preferences for wetlands and the factors that influence the public preferences. To analyze the interview data, a tabulation method, a content analysis, and a frequency analysis all were used to identify themes and categories that emerged from the data.

The results of the analysis were used to answer the research questions and to propose mechanisms for improving the planning and design process for the wetland restoration and conservation works in Malaysia, particularly for Kelana Jaya Municipal Park. In conclusion, a careful selection of the methods involved in this study was crucial to get a wide range of valid and reliable information that was relevant to the research problems. Specifically, the methods were able to explicitly disclose the public and landscape architects' preferences for wetlands, and allowed a critical comparison of the two groups' preferences to take place. In addition, the methods chosen revealed factors that potentially affect preferences.

CHAPTER 4 : PREFERENCES AND ATTITUDES FOR WETLANDS

This chapter describes people's attitudes toward and preferences for wetland landscapes. The findings are organized around the results of the analyses of the survey of participants' preferences for wetlands, attitudes toward wetland management options and verbal descriptions about what participants most and least like about wetlands. This chapter is divided into three sections. The first section discusses participants' backgrounds. The second section discusses participants' preferences for wetlands and includes an analysis of the most and the least preferred scenes and an analysis of the preferences dimension. The third section discusses participants' attitudes towards wetlands, specifically, their opinions on wetland management options and descriptions of what they most and least like about wetlands. All results have a 95% level of confidence.

4.1 SURVEY PARTICIPANTS

One of the objectives of this study is to determine if the public and landscape architects have different preferences for wetlands in urban natural areas. Altogether 502 participants were surveyed, of which 397 participants were members of the public and 105 participants were landscape architects. Below is the discussion about both participant groups' distributions.

4.1.1 Public Participants

Of the 397 public participants, 277 are residents of Section 7, Kelana Jaya, and the other 120 participants are visitors to the Kelana Jaya Municipal Park (Table 2 for a detailed distribution of the public participants). The ethnicities of public survey participants were: 62.8% Malay, 22.2% Chinese, and 15.0% Indians. The distribution reflects the ethnicity breakdown of Malaysia as a whole which is; (approximately) 60% Malays, 25% Chinese, 10% Indian, and 5% others (Malaysian Department of Statistic, 2001). The public participants' education levels included: 9.5% secondary school, 52.5% certificate/Diploma/STPM, and 28.0% bachelors' degree and above. This demonstrates that the public's level of education is fairly high. Other information related to the public participants' background are gender, age, and monthly income.

Table 2: Public participants' distribution

Participants		Number	Percent
Total public participants		397	100.0
Sub-category			
Type	Section 7 residents	277	69.8
	Visitors	120	30.2
Gender*	Male	239	61.1
	Female	152	38.9
Ethnicity*	Malay	243	62.8
	Chinese	86	22.2
	Indians	58	15.0
Age*	18-20 years (below 20 years old)	45	11.5
	20-40 years	303	77.3
	Above 40 years	44	11.2
Income level*	Below RM1000 a month	57	14.6
	RM1000-3000 a month	216	55.2
	Above RM3000 a month	118	30.2
Education level*	Secondary school	74	19.5
	STPM/Certificate/diploma	199	52.5
	Bachelor and above	106	28.0

*Note: *Some participants did not respond in all categories*

However, for the participants' age, the original six sub-categories had to be collapsed into three because there were not many participants from the original age groups of 41- 50 years old, 51-60 years old, and more than 60 years old. All the participants in these groups were reassigned to a new subgroup, 40 and above. To ensure that the interval for the age variable is consistent, participants in the original sub-group of 21-30 years and 31-40 years old were reassigned into a new subgroup 20-40 years old. No participants under 18 years old were surveyed because the Institutional Review Board (IRB) Office of Research Compliance of Virginia Tech does not allow a survey of minors without special consent.

A similar process also applied to income level, in which there were not many participants from the original income levels of RM5000-7000 and more than RM7000. All the participants in these two groups were reassigned into a new income level group, above RM3000, which they shared with the participants in the original RM3000-5000 income level.

In summary, there is enough public participation for this study to be used for a robust statistical analysis. Further, the distribution of the subgroups shows that Section 7 residents and visitors to Kelana Jaya Municipal Park are diverse. All the public participants' subgroup variables would be tested against the preference dimension to understand if any of them play a role in influencing the public participants' preferences for wetlands.

4.1.2 Landscape Architect Participants

One hundred and five landscape architects in Kelang Valley area were surveyed for the landscape architect sample. This number, 33% of all landscape architects in Malaysia, should be sufficient for a robust statistical analysis. (For a detailed distribution of the landscape architect participants, Table 3). A majority, 94.1%, of the landscape architect participants were Malays, 5.8% were Chinese, and none were Indian. The ethnicity distribution shows that landscape architecture in Malaysia is dominated by Malays. An important question is; are the landscape architects' preferences influenced by the Malay culture and values? Interestingly, the distribution of male and female landscape architects for the survey is nearly even. However, further study is needed to validate the observation above related to the landscape architects' ethnicity and gender distribution in Malaysia.

Related to landscape architects' education, my data shows that 63.8% of the landscape architects received their degree from the Universiti Teknologi MARA, 19.1% from Universiti Putra Malaysia, 6.7% from Universiti Teknologi Malaysia and 10.5% from foreign universities. This is not surprising, as Universiti Teknologi MARA is one of the few universities offering a professional landscape architecture program in Malaysia. Of 105 landscape architects surveyed, 34.6% reported that they have a graduate level education. In addition, only 18.4% of the landscape architects reported that they have a diploma in natural or life sciences. In comparison, 81.6% said they have a diploma in art, architecture or planning[19]. The data shows that those who have a diploma in art, architecture or planning are likely to continue their education in landscape architecture.

[19] Diploma education in Malaysia refers to semi-professional education. Upon finishing the diploma, students have a choice to work or get a bachelors degree.

Table 3: Landscape architect participants' distribution

Participants s		**Number**	**Percent**
Total landscape architects		105	100.0
Sub-category			
Gender*	Male	58	55.8
	Female	46	44.2
Ethnicity*	Malay	95	94.1
	Chinese	6	5.7
	India	0	0.0
Age	18-20 years	0	0.0
	20-40 years	45	45.0
	Above 40 years	55	55.0
Income level	Below RM1000 a month	4	3.9
	RM1000-3000 a month	50	48.5
	Above RM3000 a month	49	47.6
Professional Education*	Universiti Teknologi MARA	67	63.8
	Universiti Putra Malaysia	20	19.1
	Universiti Teknologi Malaysia	7	6.7
	Foreign Universities	11	10.5
Diploma in natural science/life science*	Yes	19	18.4
	No	84	81.6
Diploma in art/architecture/planning	Yes	86	18.9
	No	19	81.1
Graduate education*	Yes	36	34.6
	No	68	65.4
Type of practice	Private consultant	67	63.8
	Civil	7	6.7
	Academic	20	19.0
	Other	11	10.5
Length of practice	Less than 3 years	34	32.4
	4 – 6 years	23	21.9
	7 – 9 years	21	20.0
	More than 10 years	27	25.7

**Some participants did not respond in all categories*

The survey also collected data about landscape architects' type of practice and length of service. The data show that a majority of landscape architect participants work as consultants (63.8%). However, in terms of length of service, the distribution is fairly

even across the subgroup. To reflect the public group, the subgroups of landscape architects' income and age also were collapsed into fewer subgroups.

In summary, there are enough landscape architect participants for the study and for a robust statistical analysis. The landscape architect distributions also show that they were not a diverse group. For example, a majority was Malays, educated locally, and possessed only a bachelor's degree. All of the variables will be tested to see if they affect landscape architect preferences for wetlands.

4.2 PREFERENCES FOR WETLANDS

One of my study's objectives is to examine peoples' preferences for the introduction of wetlands in the urban areas and to determine if the public's preferences are similar to the landscape architects' preferences. To examine both participant groups' preferences, two types of analysis were conducted: an analysis of the most and least preferred scenes, and a preference dimension analysis. This section discusses the results of these analyses.

4.2.1 Analysis of the Most and the Least Preferred Scenes

For both the public and landscape architect groups, scenes were ranked according to their mean scores (see Appendix H see mean scores for all scenes for both participants groups). Consequently, the top eight and the bottom eight scenes from the rankings by both the public and landscape architects were examined further to identify environmental factors that affect preferences. The analysis focused on two aspects of the scenes, the physical content and the spatial organization. Physical content refers to the physical elements present in the scenes, and spatial organization refers to how the spaces and elements in the scenes are arranged. Below is a discussion of the result of the analysis of the most and the least preferred scenes for both participant groups.

4.2.1.1 The most preferred scenes by the public

The wetland scenes rated by public participants were ranked to identify the eight most preferred scenes. The eight most preferred scenes are 62, 19, 61, 16, 37, 63, 20 and 60 (Figure 1). The mean rating score for the scenes is moderately high and ranges between 3.73 to 3.90 on the five point Likert scale (1=dislike, 2 = somewhat

like, 3 = neither like and dislike, 4 = somewhat like and 5 = like). By looking at the scenes, it is apparent that the eight most preferred scenes by the public are parklike landscapes.

*Note: *also most preferred by the landscape architects*

Figure 1: The most preferred scenes by the public

In terms of content, all the scenes have water in them; the color and quality of the water elements varied, but there is no visible litter present in the water. The water looks calm and includes reflections of the surroundings. Another common trait of the water in the scenes is that it is expansive and covers much of the scenes. In addition to the water, the scenes mostly contain large, mature trees which convey a cool shady

environment. None of the scenes has submerged vegetation in or along the water's edge, a common characteristic of natural wetlands. The absence of submerged vegetation causes the edges of the water to look clean and well defined. Signs of human influence also are evident including the presence of buildings, boardwalks, walkways, and seating areas. Many of the structures appear inviting.

In terms of spatial organization, all of the scenes most preferred by the public have high mystery. High mystery is the sense that there is something that could be explored further if one could go farther into the scene. The winding shapes of the shoreline and walkways lead the eye farther into the scenes, causing curiosity, and the desire to explore what is hidden beyond. In addition to the sense of mystery, the scenes are highly legible[20]. High legibility means that the features and areas in the landscape are well defined and distinct. Thus, it is easy for people to make a mental or cognitive map of the landscape. Further, high legibility means that people have an easy time understanding the scenes and orienting themselves. In addition to high mystery and legibility, the scenes appear to be visually complex. In the context of the scenes most preferred by the public, visual complexity is the result of a large variety of landscape features (i.e., trees, water and structures).

From the results of the analysis, it is clear that the public prefers scenes that contain expansive bodies of water, big trees that provide shade and backdrops, clean water edges with no submerged plants, and structures. In addition, they prefer scenes with high mystery, legibility and complexity.

4.2.1.2 The least preferred scenes by the public

The eight least preferred scenes by the public are scenes 25, 22, 12, 24, 34, 14, 23, and 15 (Figure 2). The mean rating scores for these scenes are low, and ranging in between 1.87 to 2.44 using the 5 point Likert scale (1 = dislike, 2 = dislike somewhat, 3 = neither like nor dislike, 4 = like somewhat and 5 = like). In general, the scenes least preferred by the public are the more natural wetland environments.

In terms of content, vegetation was important in the least preferred scenes. The vegetation seemed to be unorganized. Some of the vegetation is tangled, and in the

[20] For further explanation of mystery, legibility and complexity, please refer to Chapter 2: Literature Review

scenes with water, the submerged vegetation growing along the waters edge covers most of the water's surface. With water elements, the scenes preferred least by the public have less visible water or in some scenes, the water was absent altogether.

Figure 2: The least preferred scenes by the public

If water is present, it appears murky or covered by aquatic vegetation. In terms of spatial organization, the vegetation often encloses the scene, making it look dark. With no open spaces or poorly defined edges, the scenes tended to have low legibility. While some of the scenes offer the opportunity for further exploration, there is no clear access into the scene, thus thwarting a sense of mystery. Scenes 24 and 22 are vast open landscapes, but the features that might attract the viewer's curiosity are far away and

lack detail. In addition, access to the scene is blocked by water, so they lack mystery. Because of vegetation, the water's edges are not clearly defined; therefore, the scenes are low in legibility.

Based on the analysis above, the public seems to least prefer natural wetland scenes because they contain vegetations that are tangled and submerged along the water's edges. Furthermore, the submerged vegetation such as lotuses also covers most of the water's surfaces. The public also seems to prefer these scenes the least because water is less visible or absent. In terms of spatial quality, the public least prefers scenes that are too enclosed or too open and lack accessibility.

4.2.1.3 The most preferred scenes by the landscape architects

Similar to those used with the public, the scenes viewed by landscape architects were ranked according to mean scores and the eight most preferred scenes were examined further for common characteristics in terms of content and spatial organization.

The eight scenes most preferred by landscape architects are 38, 46, 50, 48, 16, 58, 13, and 65 (Figure 3). Their mean rating score is high and ranges between 4.15 to 4.36 on the 5 point Likert scale (1 = dislike, 2 = dislike somewhat, 3 = neither like nor dislike, 4 = like somewhat and 5 = like). Landscape architects prefer scenes of wetlands that are more natural and less manicured**.** In terms of the water's appearance, landscape architects prefer scenes that have clear and clean water**.** This can be seen clearly in scenes 46, 50, 48, 58, 13, and 65. Some of the scenes also include aquatic and submerged vegetation covering the water's edge and surface**.**

In terms of spatial organization, landscape architects' most preferred scenes are open, highly legible, high in mystery, and highly coherent. High legibility means the viewer can understand and make sense of the place. High in mystery means the scenes promise viewers information. The mystery is enhanced by winding water edges and trees that partially block the view or where scenes offered extended views of the landscape. High coherence means the elements in the scenes are organized[21].

[21] For further discussion of legibility, mystery and coherence, please refer to Chapter 2: Literature Review

In conclusion, landscape architects prefer scenes that contain natural wetlands with clean water and subtle human influences. The scenes also may contain submerged vegetation. In terms of spatial quality, the landscape architects prefer scenes with high mystery, high legibility and high coherence.

*Note: *also most preferred by the public*

Figure 3: Scenes most preferred by the landscape architects

4.2.1.4 The landscape architects' least preferred scenes

The eight scenes least preferred by the landscape architects are 36, 60, 62, 61, 39, 5, 28, and 29 (Figure 4). The mean rating scores for these scenes range between 2.63 and 3.05. The ratings are moderately high, showing that landscape architects still

enjoy the scenes, but enjoy them less than the others. Landscape architects didn't prefer the scenes because they contained evidence of strong human influences on the landscapes. Interestingly, some of the scenes that are least preferred by landscape architects are most preferred by the public (scenes 60, 61 and 62).

Scene 36
Mean = 3.05
Stand. Dev. = 1.14

Scene 39
Mean = 2.95
Stand. Dev. = 1.17

Scene 60*
Mean = 3.01
Stan. Dev. = 1.46

Scene 5
Mean = 2.89
Stand. Dev. = 1.44

Scene 62*
Mean = 3.01
Stand. Dev. = 1.33

Scene 28
Mean = 2.86
Stand. Dev. = 1.34

Scene 61*
Mean = 2.98
Stand. Dev. = 1.37

Scene 29
Mean = 2.63
Stand. Dev. = 1.27

*Note: * most preferred by the public*

Figure 4: The least preferred scenes by the landscape architects

In terms of content, landscape architects' least preferred scenes had modified or constructed water edges. For example, scenes 36, 60, 39, 28, and 29 have artificial or man-made edges. Some of the scenes contain human structures, such as pergolas, arbors, and buildings. In terms of the spatial quality, landscapes architects seem to least prefer scenes that are low in coherence. The scenes are low in coherence because the

elements do not look properly organized. The elements seem to be scattered all over the place and do not “hang together.”

In conclusion, landscape architects least prefer scenes that show strong human influences, such as scenes that contain constructed water edges and structures. In terms of the spatial quality, landscape architects least prefer scenes that are low in coherence.

4.2.1.5 Comparison of the most and least preferred scenes

Analysis of the most and the least preferred scenes reveals attributes (through the content analysis of the content and spatial quality of the scenes) that influence both participants’ preferences for the most and the least preferred scenes. In summary, the public prefer**s** park-like landscape**s,** expansive water with no submerged plants, big trees for shade, backdrop, and structures that can be used for recreation. The public also prefers scenes that have high mystery, legibility, and complexity. In contrast, the public least prefers natural wetland scenes with less visible water and entangled and submerged plants. The scenes appear enclosed and lack accessibility.

In contrast, the results of my analysis of the most and the least preferred scenes show that landscape architects prefer natural wetlands scenes that contain clean water and submerged plants around the edges and on the water surfaces. On the other hand, landscape architects least prefer scenes that show strong human influences, such as those with constructed water edges and structures. Landscape architects also show less preference for the scenes that are low in coherence.

The results of my analysis of the most and least preferred scenes indicate that there are differences in wetland preferences between the public and landscape architects. One of the differences is related to landscape type, in which the public prefers parklike landscape, whereas the landscape architects prefer natural wetland scenes. Both participant groups prefer scenes with water, but landscape architects appear to like the water in natural wetlands to look cleaned and clear. The public may prefer parklike landscapes because these are scenes that they are probably more familiar with because they see them every day. The differences are further enhanced by the fact that the public least prefers natural wetlands.

The difference also is related to the types and conditions of the vegetation. The public shows a strong preference for scenes with mature trees and no submerged

vegetation, whereas the landscape architects prefer scenes with submerged and floating vegetation. The difference is enhanced further by the fact that the public least prefers natural wetland scenes with submerged plants and entangled vegetation.

The signs of human influence are another factor that affects both groups' differing preferences. The public prefers scenes that appear to have signs of human influence. For example, they prefer scenes that contain walkways and playgrounds. The public may prefer these scenes because they may see the opportunity to become involved with (or use) the landscapes. Meanwhile, landscape architects prefer natural and almost undisturbed scenes and least prefer scenes with strong human influences, such as buildings, structures, and constructed or modified water edges.

Another factor that differs between the public's and landscape architects' preferences is visual characteristics. The public shows strong preference for scenes with high visual complexity, meaning there are varieties of landscape elements in the scenes. Landscape architects prefer visually complex scenes with high coherence.

The scenes' spatial qualities also affect both participants' preferences for the most and least preferred scenes. The public least prefers scenes that are either enclosed or dark, or vast, open, and expansive views. This may be because these spatial qualities make the scenes less accessible. However, both the public and landscape architects show strong preferences for scenes that have strong qualities of mystery and legibility.

In conclusion, the public and landscape architects differ in their preferences for wetlands. Both participant groups react differently to the type of wetland landscapes, the type and condition of vegetation, the signs of human influence, and visual characteristics. However, they were found to react in a similar manner to the types of spatial qualities. The findings above reaffirmed the study's assumption that there are perceptual differences between the public and the experts (i.e., landscape architects) related to wetlands and the restoration of wetlands in urban areas, and this difference may cause problems with wetland restoration programs. To further validate and to triangulate the findings above, preferences dimension analyses were performed on both participants groups' preferences ratings**.**

4.2.2 Preferences Dimension Analysis

This section discusses the results of my preferences dimension analysis for both the public and landscape architect groups. Preferences dimension analysis involves four procedures**:**

1. Factor analysis/ content identifying method (CIM) to determine preference dimensions - to group scenes according to the participants' consistent pattern of reaction to a group of scenes caused by some common stimulus in each scene.
2. Calculating a mean preference for each dimension based on the mean values of the scenes contained in each dimension - to rank the preference dimensions according to preference rating magnitude.
3. Content analysis of the dimensions - to reveal the stimulus or environmental factors that affect preference.
4. Content analysis of participants' verbal descriptions of selected scenes from different dimensions - to further validate factors that affect preference.

For further explanation of preference dimension analysis, please see Chapter 3. Because the results of analysis of the most and least preferred scenes suggest significant differences in the preferences of the public and landscape architects, it was reasonable to believe that factor analysis would extract different dimensions for the public and the landscape architect groups**.**

4.2.2.1 Public preferences dimensions

Factor analysis extracted five dimensions (Table 4) from the public's preferences for wetland scenes. The dimensions were ranked according to their mean scores, and the results show that the mean for preference dimension 1 (parklike; water with pleasant place), is significantly higher than the other preferences dimensions. Conversely, the mean for preference dimension 5 (natural wetlands; access block) is significantly lower than the other preferences. Meanwhile, there is a subtle mean difference amongst preference dimensions 2, 3 and 4. The public dimensions have a medium to high value of Cronbach alpha (ranging between 0.79 to 0.93), indicating that

the scenes within a dimension are highly correlated with each other, thus providing dimensions that are highly reliable and coherent**.**

Table 4: Public preferences dimensions

Rank	Dimension name (number of scenes)	Mean	S.D	Alpha
1	Parklike setting with water; pleasant places to be (20)	3.53	0.62	0.93
2	Parklike, access block (10)	3.08	0.73	0.86
3	Natural wetlands with smooth ground texture (4)	2.92	0.81	0.81
4	Dirty water (11)	2.91	0.72	0.89
5	Natural wetlands; access block (5)	2.31	0.72	0.79

The dimensions were named by the researcher according to the scene contest or spatial organization that best described each dimension as a whole. The content and spatial organization of each dimension is described further below in the order of their mean preference for all the scenes included in the dimension.

Public preferences dimension 1: Parklike setting with water; pleasant places to be

Twenty scenes formed this dimension (Figure 5), and it received the highest preferences rating (mean = 3.53). The common characteristic of the dimension is parklike landscapes with large expanses of water. The water appears calm and pleasant. It is not surprising that water is an important aspect in the most preferred dimension because many studies have found water to be an important factor affecting preference. In addition to water, vegetation is prominent in the scenes, providing places for comfort and shade**.**

However, the most important factors related to vegetation are that it looks as if it has been maintained or taken care of; it does not appear to be scruffy and unkempt. The scenes in dimension 1 appear to receive regular maintenance, such as lawn mowing and vegetation trimming, as well as litter pick up, because the scenes look clean and in order. In addition to vegetation and water, a majority of the scenes have park features such as playgrounds, walkways, boardwalks and park benches.

Scene 20
Mean = 3.74
Loading = 0.93

Scene 36
Mean = 3.44
Loading = 0.66

Scene 19
Mean = 3.86
Loading = 0.88

Scene 61
Mean = 3.84
Loading = 0.62

Scene 64*
Mean = 3.55
Loading = 0.72

Scene 21
Mean = 3.64
Loading = 0.59

Scene 37
Mean = 3.76
Loading = 0.98

Scene 60
Mean = 3.74
Loading. = 0.57

Scene 30
Mean = 3.52
Loading = 0.70

Scene 56
Mean = 3.17
Loading = 0.56

Figure 5: Public preferences dimension 1. Parklike setting with water; pleasant places to be (continue)

*Note: * included in the participants' verbal analysis*

Figure 5: Public preferences dimension 1. Parklike setting with water; pleasant places to be

In terms of visual characteristics, the scenes in this dimension are high in complexity. Visual complexity refers to the presence of several landscape features such as park structures, water, and several types of vegetation. In addition to visual

complexity, scenes in the public preference dimension 1 also are visually coherent. The varieties of features in the scenes are organized, meaning people can distinguish one feature from another. In terms of spatial organization, the scenes in this dimension are high in mystery. The quality of mystery is enhanced by the lake edges (in some scenes, walkways) that wind further into the scenes, leading the eye to explore and entice people to venture into the scenes further**.**

Verbal description of public preferences dimension 1

To elicit participants' verbal descriptions about the wetland scenes, fifteen scenes representing various categories and sub-categories of stimulus were included in the preferences survey questionnaire. Participants from both groups were asked to describe the scenes in one or two words. After the factor analysis process, it was found that five of the fifteen scenes (16, 17, 32, 43 and 64) fell under public preferences dimension 1(Figure 5).

A majority of the descriptions by public participants related to the aesthetic quality of the scenes; 72.8% described the scenes as aesthetically pleasing. The words used by the public to describe the scenes as aesthetically pleasing included "beautiful" and "interesting." Maintenance was the second most frequent descriptive category used (9.0%), and a majority of the descriptions related to maintenance described the scenes in the dimension as "good", "clean", "maintained", and "neat".

The public also described the scenes in terms of the water, and water is the third most frequent descriptive category used. Surprisingly, most of the descriptions mentioned the poor quality of the water (6.0%) rather than its good qualities (3.4%). Participants used words like "dirty", "murky" and "smelly" to describe the negative quality of the water. However, negative comments related to the water quality were mostly used by residents of Kelana Jaya. Perhaps they were expressing their dissatisfaction with the current condition of water in the lakes at Kelana Jaya Municipal Park, which is polluted. It is interesting to note that 2.4% and 2.5% of the descriptions were related to the suitability of the areas for recreation and park structures. This suggests that public participants see the scenes in this dimension as being compatible or suitable for recreation and leisure. For a detailed description list of the public verbal descriptions, refer to Appendix I.

The results of the public verbal description content analysis for preference dimension 1 support the content analysis of the scenes of preference dimension 1. The public looked at the maintenance level, water, facility, and structures for recreation. Furthermore, the high percentage of descriptions related to aesthetic quality shows that the public reacts to spatial qualities and visual characteristics of the scenes that enhance the pleasant quality of the scenes.

Public preferences dimension 2. Parklike access block

Ten scenes were contained in the parklike with blocked access dimension (Figure 6). This dimension received the highest preference rating (mean = 3.08). The common characteristic of the scenes in this dimension is the parklike landscape.

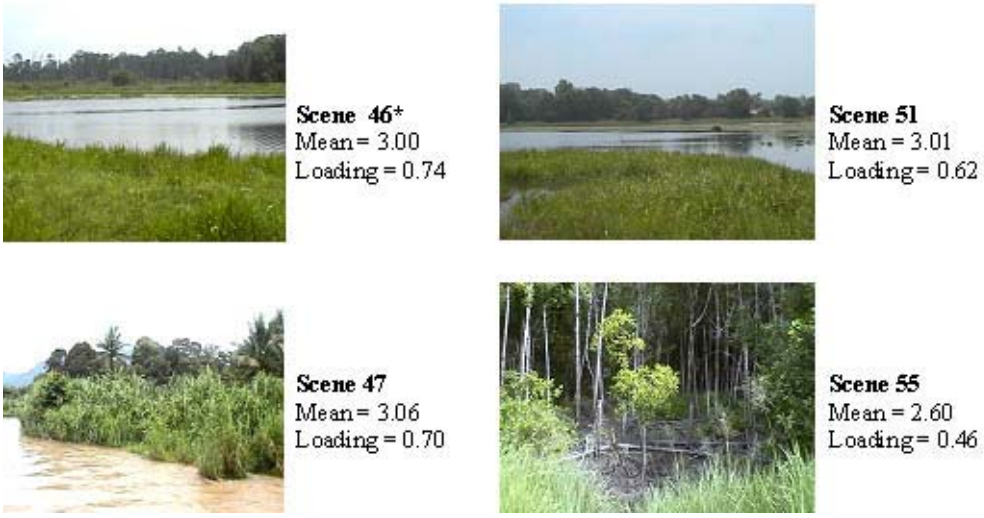
However, unlike the parklike scenes in the public preference dimension, the scenes in this dimension have scruffy water edges. While there may be a potential for further exploration because of the relatively open parklike landscape in most of the scenes, access is blocked by water or vegetation. The water edges of the scenes are covered with rock and scruffy or submerged vegetation.

The perceived lack of access reduces the sense that one could go farther into the scene, thus lowering the sense of mystery. However, most of the scenes in this dimension have relatively high legibility. The viewer easily could make sense of these landscapes. In addition to legibility, scenes in this dimension also are complex visually but low in coherence. The features in these scenes seemed to be less organized. This is one of the reasons that preference dimension 2 is rated lower than preference dimension 1, even though both contain parklike landscape scenes. None of the scenes from this dimension was in the subset for which participants provided verbal descriptions.

Figure 6: Public preferences dimension 2. Parklike access block

Public preferences dimension 3. Natural wetlands with smooth ground texture

There were four scenes in the natural wetlands with smooth ground texture dimension (Figure 7), and it received the third highest preferences rating (mean = 2.92). The scenes in this dimension contain natural marshland and mangrove wetlands.



*Note: * included in the participants' verbal analysis*

Figure 7: Public preferences dimension 3. Natural wetlands with smooth ground texture

However, as reflected in the name, the scenes in this dimension have smooth and fine ground texture. This situation can be seen in scenes 46 and 51, in which the grasses provide fine texture and the textural quality is enhanced by water. The situation is similar to scene 55, in which the grasses in the foreground are fine in texture. In addition, the mangrove leaves also have a fine textural quality. In scene 47, the papyrus and reed-like vegetation behind the water also is fine in texture. According to Ulrich (1983), the fine and smooth texture of the material affects people's preferences, and Ryan (1997) found that fine texture affects people preference for natural scenes.

However, despite having fine texture, the scenes in this dimension have moderately low legibility because there are few well-defined spaces and the edges are irregular. In addition, the landscape is relatively flat, with few distinguishing characteristics. It would be difficult to make a cognitive map of this landscape, and thus it has relatively low legibility. The scenes in this dimension also are relatively low in mystery because the view farther into the scenes is blocked by the orientation of the water, which is parallel with the viewer's eyes. There are no elements that can further entice viewers into the scenes. However, scenes in this dimension visually are coherent. The wetlands, the water, and the nature backdrop are distinct from each other, but organized.

Verbal description of public preferences dimension 3

One scene (scene 46) from the public, natural wetlands with smooth texture: access block dimension, was included in the subset of scenes for which the public provided descriptions (Figure 7). According to the data, the most frequent descriptive category used to describe the scenes was “aesthetically pleasing” category (66.0%). In comparison, only 8.2% of the respondents described the scene as not aesthetically pleasing. The words used to describe the scenes as pleasing aesthetically were, for example, “beautiful”, “interesting”, and “tranquil”. Quiet and tranquil refer to the natural and undeveloped state of the landscape, whereas fresh, beautiful, and interesting refer to the clean and clear water in some of the scenes.

The second most frequent description referred to the vegetation (17.9%) and included words such as “long grasses”, “bushy”, and “weeds”. Participants did not refer to the textural quality of the vegetation, but it is important to note that they noticed the vegetation as an important stimulus in the scene and thus validated the scene content analysis. The negative components of the scenes, such as “low maintenance” and “unmanaged”, was the third most frequent description category in the content analysis (7.1%). For a detailed description list, refer to Appendix I.

Public preferences dimension 4. Dirty water

Eleven scenes formed the public preference dimension 4, dirty water (Figure 8). This dimension ranked fourth among the public preference dimensions (mean = 2.92). The common characteristics of scenes in this dimension relate to the quality of the water in one of two ways, either the water has a brown, dirty appearance, or there is aquatic vegetation in or along the water's edges. The water is murky and, in some instances, contains dead leaves.

In terms of spatial organization, the scenes in this dimension are relatively high in legibility, meaning that people can see through the landscapes and make sense of the environment. This is because the scenes have distinguishing features, such as boardwalks, buildings, rocks, and walkways that can guide them through the landscapes. These features become landmarks for the environment.

Scene 41*
Mean = 3.03
Loading = 0.84

Scene 27
Mean = 2.63
Loading = 0.60

Scene 6
Mean = 2.70
Loading = 0.81

Scene 29
Mean = 2.91
Loading = 0.53

Scene 18
Mean = 3.23
Loading = 0.73

Scene 12
Mean = 2.42
Loading = 0.50

Scene 67*
Mean = 2.70
Loading = 0.72

Scene 13
Mean = 2.80
Loading = 0.50

Scene 65*
Mean = 3.06
Loading = 0.70

Scene 39
Mean = 3.32
Loading = 0.42

Scene 44*
Mean = 2.63
Loading = 0.60

*Note: * included in the participants' verbal description analysis*

Figure 8: Public preferences dimension 4. Dirty water

Verbal description of public preferences dimension 4

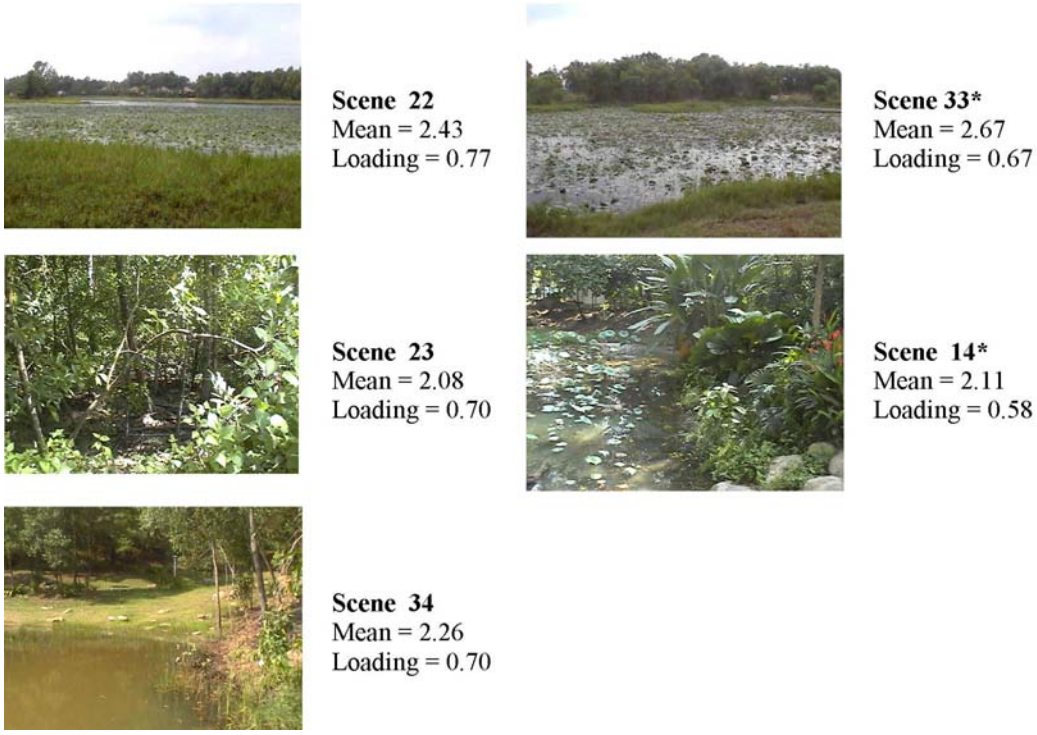
For the public preferences dimension 4, dirty water, four scenes (8, 12, 13, and 14) were included in the participants' verbal analysis (Figure 8). The most frequently cited descriptions by the public for the scenes in the dimension were aesthetically pleasing quality of the scenes (52.1%). The words used to describe the aesthetic quality of the scenes were "calm," and "beautiful." Interestingly, the second most frequently cited category was aesthetically not pleasing (15.2%) and participants used words like "hot," "bad," and "not okay."

Parallel with the scenes' content analysis results, water was the third most frequently cited category (9.8%) and public participants described the water in negative ways such as "dirty water," "murky water," and "bad water quality." The perceived dirty condition of the water likely relates to the fourth most frequent description category, maintenance (9.3%), in which all the words used in the category related to poor maintenance levels such as "no maintenance," and "dirty." For the full list of descriptions for the dimension, refer to Appendix I.

Public preferences dimension 5. Natural wetlands, access block

This dimension received the lowest preferences rating mean score (mean = 2.31) and five scenes (22, 23, 34, 33, and 14) formed the dimension (Figure 9). As reflected in the name of the dimension, all the scenes in the dimension are natural wetlands, but viewers cannot enter the scenes visually or physically. Two of the scenes are mangrove wetlands (scenes 23 and 34) and the rest are marshlands with marsh grasses and lotuses covering the water surfaces (scenes 22, 33 and 14).

One of the characteristics of the scenes in this dimension is the crisscrossing of the vegetation, which makes it look tangled. The tangled vegetation blocks the viewers from entering the spaces, and prohibits use. Further, the scenes in dimension 4 have less or no visible water because the water was replaced with or covered by mud and surface vegetation. The public might know that there is water under the lotuses, but the conditions perhaps make them unsure what to expect from the scenes because they cannot see directly into the water. As a result, viewers cannot predict the consequences that they may face if they enter the areas.



*Note. *included in the verbal description analysis*

Figure 9: Public preferences dimension 5. Natural wetlands, access block

Therefore, besides the lack of water, the scenes in this dimension have low legibility and mystery. The absence of these two spatial qualities makes it hard for the public to understand the environment, and thus they would hesitate to enter and use the scenes. In addition to the lack of legibility and mystery, the scenes in dimension 4 are low in complexity and coherence. According to S. Kaplan and R. Kaplan (1982), scenes that are high in coherence but low in complexity can bore the viewers.

Verbal description of public preference dimension 5

Two scenes from this dimension (14 and 33) were in the subset of scenes for which the public provided verbal descriptions (Figure 9). For this dimension, descriptive terms related to aesthetically displeasing characteristics were used more frequently (38.0%) than descriptions related to aesthetically pleasing (19.3%) characteristics.

Among words used to describe aesthetically displeasing characteristics were "not okay," "not beautiful," "not interesting," and "I don’t like." Negative descriptions about maintenance levels also were cited frequently by public participants (13.3%),

who used words like "dirty," "not maintained," and "smelly." Descriptions related to water were the fourth frequently cited category (12.0%), but public participants described the water as "dirty," "muddy," or "no water" (for scene 23). Interestingly, participants also described the scenes in term of the vegetation (6.4%), in which they relate the organization for the vegetation as "messy" and "not arranged" (2.8%). For the list of the descriptions for the dimension, refer to Appendix I.

The results of my analysis validate the previous scenes' content analysis results, which suggest that the stimuli important for preference dimension 5 are the absence of water, the lack of visual characteristics, and poor organization and condition of the vegetation.

Summary and conclusion of the public preferences dimensions analysis

Based on the public's preferences rating, five preference dimensions were extracted by factor analysis or content identifying method (CIM). According to the dimensions preferences means score, the highest rated dimension is preferences dimension parklike setting with pleasant places to be (mean = 3.53), followed by preferences dimension parklike access blocked (mean = 3.08), preferences dimension natural wetlands with smooth ground texture (mean = 2.92), preferences dimension dirty water (mean = 2.91), and preferences dimension natural wetlands: access blocked (mean = 2.31). The ranking of the preferences dimensions according to their preferences rating means suggests that the public highly prefers parklike landscape (preferences dimension 1), moderately prefers the dimension consisting of both the parklike and natural wetlands (dimensions 2, 3 and 4), and least prefers natural wetlands (dimension 5).

The results of the preference dimension ranking suggest that public participants prefer preference dimensions that contain parklike landscape scenes. This preference can be seen by looking at the top two ranked dimensions, which are parklike landscape scenes. These results validated the findings of the most and least preferred scenes analysis, in which the public showed higher preferences for the parklike landscapes in comparison to the natural wetlands.

Table 5: Summary of the public preferences dimension ranking and analysis

Dimension (mean)	Analyses	Contents	Spatial organization
1. Parklike setting with water: pleasant places to be (3.53)	Content and spatial organization	Open and expansive water, tame nature, no submerged vegetation, park structures, no litter	High mystery, complexity and coherence
	Public descriptions	Good maintenance and cleanliness, water, park facility and structures	Aesthetically pleasing (beautiful, serene, good),
2. Parklike: access block (3.08)	Content and spatial organization	Scruffy vegetation, rock and submerged vegetation along water edges	Legible, complexity, low coherence, less accessible to the water
	Public descriptions	**Not available**	
3. Natural wetlands with smooth ground texture (2.92)	Content and spatial organization	Natural wetlands, fine ground textures, clean and clear water features	Open, coherence
	Public descriptions	Vegetation, maintenance, naturalness, good water quality	Aesthetically pleasing (fresh, quiet, tranquil)
4. Dirty water (2.91)	Content and spatial organization	Poor water quality, submerged vegetation, scruffy vegetation along the edges, broken edges, distinct features: building, rock, boardwalk	Legible
	Public descriptions	Poor water quality, poor maintenance, vegetation	Aesthetically pleasing (calm, beautiful)
5. Natural wetlands: access block (2.31)	Content and spatial organization	Natural wetlands, tangled vegetation, submerged vegetation, less visible water	Low legibility, low mystery, low complexity
	Public descriptions	Less visible water, organization condition of the vegetation	Aesthetically not pleasing

To reveal the reasons why the public prefers the leaving wetlands landscape the way it is, the scenes in each dimension also were analyzed for their content and spatial organization. In addition, the dimensions also were analyzed based on participants' verbal description. The analyses of content and spatial organization, as well as the analysis of the public's verbal descriptions of the selected dimensions scenes provide the underlying reasons for how several environmental characteristics affect public preferences (refer to Table 5 for the summary of the public preference dimension analysis).

Based on the public preferences dimension analysis, the public seemed to prefer parklike landscapes and least preferred natural wetlands; few environmental characteristics were found to be important in influencing their preferences. The environmental characteristic can be described according to the content, the spatial quality and visual characteristics.

Regarding content of the scenes, analysis suggested that the public prefers scenes that have water present. This can be seen in public participants' strong preferences for scenes in dimensions 1 and 2, which have expansive water bodies. In addition to size, the public also prefers clean water based on little public preference for dimension 4 and 5, in which the water is dirty, muddy, or simply absent. Furthermore, water in preferences dimensions 4 and 5 appears to be stagnant. Cleanliness of water is one reason that preference dimension 3 is ranked higher than preference dimensions 4 and 5.

Another content of the scene that affects public preference is the condition of the vegetation. The public shows strong preferences for scenes that have tamed vegetation, such as the scenes of preference dimension 1. The suggestion also is supported by the fact that the public shows displeasure with scenes that have scruffy, submerged, and floating plants.

Cleanliness and good maintenance are other factors that affect public preferences. They prefer scenes that appear have no litter, organized, and not broken. Furthermore, they show strong preferences for scenes with mowed lawns. Lastly, the public participants prefer scenes that have park facilities, such as playgrounds, walkways, benches, and utility buildings. The scenes in dimension l, which have all these facilities and park structures, convey a sense to the viewer that the landscape affords or provides opportunities for use and supports human leisure and recreation activities.

In terms of spatial qualities, both mystery and legibility are important for the public. The results suggest that scenes in public preference dimension 1 are high in mystery, whereas the scenes in public preference dimension 2 are high in legibility (these two preference dimension were rated higher than the other preference dimensions). Mystery and legibility evoke people's desires to further venture into the scenes. Mystery and legibility are very important for the wetland environments to be

preferred by the public, as the two preference dimensions that represent natural wetland scenes (3 and 5), do not display strong mystery and legibility.

Last, in term of visual characteristics, the public reacts positively to scenes that visually are coherent. Coherence clearly affects public preference for preference dimensions 2, 3, 4, and 5. For preference dimensions 2 and 4, the scenes are visually complex, but they are low in coherence. The elements in the scenes are not well organized or defined, and thus lowering participants' preference ratings. In preference dimension 3, the scenes are highly coherent. In preference dimension 5, the scenes are less complex but highly coherent and thus unexciting. Furthermore, the public's verbal description analyses show that the public described the scenes in dimensions 2, 4, and 5 as crowded, messy, and unorganized, showing that they are concerned about the lack of visual coherence.

In conclusion, from the public preference dimension analysis, it is possible to conclude that the public prefers scenes of parklike landscapes to natural wetland scenes. Among the factors found to significantly affect public participants' preferences are the presences of water, tamed vegetation, good maintenance, and cleanliness. They also prefer scenes that have park structures and facilities because of the potential for involvement. The effect of these factors on public preferences shows that the public prefers scenes that have signs of human influence. In addition, they also prefer scenes with mystery, legibility and visual coherence.

4.2.2.2 Landscape architects' preferences dimensions

This section discusses the analyses and findings related to landscape architects' preferences for wetlands. A factor analysis was completed on the wetland preference rating of landscape architects; altogether, five preference dimensions were extracted (Table 6). The dimensions have medium to high Cronbach alpha values (range between 0.78 to 0.97), suggesting that the scenes within a dimension are highly correlated with each other, hence the dimensions are reliable and coherent. Names were given by each dimension according to the characteristics that best describe the dimensions. The analysis of landscape architects' preferences dimension means shows that all of the landscape architecture preferences dimensions means are high. This is because the

lowest preferences mean score is 3.27, a value above the Likert scale mid-point of 3.0 (neither dislike nor like).

Table 6: Landscape architects' preferences dimension

Rank	Dimension name (number of scenes)	Mean	S.D	Alpha
1	Diverse natural vegetation (3)	4.16	0.67	0.78
2	Visually pleasing wetlands (6)	4.02	0.64	0.81
3	Natural wetlands (6)	3.95	0.79	0.85
4	Natural wetlands with scruffy vegetations (4)	3.88	0.79	0.79
5	Human influences (28)	3.27	0.88	0.97

The ranking of landscape architects preference dimensions shows that preference dimension 1 (diverse natural vegetation) has the highest mean rating and preferences dimension 5 (human influence) has the lowest mean rating. However, further descriptive analysis of the means shows that the means for landscape architects' preference dimension 1, 2, 3, and 4 were not different very much. Only 0.28 units separate dimension 1, the most preferred dimension, from dimension 4, the second least preferred dimension. However, there is a large difference between the means of dimensions 1, 2, 3, and 4 and the mean of dimension 5.

The results were interesting because landscape architects' preferences dimensions 1, 2, 3, and 4 were all related to different aspects of natural wetland scenes, whereas preference dimension 5 was related to human-influenced landscapes. The landscape architects' preferences, like the public dimensions, underwent content analysis to reveal the stimuli that affect landscape architects' preferences. In addition, landscape architects' verbal descriptions of wetlands scenes also were analyzed.

Landscape architects' preferences dimension 1. Diverse natural vegetation

The first landscape architects' preferences dimension is diverse natural vegetation. This dimension has the highest preference rating (mean = 4.16), and there are three scenes that comprise this dimension (Scenes 12, 14, and 38) (Figure 10). The common content of scenes in this dimension is diverse, natural vegetation. The scenes in this dimension contain many types of wetland vegetation. Because the scenes are from a relatively low vantage point, viewers can see a great deal of detail, such as

individual plants and the color and texture of the foliage. The vegetation in these scenes is not manicured. It looks very natural.

Scene 38
Mean = 4.356
Loading = 0.90

Scene 14*
Mean = 4.09
Loading = 0.61

Scene 12
Mean = 4.04
Loading = 0.73

*Note. *included in the participants' verbal description analysis*

Figure 10: Landscape architects' preferences dimension 1. Diverse natural vegetation

The scenes in this dimension do not have highly visible water because the surface of the water is covered with floating, surface and emergent aquatic vegetation. The different types of vegetation and the variety of colors and textures cause theses scenes to be visually complex. In addition to the complexity, the scenes are highly coherent, meaning that the composition of landscape features is in order and landscape features hang together.

Verbal description of landscape architects' preferences dimension 1

Landscape architects were asked to provide a word or two that best describes each scene for a subset of the scenes used in the rating preference. The subset included fifteen scenes selected to represent various stimuli and sub-stimuli of the wetland scenes used in the preference survey**.** From the factor analysis, of dimension 1, only one scene (number 14) was part of the subset (Figure 10).

Landscape architects frequently described the scene for its naturalness (40.0%) and used words like "nature," "green," "tropical" and "lush green." The second most frequent category is aesthetically pleasing (15.0%), in which participants described the scenes with words like "nice," "peaceful," "lively," and "calm." In comparison, only 11.0% of the descriptions fell into the category of aesthetically not pleasing, in which participants used words like "sorrow" and "too much" to describe the scene. 11% of the

descriptive words referred to the vegetation as "a mixture of vegetation," "too many types of vegetation" and "the vegetations are too dense." These descriptions are consistent with the idea of visual complexity. Another category that is consistent with the idea of visual complexity is design organization, in which landscape architects used words such as "complexity," "crowded," and "texture" to describe the scene. For the full list of landscape architect participants descriptions, refer to Appendix J.

Landscape architects preferences dimension 2. Visually pleasing wetlands

The second highest mean preference (4.02) is for dimension 2, visually pleasing wetlands. Six scenes (25, 45, 57, 58, 65, and 67) are loaded into dimension 2 (Figure 11). In terms of content, the scenes primarily are natural wetlands. They have aquatic vegetation along the shoreline and in the water, and this seems to enhance the naturalness of the scenes. Although there are man-made features in some of the scenes, they do not visually dominate. They are subordinate to the natural character of the landscapes.

Scene 57
Mean = 4.05
Loading = 0.81

Scene 65*
Mean = 4.15
Loading = 0.50

Scene 58
Mean = 4.21
Loading = 0.79

Scene 67*
Mean = 3.85
Loading = 0.47

Scene 45
Mean = 4.93
Loading = 0.57

Scene 25*
Mean = 3.93
Loading = 0.46

*Note. * included in the participants' verbal analysis*

Figure 11: Landscape architects' preferences dimension 2. Visually pleasing wetlands

Mystery is an important characteristic of this dimension. The sense of mystery is created by the alignment of the water features or pathways that wind through the scenes, thus leading viewers' eyes farther into the landscapes. In addition to the mystery, the scenes in the dimension are highly legible. Viewers easily can understand and make sense of the environments in the scenes. There are distinct features in the scenes such as rocks, islands, marshes, and light poles that can guide people in the environment. In addition to legibility and mystery, the scenes in the dimension are visually coherent. Landscape elements are well organized, which helps the space look well defined. Visual coherence enhances the legibility of the environment.

Verbal description of landscape architects' preferences dimension 2

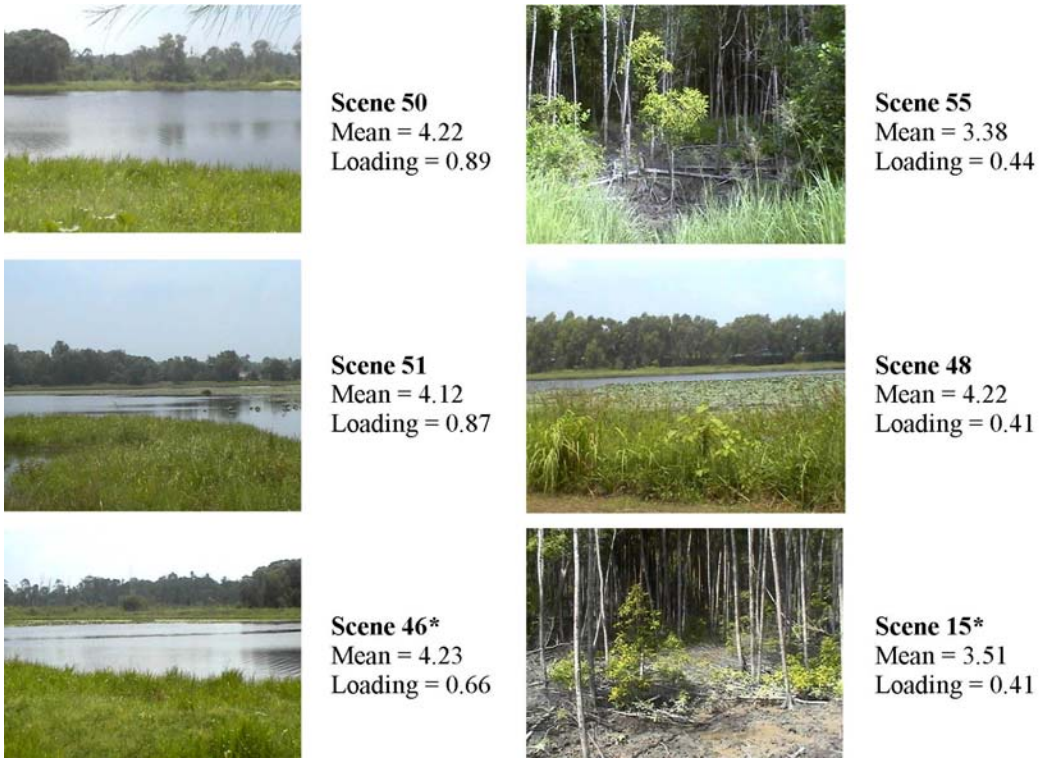
For the visually pleasing wetlands dimension, three scenes (25, 65, and 67) from dimension 2 (Figure 11) were included in the subset for which descriptive words were provided. Landscape architects mostly described the scenes in the dimension as aesthetically pleasing (30.4%), the most frequent category. This is consistent with the content analysis suggestion that concludes the scenes are aesthetically pleasing. Participants used words like "tranquil," "peaceful," and "unique" to describe the scenes.

The second most frequent descriptor (15.5%) referred to the naturalness of the scene and included words like "natural," and "green." The third most frequent description category is design quality (12.5%), which included words such as "order," "harmony," and "balance." Other categories that described scenes' content analysis are landscape type (8.5%) and spatial organization (4.4%).

In the landscape type category, landscape architects described the scenes as wetlands and natural lake. The result shows that landscape architects recognize the areas as natural wetland areas. In the spatial organization category, landscape architects described the scenes as "coherent," "legible," and "open." For the full list of descriptions, refer to Appendix J.

Landscape architects' preferences dimension 3. Natural wetlands

The third landscape architect preference is natural wetlands. This dimension had the third highest preferences rating (mean = 3.95) and the scenes in this dimension are 15, 46, 48, 50, 51, and 55 (Figure 12).



*Note. * included in the participants' verbal analysis*

Figure 12: Landscape architects' preferences dimension 3. Natural wetlands

Obviously, natural wetland scenes dominate this dimension: natural mangrove and marshland wetlands. The dominant characteristic of these scenes is their naturalness. They lack mystery because they do not have visual elements that can pull viewers in. They also lack legibility because the elements in the scenes are not well defined and there is no distinct feature that can be used as a landmark. Furthermore, they lack the pleasing visual characteristics of dimension 2.

Verbal description of landscape architects' preferences dimension 3

For the natural wetlands dimension, two scenes (15 and 46) in the dimension were among those that landscape architects provided descriptive words for (Figure 12). Landscape architects frequently describe the scenes as aesthetically pleasing (28.0%); in comparison, only 3.5% of the descriptions were included in the aesthetically not pleasing category. Landscape architects described the scenes as "serene," "cool," "tranquil," and "peaceful."

The second most frequent descriptors of this dimension referred to the scenes' naturalness (20.2%) and they described the scenes as "natural," "untouched nature," and "green." Consistent with the scenes' content analysis, landscape architects described the scenes according to their landscape type (7.0%), such as wetlands, swamps, mangroves, and forest. There also were descriptive words that referred to the spatial organization of the scenes. However, the words seemed to fall into two groups; one was for scene 46, which landscape architects described as "open" and "panoramic." Second was scene 15, which landscape architects described as "enclosed," "dark," and "too deep."

This is very revealing. To have two scenes with such very different organization characteristics in the same dimension confirms that this is not a common stimulus. Therefore, this dimension is not about organization. Dimension 2 was primarily natural scenes with pleasing aesthetic qualities. Dimension 3 was simply natural scenes without the other qualities mentioned above; aesthetically pleasing, naturalness, and wetlands. For the full list of the description, refer to Appendix J.

Landscape architects' preferences dimension 4. Natural wetlands with scruffy vegetations

The fourth dimension for landscape architects is natural wetlands with scruffy vegetation. Four scenes (23, 24, 33, and 47) loaded into this dimension, and the mean preference for this dimension is 3.88 (Figure 13).

Scene 24
Mean = 3.90
Loading = 0.77

Scene 23
Mean = 3.83
Loading = 0.66

Scene 33*
Mean = 3.91
Loading = 0.66

Scene 47
Mean = 3.90
Loading = 0.46

*Note. *Scenes included in the participants' verbal description analysis*

Figure 13: Landscape architects' preferences dimension 4. Natural with scruffy vegetation

The scenes in landscape architects' preference dimension 4 contain natural wetlands, three of which are marshlands and one of which is a mangrove wetland. They vary greatly in their visual appearance. However, all of them have natural or rather scruffy vegetation including mangrove trees, aquatic vegetation, and scruffy shorelines. They do not have a manicured appearance. Therefore, the common content of these scenes is their natural character, together with scruffy vegetation.

In terms of spatial organization, the scenes have relatively low legibility and mystery. In all the scenes, access farther into the scene is blocked by water or vegetation. Therefore, the scenes present few opportunities for further exploration and are low in mystery. The scenes are low in legibility. Spaces are not well defined, edges are irregular, and there are few distinguishing landmarks. Viewers would have a difficult tine forming a cognitive map of these landscapes.

Verbal description of landscape architects' preferences dimension 4

One scene from dimension 4, natural with scruffy vegetation, was part of the verbal description analysis; this is scene 33 (Figure 13). The most frequent descriptor for this preference dimension is naturalness (16.2%), and most of landscape architects just describe the scene as natural. Landscape architects liked the natural character of the scene, so the second frequently used category was aesthetically pleasing (15.2%), followed by vegetation (13.1%).

Landscape architects described the scene as aesthetic and they used words like "unique," "nice," and "natural beauty." For the vegetation, consistent with the results from the scene content analysis, landscape architects described the scene's vegetation as "lotus", "bushes" and "plant succession". They also described the scene from the design organization point of view (5.0%), in which they described the scene as "messy," "crowded," "enclosed," and "havoc." These descriptions are consistent with the scenes content analysis, which suggests the dimension is dominated by natural wetlands with scruffy vegetation. In recognizing the natural wetlands in the scenes, landscape architects also described the scene as an area for fish and wildlife habitat (11.1%).

In summary, landscape architects recognized the scenes for their naturalness, and importance for habitats. At the same time, they also recognize that the scenes contained scruffy vegetation (design organization). This confirms that the natural

characteristic of the scenes was important to landscape architects. For the full list of the descriptive themes, refer to the Appendix J.

Landscape architects' preferences dimension 5. Human influences

The least preferred landscape architect preference dimension is human influence, and 28 scenes loaded into this dimension (Figure 14). The mean for this dimension is 3.27. Scenes of parklike landscapes made up the majority of the scenes in this dimension. Signs of human influence in the landscape are the common characteristic of the scenes in this dimension, and the signs included buildings, park structures, walkways, and benches.

In addition, human influence is evident in the maintenance of the landscapes, such as manicured vegetation, mowed lawns, altered slopes, and constructed water edges. Poor water quality is another characteristic of many of these scenes. The water tends to be murky and brown. This may have been perceived to be the result of human influence or activities. In terms of spatial organization, mystery and legibility are the common qualities present in the scenes. However, signs of human influences were overwhelming compared to the spatial characteristics of mystery and legibility.

Verbal description of landscape architects' preferences dimension 5

Six scenes (17, 32, 41, 44, 64, and 66) from preferences dimension 5 were part of the subset of scenes that landscape architects had provided with descriptions (Figure 14)**.** The most common category of words used by landscape architects to describe these scenes referred to the naturalness of the scenes (20.2%)**.** However, the landscape architects described the scenes not for their green naturalness, but rather their unnatural character. They used words such as "too hard," "not natural" and "artificial landscape**."** The second most frequent category was aesthetically pleasing (19.2%). Landscape architects described the scenes as "nice," "comfortable," "shady," and "refreshing". The results show that, despite being labeled as "unnatural," landscape architects still regard these as scenes being aesthetically pleasing. Perhaps that is why the dimension preference rating is moderately high (mean = 3.27), even though it is their least preferred dimension.

Scene 39
Mean = 2.95
Loading = 0.95

Scene 30
Mean = 3.07
Loading = 0.82

Scene 63
Mean = 3.11
Loading = 0.95

Scene 62
Mean = 3.01
Loading = 0.81

Scene 64*
Mean = 3.26
Loading = 0.90

Scene 7
Mean = 3.18
Loading = 0.77

Scene 61
Mean = 2.98
Loading = 0.87

Scene 29
Mean = 2.63
Loading = 0.76

Scene 60
Mean = 3.01
Loading = 0.87

Scene 59
Mean = 3.10
Loading = 0.76

Scene 42
Mean = 3.23
Loading = 0.83

Scene 19
Mean = 3.51
Loading = 0.75

Figure 14: Landscape architects' preferences dimension 5. Human influences (continue)

Scene 17*
Mean = 3.19
Loading = 0.74

Scene 20
Mean = 3.33
Loading = 0.67

Scene 28
Mean = 2.86
Loading = 0.73

Scene 43
Mean = 3.57
Loading = 0.63

Scene 40
Mean = 3.29
Loading = 0.70

Scene 32*
Mean = 3.71
Loading = 0.63

Scene 52
Mean = 3.07
Loading = 0.69

Scene 5
Mean = 2.89
Loading = 0.59

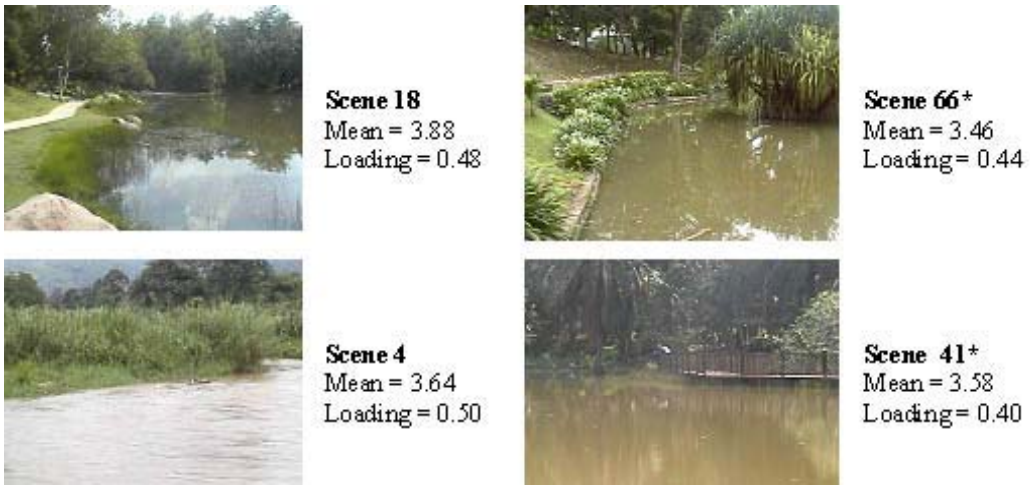
Scene 44*
Mean = 3.37
Loading = 0.69

Scene 54
Mean = 3.45
Loading = 0.57

Scene 36
Mean = 3.05
Loading = 0.68

Scene 27
Mean = 3.38
Loading = 0.57

Figure 14: Landscape architects' preferences dimension 5. Human influences (continue)



*Note. *Scenes included in the participants' verbal description analysis*

Figure 14: Landscape architects' preferences dimension 5. Human influences

Landscape architects also described the scenes from a design point of view and this category is the third most frequent descriptor (9.8%). The most common words used to describe the design quality are "typical" or "common." They also recognized structures in the scenes (8.1%) noting "bridges," "pergolas," "buildings," and "hardscapes". In addition, they also described the scenes as landscape types (7.3%), and used words such as "park," "urban park," and "urban nature**."** Interestingly, landscape architects also described the scenes from the park activity point of view. They wrote "picnic," "fishing," "recreation," and "family activity" to describe the scenes.

In summary, landscape architects described the scenes according to their naturalness (unnaturalness), aesthetics, design quality, structures, landscape type, and park activity. All these descriptors show that landscape architects recognized that the scenes have been influenced by human activities and were consistent with the scenes' content analysis result.

Summary and conclusion of the landscape architects preferences dimensions analysis

Based on the landscape architects scenes preferences ratings, five preferences dimensions were extracted by the factor analysis or CIM. According to the dimension preferences means scores, the highest rated preference dimension is diverse natural vegetation (mean = 4.16), followed by preference dimension visually pleasing wetlands (mean = 4.02), preference dimension natural wetlands (mean = 3.95), preference

dimension natural with scruffy vegetation (mean = 3.88) and preference dimension human influences (mean = 3.27). The common content and spatial organization of each dimension was identified. In addition, the participants' verbal description of the selected scenes were also analyzed (Table 7 for the summary of the analysis).

Table 7: Summary of the landscape architects dimension ranking and analysis

Dimension (mean)	Analyses	Contents	Spatial
1. Diverse natural vegetations (4.16)	Content and spatial organization	Vegetation diversity, submerged vegetation	High complexity, high coherence
	LA's*	Naturalness, vegetation, maintenance and cleanliness	Aesthetically pleasing, organization
2. Visually pleasing wetlands (4.02)	Content and spatial organization	Natural wetlands, clear and visible water,	Mystery, legibility, coherence
	LA's*	Naturalness, landscape type, maintenance and cleanliness	Aesthetically pleasing, design attribute, organization
3. Natural wetlands (3.95)	Content and spatial organization	Natural wetlands, fine texture vegetation	Coherences
	LA's*	Naturalness, maintenance and cleanliness, landscape type, vegetation	Aesthetically pleasing, organization
4. Natural wetlands with scruffy vegetation(3.88)	Content and spatial organization	Natural wetlands, submerged vegetation, scruffy	Low legible, low mystery, coherence
	LA's*	Naturalness, vegetation, landscape types	Aesthetically pleasing, design attributes, organization,
5. Human influences (3.27)	Content and spatial organization	Parklike, sign of human influences, maintained	Legibility, coherence, mystery
	LA's*	Naturalness, structures, landscape type, facility and park activity	Aesthetically pleasing, design attribute

*Note: * LA's refer to Landscape architects' verbal descriptions*

My results suggest that landscape architects prefer natural wetlands to human influenced wetlands and distinguish between different types of natural wetlands. The results were consistent with the findings from the landscape architects' most and least preferred scenes analysis, which found that landscape architects had high preferences for the natural wetlands. One reasons maybe that landscape architects are educated

about the importance of natural environments and wetlands, and they deal with natural environments when they plan and design landscapes.

However, these results raise a question: why do landscape architects prefer natural landscapes and wetlands? What factors affect landscape architects' preferences for wetlands? The analyses of content and spatial organization as well as the analysis of landscape architects' verbal descriptions of scenes from the dimensions, provide insights into several environmental characteristics that affect the preferences of landscape architects. As was the case with public participants, environmental characteristics can be described by the content and visual characteristics.

In terms of content, the most important factor that affects landscape architects' preferences is the naturalness of the scenes/degree of human influences. According to the data, all of the landscape architects' preference dimensions except for preference dimension 1 had a high degree of naturalness, and these dimensions received high preference ratings. In addition, the majority of verbal descriptions related to those dimensions reveal that landscape architects are aware that the scenes are natural. Naturalness also plays an important role in reducing landscape architect preferences. The least preferred dimension, human influence, consists of scenes that have a high degree of human influence on the landscapes, and that dimension received the lowest preference rating. Furthermore, the verbal descriptions of scenes in that dimension show that landscape architects noticed the high degree of human influences in these scenes.

Another factor that affects landscape architects' preferences is the condition of the vegetation. Landscape architects seemed to prefer vegetation that looked natural, as it does in the wild landscapes. Landscape architects prefer dimensions that have scruffy, submerged, floating, and diverse vegetation, and preference dimensions 1, 2, 3, and 4 all have this character. In terms of spatial quality and visual characteristics, mystery affects landscape architects' preferences for preference dimensions 1 and 5. Moreover, legibility is an important factor affecting landscape architects' preferences for preference dimensions 1, 2, and 5. Meanwhile, complexity plays a major role for preference dimension 1. These are important in shaping landscape architects' preferences. This is not surprising as they are trained to see these characteristics of a

landscape. However, those characteristics are not as important as the visual characteristic of coherence in shaping landscape architects' preferences for wetlands.

Visual coherence refers to the organization of the landscape elements in the scenes into distinct spaces or areas; thus, coherence helps to enhance the legibility of the environment. Visual coherence exists in all of the landscape architects' preference dimensions. In addition, in the verbal description analysis, landscape architects always described the scenes in term of design organization, such as "crowded," "balance," "coherence," "messy," and "arranged." All these design organization attributes refer to the visual coherence of the scenes.

In conclusion, landscape architects prefer natural wetland scenes with natural vegetation that is scruffy, wild, and diverse. They prefer scenes less that have a high degree of human influence. Further, they like to see all the elements in the scenes as visually coherent, meaning that the elements nicely organize the environment into distinct areas or spaces.

The preference dimension analysis reveals the public's and the landscape architects' preferences for wetlands and the environmental characteristics that affect those preferences. However, how the do public's and landscape architects' preferences fare? Are they compatible? Are they different or similar? In the next section, the public's and landscape architect's preferences are compared and contrasted and the findings are discussed.

4.2.2.3 Comparison and conclusion of the public and landscape architects preferences analysis

The analysis of the public's and landscape architects' preferences reveals both groups' preferences for wetlands and the environmental characteristics that affect those preferences. In summary, the public prefers landscapes that have signs of human influence, especially parklike landscapes with water, tamed vegetation, and park structures. These landscapes must be well-maintained and clean. In addition, mystery, legibility and visual coherence affect the public's preferences because these qualities enhance the public's understanding about and involvement with the landscape.

Landscape architects prefer natural wetland scenes with submerged, floating, and diverse types of vegetation. However, they prefer the elements in the scenes to be coherent or hang together.

In conclusion, based on the results of the public and landscape architects' preference dimension analyses, these groups appear to have significantly different wetland preferences. These groups differ on degree of naturalness, vegetation condition, presence of water, and spatial quality factors.

In terms of the degree of naturalness, the public prefers parklike landscapes to natural wetlands. Parklike landscapes can be construed as landscapes that have evidence of human influence. The evidence of human influence can be referred to the presence of park structures, like buildings, pergolas, walkways, and playgrounds, and signs of maintenance activities and cleanliness. In contrast, landscape architects prefer the other end of the landscapes continuum: natural wetlands. According to my content analysis, all of the top four most preferred landscape architects' preference dimensions consisted of natural wetlands. The least preferred dimension by landscape architects consisted of landscapes with human influences.

In terms of vegetation condition, the public prefers vegetation that is tamed. The mowed lawn is preferable to bushes. The public prefers water edges that are clear, and without submerged and emergent plants, and water bodies that don't have floating vegetation. In contrast, landscape architects prefer scenes with scruffy water edges, submerged plants, and floating vegetation. These wild looking vegetation conditions add "natural flavor" to the natural wetlands.

In terms of the presence of water, the public has a high preference for water. All public preference dimensions have water in them, except for preference dimension 5: Natural wetlands block access. However, public preference dimension 5 is the least preferred preference dimension. Nevertheless, quality of water might affect the strength of preferences. The public least prefers dimensions with dirty and murky water. In contrast, landscape architects were less concerned with the presence of water. Landscape architects' most preferred dimension, diverse natural vegetation, does not have any scenes that contain water. The pattern can be seen in the other preference dimensions, too, in which some of the scenes have water and some do not.

In terms of spatial quality, the public prefers scenes with legibility and mystery. Legibility is present in three of the five public preference dimensions, 1, 2, and 4. For preference dimensions 3 and 5, which are natural wetlands, legibility is low or absent, thus lowering the public's preference. Legibility is important for the public because the quality provides directional orientation in the environment. In addition to legibility, mystery is another spatial quality that affects the public's preferences. Similar to legibility, when mystery is absent from the dimension scenes, that dimension had lower preference. In this case, mystery is absent in the public preference dimensions 3 and 5. Mystery is particularly important for the public because it pulls people into the site visually as well as physically. For landscape architects, spatial quality, mystery and legibility did not really affect preferences. Mystery was only found in preferences dimension 5 but in that dimension, human influence was much more prevalent. Legibility was present in preference dimensions 2 and 5, but once again, there is other environmental characteristic that are more influential, like visual coherence.

The above discussion focuses on the differences between the public and the landscape architects. However, my study also found similarities between these two groups. Both participant groups react positively to scenes with visual coherence. Visual coherence refers to the organization of the landscape elements in the scenes into distinct spaces or areas, thus enhancing the legibility of the environment. For the public, coherence clearly affects their preferences. If the scenes are not visually coherent, the preference ratings were lower. This is true for public preference dimensions 2, 4 and 5. Visual coherence was found in all of the landscape architects dimensions.

The findings above validate the findings from the most and least preferred analyses, which suggest that the public and landscape architects have different preferences for wetlands. The preference dimension analyses shows that both groups produced different preference dimensions and reacted to different environmental characteristics. Therefore, the findings have further reaffirmed my assumption that there are differences of perception related to wetlands in urban areas between the public and the expert (i.e., landscape architects) and it may cause problem with a wetland restoration program. To further understand people's perception of wetlands, below is a discussion about both participants' opinions on wetlands management options, and verbal descriptions of what they most and least like about wetlands.

4.3 ATTITUDES TOWARD WETLANDS

To understand people's perceptions of wetlands, it is important to examine not only their preferences for different wetland environments, but also to examine their attitudes regarding wetlands. To measure participants' attitudes towards wetlands, they were asked about

1. Opinions on wetland management options, and
2. The most and least liked aspects of wetlands.

This section first will describe the factors above for the public and landscape architects and then compare the factors for both groups.

4.3.1 Opinions on Wetland Management

People may have different opinions regarding wetland management options, and their opinions may be related to their preferences for wetlands. The public and landscape architect survey groups were asked to use a 6 point Likert scale (1= disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree and 5= agree and 6 = I don't know)[22] to indicate their agreement on six items related to management options for wetlands (refer to Table 8 for the descriptive data of participants' opinions toward wetlands management).

Table 8: Opinions on wetland management options

	Public				LA's^			
Items/ Descriptive	**N**	**Mean**	**Median**	**Std. Deviation**	**N**	**Mean**	**Median**	**Std. Deviation**
Used for farming activities*	364	3.77	4.00	1.24	104	2.20	2.00	1.34
Protected and conserved*	391	4.16	4.00	.74	105	4.78	5.00	.64
Developed for housing areas*	393	2.85	3.00	1.10	105	1.61	1.00	1.11
Used for education and research*	396	4.11	4.00	.86	105	4.77	5.00	.74
Developed for fishery industry*	380	4.02	4.00	.91	102	3.17	4.00	1.25
Leave alone as natural open spaces	394	4.13	4.00	.75	104	4.25	5.00	1.17

Notes: ^ landscape architects; * pair wise comparison with $p<0.001$

[22]For the analysis purposes in this study, the item score of "6 = I don't know" was assigned to missing system/values.

4.3.1.1 Public opinions toward wetlands management options

The data (Table 8) shows that the public agrees that wetlands “should be protected and conserved” (mean = 4.16), “should be left as natural open spaces” (mean = 4.13), and “should be left alone as open spaces” (mean = 4.11). However, the public somewhat agrees that the wetlands “should be used for farming activities” (mean = 3.77) and “should be developed for fishery industry" (mean = 4.02). Meanwhile, the public somewhat neutral that wetlands should be “developed for housing areas” (mean = 2.85).

Based on the results, the public agrees that wetlands should be managed for passive, recreational, and educational purposes and somewhat agree (farming) and neutral (housing) to the idea of wetlands totally developed for human use. The results suggest that the public shows an inclination toward the idea of managing wetlands for more economical reasons.

4.3.1.2 Landscape architects opinions on wetlands management option

The data (Table 8) shows that the landscape architect group highly agrees that wetlands should be “protected and conserved” (mean = 4.78) and “used for educational and research” (mean = 4.77). The landscape architects also agree to “leave wetlands as natural open spaces" (mean = 4.25). However, they were somewhat neutral to the idea that wetlands should be “developed for fishery industry” (mean = 3.18). Landscape architects disagree that wetlands should be “developed for housing areas” (mean = 1.62) and “used for farming activities” (mean = 2.20).

Based on the results above, it is clear that landscape architects strongly favor the idea of wetland protection and conservation and rejects the idea of using the wetlands totally for human consumption. The data also suggests that the landscape architects accept the idea of using wetlands for education, open spaces, and fishery purposes, all uses that can be regarded as sustainable.

4.3.1.3 Comparison of the opinion on wetlands management options between the public and landscape architects

To examine if the public and landscape architects have differences of opinions regarding wetland management, independent t-tests were conducted on all the surveyed

items related to wetland management. The results show that the public and landscape architects have significant differences ($p<0.05$) of opinion regarding wetlands management, except for the management option that wetlands should be "left alone as natural open spaces" (Table 8). In addition, the landscape architect group has significant differences and higher agreements than the public does regarding the options that allow wetlands to be managed for conservation, preservation and education (Table 8)

In contrast, the public has differences and higher agreements regarding the management options that allow wetlands to be developed for housing, farming and fishery ($p<0.001$) (Table 8). However, the results do not suggest that the public agrees that wetlands should be developed for housing, farming, and fisheries, because their mean ratings for the items related to management of wetlands for conservation, preservation, and education are still higher than their mean ratings related to management of wetlands for housing, farming and fishery

In conclusion, based on the results of the descriptive analysis and tests, both the public and landscape architects agreed that wetlands should be managed as natural open spaces. In addition, both participant groups favor protecting and conserving wetlands for passive and educational uses, and the public has neutral to somewhat agree attitude for the idea of wetlands be developed for economic purposes. The results above show that one of the reasons the public prefers the scenes that show signs of human influence perhaps because they believe that wetlands could be managed in ways that can benefit them.

4.3.2 The Most and the Least Liked Aspects of Wetlands

To further understand participants' attitudes toward and preferences for wetlands, each participant group was asked to write what they like the most and what they like the least about wetlands. A verbal content analysis method was used to analyze the written responses.

Content analysis involved sorting participants' verbal responses into several groups. The sorting procedure was based on themes generated by participants' responses, and the groups later were named according to the themes that emerged. The themes helped to identify reasons underlying participants' likes and dislikes about

wetlands. Further, to understand the magnitude of the response, the frequency of participants' responses for each theme was calculated.

4.3.2.1 The public like the most about wetlands

One hundred and twelve responses were received from the public regarding what they liked about wetlands, and five themes emerged from the public participants' responses. The themes were listed according to frequency of responses (Table 9).

Table 9: What the public most like about wetlands

	Theme	Frequency	Percentage (%)
1.	Place for outdoor recreation (fishing, jog, walk)	44	39.30
2.	Aesthetically pleasing (beautiful, scenic, serene)	30	26.79
3.	Clean and fresh environment (clean air, clean environment, good air)	13	11.60
4.	Green areas (forest, green area, mangrove area, natural area, park)	7	6.25
5.	Presence of water (water, lake, pond)	7	6.25
6.	Biodiversity (biodiversity, varieties of animals, varieties of plants)	6	5.34
7.	Presence of wildlife (birds, wildlife, fish)	5	4.46
	Total participants responses	112	100.00

The most frequent responses by the public on what they like about wetlands are related to the wetland's ability to cater to outdoor recreation activities (39.30%). Public participants explained that wetland areas were suitable for jogging, walking, and exploration. However, the most important type of recreation cited was fishing; of 44 responses related to the recreation theme, 22 of them mention fishing. This is probably because they see fishing as the main outdoor recreation activity available in wetland areas.

The second most frequent response related to the wetlands' visual character that is aesthetically pleasing (26.79%) and participants wrote that wetlands are beautiful, nice, scenic, look calm, and are peaceful. The answers are quite surprising because it is assumed that the public would regard wetlands as not aesthetically pleasing. Perhaps

they thought wetlands were unique-looking landscapes. The responses related to wetlands as aesthetically pleasant environments can be related to the other responses themes, for instance, the presence of water (6.25%) and perception of wetlands as important green areas (6.25%). Public participants see wetlands as important because they are part of the forest, green, natural areas that should be in urban areas. Responses relating to aesthetically pleasing environments also can be seen in the context of wildlife. Four point four six percent (4.46%) of respondents said that they like wetlands because they can see wildlife; however, it is surprising that very few participants cited wildlife as the reason they like wetlands, because people presumably want to go to wetland areas because of the presence of wildlife. However, it is notable that people mostly cite birds and fish as the types of wildlife they want to see in wetland areas.

Surprisingly, 11.25% of the responses said that they like wetlands because they are clean, have fresh air, have clean water, and are able to increase the quality of the air. Only 5.34 % of the responses cited biodiversity as a reason they like wetlands. For the biodiversity theme, they wrote that they like wetlands because of wetland biodiversity, variety of plants, and variety of species.

Based on the analysis above, it is clear that the public equates parks near water with wetlands because of their ability to cater to their needs for outdoor recreational activities and their aesthetically pleasing characteristics. "Aesthetically pleasing environment" might relate to the perception that wetlands are important green areas with the presence of wildlife and water. Furthermore, by nature of being perceived as green areas, the public also may regard wetlands as areas that have good environmental quality.

4.3.2.2 The public least like about wetlands

One hundred and five responses were received from the public regarding what they least like about wetlands. Using the content analysis procedures, responses were categorized into eight themes and ordered according to the frequency of responses in each theme (Table 10).

The most frequent responses on what the public least liked about wetlands related to the lack of maintenance and cleanliness in wetland areas (35.24%); they said that wetlands were dirty, had a lot of litter, and not been maintained at all. The

responses that related to the lack of maintenance were perhaps related to 2.86% of the respondents who said the vegetation was a reason why they don't like wetlands. They said that the wetlands are bushy, messy, and unorganized.

Table 10: What the public least like about wetlands

	Theme	Frequency	Percentage (%)
1.	No maintenance/dirty (dirty, not maintain, litters)	37	35.24
2.	Pollution (polluted areas)	29	27.62
3.	Poor water quality (muddy, water clog, stagnant water, dirty water)	16	15.24
4.	Bad smell (smelly, bad odor)	13	12.38
5.	Plants condition (bushy, messy)	3	2.86
6.	Not visually pleasing (less interesting)	3	2.86
7.	Wildlife (habitat, mosquitoes)	2	1.90
8.	Landscape type (wetlands, forested)	2	1.90
	Total participants responses	105	100.00

The reasons why the public least liked wetlands was the lack of maintenance. This was probably caused by the public's is familiarity with the concept of urban landscapes that are tame and clean. The responses related to the lack of maintenance and dirtiness can be related partially to pollution because 27.62% of the respondents said they least liked wetlands because the areas seem polluted. It is surprising to see that the public perceived wetlands as polluted areas, but these responses came from residents of Section 7, Kelana Jaya, areas that currently are facing pollution in the Kelana Jaya Municipal Park.

In addition to the lack of maintenance, 15.24% of respondents said that they did not like wetlands because the water condition was bad, dirty, smelly, and stagnant. Furthermore, 12.38% of respondents said there were bad smells coming from wetland areas and it is unclear if the public associates the odor problem with the water. However, the responses related to water condition and smell show that the public perhaps lacks knowledge about the biological and chemical processes of wetlands that cause the water to look dirty, smelly, and stagnant. In conclusion, the public least likes

wetlands because they perceive wetland areas as lacking maintenance, being polluted and smelly, and having poor water quality.

4.3.2.3 Landscape architects like the most about wetlands

The landscape architect's group produced 125 responses, and seven themes emerged. The themes later were ordered according to the frequency of responses in each theme (Table 11).

Table 11: What the landscape architects most like about wetlands

	Theme	Frequency	Percentage (%)
1	Aesthetically pleasing (scenic, unique, beautiful)	30	24.00
2	Green/naturalness (green, natural)	28	22.40
3	Wildlife habitat (habitat, faunas, bird, fish)	27	21.60
4	Vegetation (flora, plants' character, vegetation)	18	14.40
5	Presence of water (water, water element)	10	8.00
6	Biodiversity (biodiversity)	6	4.80
7	Uses (education, recreation)	6	4.80
	Total	125	100.00

The most cited responses by landscape architects belonged to the aesthetically pleasing theme (24.0%). Landscape architects said that they like wetlands because they are scenic, unique, nice, and tranquil. These responses are expected from the landscape architects because they had already shown high preference for wetlands scenes.

Landscape architects also like wetlands because of their naturalness (22.40%). The theme of naturalness is ranked second after aesthetically pleasing. Again, the result is expected because landscape architects showed preferences for natural areas. Landscape architects' responses about wetland naturalness perhaps related to the other four themes; wildlife (21.60%), presence of vegetation (14.40%), presence of water (8.00%), and bio-diversity (4.80%). For the wildlife theme, landscape architects said wetlands are habitats for wildlife and there is a lot of wildlife in these areas especially birds and fishes. Landscape architects said that they like the unique wetlands plants' characters and varieties.

The water theme is interesting because landscape architects do not focus on the quality of water, but rather the presence of water. They simply wrote "I like wetland because it has water everywhere." For the diversity theme, landscape architects comments are straight forward: "I like wetlands because of its biodiversity." Common responses by landscape architects are that they like wetlands because of the wetlands naturalness, importance for wildlife habitat, vegetation, water, and biodiversity was expected because landscape architects are educated about natural resources such as wetlands. Furthermore, besides learning about wetlands, they also have been taught to plan and design the landscape with care to protect sensitive natural resources such as wetlands.

In conclusion, landscape architects like wetlands because they perceive them as aesthetically pleasing and are important because of their naturalness, wildlife, vegetation, water, and bio-diversity; these factors are important for enhancing the ecological values of the wetlands.

4.3.2.4 Landscape architects least like about wetlands

Seven three responses were received from landscape architects regarding what they least like about wetlands; from these responses, six themes emerged (Figure 11). The most frequent response was "dangerous wildlife" (41.10%). This is interesting because landscape architects also said they like wetlands because of the wildlife. However, closer analysis reveals that landscape architects like the tame and gentler wildlife, for example birds and fish.

However, they least liked wildlife such as mosquitoes, lizards, and snakes. The results suggest that landscape architects like wetlands as habitat for wildlife in general, but they may not like certain types of wildlife, especially those that are perceived dangerous. Landscape architects also said they do not like wetlands because of poor water quality (21.92%). They specifically wrote mud and lack of water as reasons that they don’t like wetlands. This is quite confusing, as the landscape architects said that they liked wetlands because of the water. However, a careful look at the responses reveals that landscape architects liked the water, but they do not like the quality or conditions of the water. This is probably due to fact that landscape architects are concerned with the visual appearance of the landscape. Landscape architects also said

that they do not like wetlands because of their spatial quality (15.07%). They wrote that wetlands have a lack of access or bad accessibility. This is probably related to their concern about the legibility of wetland areas.

Table 12: What landscape architects least like about wetlands

Themes	Frequency	Percentage (%)
Dangerous animal (mosquitoes, leech, snakes, lizards)	30	41.40
Condition of the water (muddy, no water)	16	21.92
Spatial and visual quality (lack of access, difficult to explore, messy)	11	15.07
Bad smell (smelly, odor)	7	9.60
Lack of activity (no facilities, no amenities)	5	6.90
Become waste area (place for waste, waste thrown into)	4	5.50
Total	73	100.00

Further, they said that the wetland areas are difficult to predict and explore, and the responses are probably related to the quality of mystery. In addition, landscape architects wrote about the arrangement of the scenes that were too vast, too messy or chaotic. For these types of responses, it is assumed that landscape architect referred to the visual coherence quality. The responses about spatial quality probably stem once again from the fact that landscape architects are concerned with visual appearance as well as spatial arrangement of the landscape.

The findings about spatial quality somehow contradict the result of what the landscape architects like the most, in which they perceived wetlands as being aesthetically pleasing. Careful analysis shows that, for the question on why they liked wetlands, landscape architects just said that they liked wetlands' aesthetic quality in general. However, for the question on what they least like, the landscape architects become more specific about the spatial quality of the wetlands.

Landscape architects also expressed concerns that wetland areas have a lack of activity to offer (6.90%) and bad smells coming from wetlands (9.60%). Last, landscape architects also dislike wetlands because they believe people use wetlands as waste areas

(5.50%). The responses do not explicitly say they don't like wetlands but that they were rather frustrated over what had happened to the wetlands areas.

In conclusion, landscape architects least like wetlands because the wetlands contain dangerous animals, poor water conditions, bad odor, and lack of spatial and visual qualities. They also were frustrated about the fact that wetland areas have less to offer for uses and are becoming dump yards.

4.3.2.5 Summary and comparison between the public and the landscape architects about the most and the least like about wetlands

In summary, the analysis about what participants liked about wetlands found that the public likes wetlands because of their ability to cater to public needs for outdoor recreational activities. Wetlands also are regarded as aesthetically pleasing environments, and that perception might relate to the notion that wetlands are important green areas with the presence of wildlife and water. Furthermore, the public also regards wetlands as areas that have good environmental quality. In contrast, the public least liked wetlands because they see a lack of maintenance, and pollution. As a result, wetland areas are smelly and have a poor quality of water.

Landscape architects like wetlands because they perceived wetlands as aesthetically pleasing and important because of their naturalness, wildlife, vegetation, water, and bio-diversity. In contrast, landscape architects least liked wetlands because they perceived wetlands as containing dangerous animals, having poor water conditions, a bad odor and a lack of spatial and visual qualities. They also were frustrated about wetlands becoming dump yards.

In comparison, there were differences and similarities between the public and landscape architects regarding what they like and least like about wetlands. For example, both groups like wetlands because of their aesthetically pleasing appearance. However, there are differences as to why they said wetlands are aesthetically pleasing. The public relates aesthetics with the ability of wetlands to cater the public needs for outdoor recreation and opportunities to see water and varieties of plants, and wildlife. Wetlands also are regarded as areas where the public can get fresh air and water. In contrast, the landscape architects relate wetlands aesthetics with ecological functions and values. Unlike the public, landscape architects like wetlands because they perceived

them as natural resources that are important for wildlife habitats, unique vegetation, water storage and biodiversity. Regarding why they least like wetlands, both participant groups least like wetlands because of perceived dirtiness, poor water quality and smell. The public also dislikes wetlands because of perceived pollution. However, landscape architects, as professionals who are educated about design and space organization, also least like wetlands because of their lack of spatial organization and visual appearances. From the analysis, landscape architects seemed concerned with wetland's appearance and the lack of mystery, legibility and coherence. In addition, landscape architects also seemed to be concerned with dangerous animals in the wetlands.

In conclusion, based on the results of verbal analysis, there are differences and similarities between what the public and landscape architects like and least like about wetlands. Both groups like wetlands because they are aesthetically pleasing but the public places importance on the ability of wetlands to cater their needs, whereas the landscape architects value the functions and benefits of wetlands environments. Regarding why they least like wetlands? Both the public and landscape architects do not like wetlands because of their dirtiness, poor water quality and smell. However, landscape architects also dislike wetlands because of their lack of organization and lack of good visual quality.

4.4 CONCLUSION

Five hundreds and two participants were surveyed for this study; 397 of them live around the Kelana Jaya Municipal Park or visitors to the Kelana Jaya Municipal Park and 105 of the participants were landscape architects who live and work in the Kelang Valley area. Three types of analyses were reported in this chapter: preference for wetlands, opinion on wetland management options, and the most and least liked factors of wetlands. All of these analyses were done to examine if both participants groups have differences or similarities relating to their preferences for and attitudes towards wetlands.

In conclusion, the public and landscape architects have differences in their preferences and attitudes toward wetlands. The public prefers parklike landscapes that have signs of human influence, especially parklike landscapes with water, tamed vegetation, and park structures. The landscapes also must appear to be maintained and

cleaned. In addition, mystery, legibility and visual coherence in affect the public's preferences, as these qualities enhance their understanding about and involvement with the landscape. Landscape architects prefer natural wetlands scenes with submerged, floating and diverse types of vegetation. However, landscape architects prefer the elements in the scenes to be coherent. Further analysis shows that they have different bases for these factors; degree of naturalness, vegetation condition, presence of water and spatial quality.

The results of the analysis on wetland management options validate the above findings about preference differences. Even though both participant groups agree that wetlands should be managed as natural open spaces and are in favor of protecting and conserving natural wetlands for passive and educational uses, the public believes that wetlands could be developed for economic purposes such as farming and fishery. The results provide a clue as to why the public prefers landscapes that have signs of human influence. The public seemed to believe that wetlands should be managed to serve primarily human needs.

My analysis found differences and similarities between what the public and the landscape architects like, and least like about wetlands. Both groups like wetlands because they are aesthetically pleasing but the public places importance on the ability of wetlands to cater their needs, whereas the landscape architects value the functions and benefits of wetlands for the environment. For the reasons why they least like wetlands, the public and landscape architects do not like wetlands because of their dirtiness, poor water quality, and smell. However, landscape architects also dislike wetlands because of their lack of organization and good visual quality.

The findings once again validate this study's assumption that there are differences between the public’s and landscape architects preferences for wetlands. Even though the public shows some similarities to landscape architects about what they like and dislike about wetlands, the reasons are different. The public looks to wetlands to serve their recreational needs, but landscape architects look to wetlands to serve the environment and humans as well. Furthermore, the findings also provide more clues as to why the public prefers parklike landscapes to natural landscapes. In the next chapter, I will look further into the reasons why the public and landscape architects differ in their opinions, especially on factors that affect their preferences for wetlands.

CHAPTER 5 : FACTORS AFFECTING WETLAND PREFERENCES

This chapter discusses my analysis and findings of factors affecting both the public's and landscape architects' preferences for wetlands. It is important to examine factors that affect preferences for wetlands because knowing the factors that affect people's preference for wetlands may make it possible to design an effective wetland restoration program. This may help minimize opposition toward wetland restoration. Several potential factors have been identified from the review of literatures:

1. **Attitudes toward wetland activities and safety:** People may oppose wetland restoration because they do not perceive wetlands as enjoyable, safe places.
2. **Attitudes toward wetland benefits to urban natural open spaces:** Given the fact that landscape architects formally have learned about wetlands, it is assumed that they would have higher preferences for wetlands.
3. **People's motivation to use open spaces:** It has been argued that the public would prefer particular scenes of urban open spaces only if they see that the scenes can meet their motivations for leisure and recreation.
4. **The approach and philosophy of landscape architects to landscape design and planning:** A landscape architect designs particular landscapes with a certain design philosophy and approach. This potentially can affect their preference for wetlands.
5. **Participants' backgrounds:** Preference, which is a result of perception, based on cognitive processing: the process is influenced by participants' backgrounds, including their cultural and gender.

The public and landscape architects' attitudes for each of these factors will be described separately, after which the results of my analysis of the relationship between the factors and preferences will be discussed**.**

5.1 ATTITUDES TOWARD WETLAND ACTIVITIES AND SAFETY

This section discusses participants' attitudes toward wetland activities and safety. "Wetland activities" includes the ways in which wetlands can be enjoyed and used. "Wetland safety" relates to any danger presented by wetlands in terms of health,

wildlife, and way finding. To measure participants' attitudes toward wetlands activities and safety, they were asked to use a 6 point Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, 5 = agree and 6 = I don't know) [23] to rate their agreement on nine statements about wetland activities and safety.

In my survey, some of the statements were worded negatively (i.e., "wetlands contain dangerous animals"). During data analysis, the items were recoded into positive worded statements (i.e., "wetlands do not contain dangerous animals") to provide consistency on the scale measured.

Table 13: Agreement on wetland safety and health by both participant groups

	The Public				Landscape Architects			
Items	**n**	**Mean**	**Median**	**Std. Deviation**	**n**	**Mean**	**Median**	**Std. Deviation**
I would like to visit wetlands*	391	3.44	4.00	1.09	105	4.60	5.00	0.79
Wetlands are safe*	312	2.66	3.00	1.13	104	3.94	4.00	1.22
I enjoy seeing wildlife in the wetlands*	390	3.52	3.00	.86	101	4.80	5.00	0.62
Wetlands do not contain dangerous animals*	280	2.38	2.00	1.15	100	3.37	3.00	1.24
Wetlands are nice place to take photographs*	388	3.61	4.00	0.86	95	4.31	4.00	0.79
It is not easy to get lost in wetlands*	364	2.98	3.00	0.82	91	3.64	4.00	1.29
Wetlands are places for tranquility and peace*	389	3.73	4.00	0.81	104	4.63	5.00	0.69
I do not feel bored when I see wetlands*	376	2.93	3.00	0.95	101	4.35	5.00	0.90
Wetlands are not bad for your health*	352	2.97	3.00	1.13	102	4.48	5.00	0.94

*Note: *Pair wise comparison indicates significance differences between the public and landscape architects at 0.001 significant levels*

5.1.1 Public Attitudes toward Wetland Activities and Safety

The results show that public participant's opinions on most statements about wetland activities and safety vary (Table 13). Public participants somewhat agreed that "wetlands are places for tranquility and peace" (mean = 3.73), followed by "wetlands

[23] For the analysis purposes in this study, the item score of "6 = I don't know" was assigned to missing system/values.

are nice place to take photographs" (mean = 3.61), "I enjoy seeing wildlife in the wetlands" (mean = 3.52), and "I would like to visit wetlands" (mean = 3.44). It is notable that all these statements relate to wetland activities.

Meanwhile, items rated lower are "wetlands do not contain dangerous animals" (mean = 2.38) and "wetlands are safe" (mean = 2.66), both items that relate to wetland safety. The mean scores for these two statements do not indicate that the public disagrees with them, but rather that they are less likely to agree or are not sure about whether wetlands are safe places or not. The notion is supported by the standard deviation scores of these two items in which both item standard deviations are large (1.15 and 1.13 respectively) showing there is disparity among the public participants

In summary, the ranking of these items suggests that the public appreciates wetlands more as natural areas to see and enjoy, and their appreciation could be increased with the presence of something unique to wetlands, such as wildlife. However, participants are less sure about whether they are safe in wetlands.

5.1.2 Landscape Architect Attitudes towards Wetlands Activities and Safety

Landscape architects' agreement on wetland activities and safety statements are very high. The highest agreement is for the statement "I enjoy seeing wildlife in the wetlands" (mean = 4.80), followed by "wetlands are place for tranquility and peace" (mean = 4.63) and "I would like to visit wetlands" (mean = 4.60). The results also show that landscape architects agree with statements related to wetland safety. For example, "wetlands do not pose dangers to human health" (mean = 4.48), "wetlands are safe" (mean = 3.94), and "it is not easy to get lost in the wetlands" (mean = 3.64). Even though the mean scores of these statements are not as high as the statements related to wetland activities, the scores are still relatively high.

It is interesting to note that landscape architects are somewhat neutral on the statement that that wetlands "do not contain dangerous animals" (mean = 3.37); at the same time, they highly agree that they enjoy seeing wildlife in wetlands (mean = 4.80). The results are similar to the landscape architects' verbal descriptions about what they most and least like about wetlands (see Chapter 4, Section 4.3.2). Analysis indicates that landscape architects like wetlands because of the presence of wildlife in spite of the fact that they seem to be aware that animals may be dangerous. The result shows the

landscape architects are consistent in their answers. In summary, the data related to landscape architects' attitudes toward wetland activities and safety suggest that they agree on wetlands activities and are slightly less concerned about wetland safety.

5.1.3 A Comparison of Agreement on Statements Regarding Wetland Activity and Safety between the Public and Landscape Architects

In general, landscape architects have higher agreement on statements regarding wetland activities and safety than do the public. However, there are some similarities in the statements ranking. Both participant groups rank the statement “wetlands do not contain dangerous animals” (public mean = 2.38 and landscape architect mean = 3.37) the lowest, indicating that both groups are concerned that wetlands contain dangerous animals. To validate the observation that they are similar, an independent t-test was conducted; the results indicate that landscape architects have significantly higher agreement than the public for all statements about wetland activities and safety (all items’ $p<0.001$). In conclusion, it is apparent that the public has lower agreement on wetland activities and safety than landscape architects do. Arguably, their different attitudes toward wetland activities and safety cause the groups to have different preferences for wetlands. However, do agreements on wetland safety and activity influence each group's wetland preferences?

5.1.4 The Influence of Agreement on Wetland Activities and Safety on Preferences

To determine if agreement on wetland activities and safety affects both groups’ preferences for wetlands, a factor analysis was performed on both the public and landscape architect’s ratings for wetland activities and safety statements. Factor analysis grouped the statements into several meaningful categories. Second, both groups were divided into three groups based on their mean scores on categories identified during the factor analysis. The participants were divided based on the category percentile, specifically, the 33^{rd} and 66^{th} percentiles. Participants whose mean scores lay between the 0 and 33^{rd} percentile values were grouped together. A similar process was applied to participants with mean scores between the 33^{rd} and 66^{th}

percentile and the 66th and 100th percentile. Thus, percentile was used to divide the participants because it had the ability to group the participants proportionately.

MANOVA was performed to examine if there was a relationship between the dependent variables (preference dimensions) and the independent variables (wetland activity and safety). If the MANOVA results were significant, a univariate analysis (ANOVA) was performed to examine if group differences exist for every preference dimension. Consequently, if the ANOVA results were significant, a multiple comparisons analysis would be performed to examine which groups differ for every preference dimension.

5.1.4.1 The relationship between wetland activities and safety categories and public preferences

For the public group, the factor analysis on the wetland activities and safety extracted two categories. The first category is related to safety and health; the second category, related to wetland activities, was renamed wetland enjoyment (Table 14). Consequently, for each category, public participants were divided into three agreement groups based on each category's percentile (Table 15).

Table 14: Categories for public agreement on wetland activities and safety

	Dimension and Items	Mean	Loading	Alpha
1	**Safety and health**	**2.78**		**0.83**
	Wetlands are safe	2.66	0.90	
	Wetlands are not bad for your health	2.97	0.84	
	It is not easy to get lost in wetlands	2.97	0.72	
	Wetlands do not contain dangerous animals	2.38	0.66	
2	**Wetlands Enjoyment**	**3.67**		**0.66**
	Wetlands are places for tranquility and peace	3.73	0.91	
	Wetlands are nice places to take photographs	3.61	0.80	

The MANOVA analysis results indicate that both categories, safety and health and enjoyment with wetlands, significantly relate or influence the public's wetland preference dimensions [$F_{17.87}$, $p<0.001$ and $F_{13.31}$, $p<0.001$ respectively] (Table 16). Further, ANOVA results indicates that, for both categories, significant preference

differences exist among agreement groups for the public wetlands preference dimensions 1, 2, 4 and 5 (Table 16).

Table 15: Group breakdown for public agreement on wetland activities and safety

Category	33rd Percentile value	66th Percentile value	Group	Number (n)
Safety and Health	2.49	3.04	Very concerned	153
			Concerned	149
			Less concerned	92
Enjoyments with wetlands	3.24	3.92	Less enjoyable	143
			Enjoyable	85
			Very Enjoyable	165

Table 16: MANOVA and Univariate results on agreement on wetland activities and safety

Factors Dimensions	Groups Means			MANOVA		Univariate	
	Very concern	Concern	Less Concern	F	P<	F	P<
Safety and Health				**17.87**	**0.001**		
1. Parklike setting with water; pleasant places to be	3.42	3.51	3.76			8.97	0.001
2. Parklike, access block	3.03	2.96	3.37			10.30	0.001
3. Natural wetlands with smooth ground texture	2.98	2.94	2.81			Not sig.	
4. Dirty water	2.99	2.56	3.34			40.20	0.001
5. Natural wetlands; access block	2.21	2.19	2.67			16.62	0.001
	Less enjoyable	**Enjoyable**	**Very enjoyable**				
Enjoyment with wetlands				**13.31**	**0.001**		
1. Parklike setting with water; pleasant places to be	3.40	3.50	3.65			6.09	0.002
2. Parklike, access block	2.97	2.87	3.30			13.12	0.001
3. Natural wetlands with smooth ground texture	2.97	3.06	2.82			Not sig.	
4. Dirty water	2.76	2.59	3.19			25.95	0.001
5. Natural wetlands; access block	2.11	2.29	2.49			11.03	0.001

Note: the multiple comparison analyses will not be performed on the dimensions that are not significant in the Univariate analysis.

For the safety and health category, the results of the multiple comparison analyses using the Bonferroni Post Hoc method indicate that the less concerned groups have significantly higher preferences than the concerned and very concerned groups for preference dimensions 1 (Parklike setting with water; pleasant places to be), 2 (Parklike, access block), 4 (Dirty water), and 5 (Natural wetlands; access block). For all the preference dimensions, the concerned group's preferences do not differ significantly from those of the "very concerned" group. In summary, the multiple comparison results indicate that, for the safety and health category, the preferences ratings for the preferences dimension increase when people's concern for safety and health related to the wetlands decreases

For the wetland enjoyment category, the multiple comparison analyses results suggest that, when the public's enjoyment of wetlands increases, their preferences for wetlands also increase. Results indicate that, for preference dimension 1 (Parklike setting with water; pleasant places to be), the "very enjoyable" group (mean = 3.65) has significantly higher and different preferences than the "less enjoyable" (mean = 3.40) group. However, the "very enjoyable" group does not have a different preference than the "enjoyable" group (mean = 3.50). The result is similar for preference dimension 5 (natural wetlands; access block), in which the "very enjoyable" group (mean = 2.49) has a significantly higher preference than the "less enjoyable" group (mean = 2.11) but not higher than the "enjoyable" group (mean = 2.29). For preferences dimension 2 (parklike, access block) and 4 (dirty water), the "very enjoyable" group (mean = 3.29 and 3.19, respectively) has significantly higher and different preferences than both the "enjoyable" (mean = 2.87 and 2.59, respectively) and "less enjoyable" (mean = 2.97 and 2.76, respectively) groups.

In conclusion, based on the MANOVA, ANOVA and multiple comparison analyses results, one can argue that attitudes toward wetland activities and safety significantly affect the public's preferences for wetlands.

5.1.4.2 Relationships between wetland activities and safety categories and the landscape architects' preferences

Just as with the public group, a factor analysis was performed on landscape architects' responses to determine agreement with the statements wetland activities and

safety and the factor analysis. This effort extracted two categories. Just as with the public, the first category is related to safety and health; the second category relates to wetland activities and has been renamed enjoyment with wetlands (Table 17). Consequently, landscape architects were divided into three groups based on each category's 33rd and 66th percentile values (Table 18).

Table 17: Categories for landscape architects' agreement on wetland activities and safety

	Category and Item	Mean	Loading	Alpha
1	**Safety and health**	**3.86**		**0.59**
	Wetlands are safe	3.94	0.77	
	Wetlands are not bad for your health	4.48	0.67	
	It is not easy to get lost in wetlands	3.64	0.65	
	Wetlands do not contain dangerous animals	3.37	0.54	
2	**Enjoyment with wetlands**	**4.53**		**0.56**
	Wetlands are nice place to take photographs	4.31	0.71	
	I enjoy seeing wildlife in wetlands	4.80	0.56	
	I do not feel bored when I see wetlands	4.35	0.54	
	Wetlands are places for tranquility and peace	4.63	0.45	

Table 18: Group breakdown for agreement on wetland activities and safety category

Categories	33rd Percentile value	66th Percentile value	Groups	Number (n)
Safety and Health	3.64	4.38	Very concerned	34
			Concerned	37
			Less concerned	34
Enjoyments with wetlands	4.29	4.79	Less enjoyable	32
			Enjoyable	42
			Very Enjoyable	31

A MANOVA analysis was performed, but the results indicate that the enjoyment with wetlands category does not significantly influence landscape architects' preferences for wetlands ($p>0.05$); therefore, there was no need to run an ANOVA analysis for the enjoyment with wetlands category**.** For the safety and health category, the MANOVA result is significant ($F_{2.21,}$ $p<0.019$), suggesting that concern about safety and health influences landscape architects' preferences for wetlands**.** However, the

ANOVA results indicate that there are no significant preferences differences among sub-groups for any of the landscape architects preference dimensions**.**

Based on the above results, it is clear that enjoyment of wetlands does not influence landscape architects preferences for wetlands. Results also indicate that that there is only a weak relationship between concern for safety and health and landscape architects' wetland preferences.

5.2 ATTITUDES TOWARD WETLAND BENEFITS TO THE URBAN NATURAL OPEN SPACES

This section discusses the role of knowledge on both groups' preferences for wetlands. It is hypothesized that, if people know about wetlands, they will have good attitudes regarding their benefits; these attitudes, in turn, may influence people's support for the placement of wetlands in urban open spaces. In this section, the public's attitudes toward wetland benefits are discussed, followed by a discussion about landscape architects' attitudes. Then, the two groups' attitudes toward wetland benefits will be compared and contrasted. Next, the role of information on participants' attitudes toward wetlands benefits will be discussed. Finally, I will discuss the influence of attitude toward wetland benefits in each participant group.

To measure participants' attitudes toward wetland benefits, they were asked the extent to which they agreed with statements regarding the functions and value of wetlands. They were asked to use a 6 point Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, 5 = agree and 6 = I don't know)[24] to rate their agreement with seven statements related to wetland functions and values (for example, "wetlands minimize flooding"). Refer to Table 19 for both participant groups' scores on the statements regarding wetland benefits.

[24] For the analysis purposes in this study, the item score of "6 = I don't know" was assigned to missing system/values.

Table 19: Agreement on wetland functions and values by both participant groups

	The Public				Landscape Architects			
Item	**n**	**Mean**	**Median**	**Std. Deviation**	**n**	**Mean**	**Median**	**Std. Deviation**
Increase fish and wildlife populations*	356	4.11	4.00	.72	101	4.63	5.00	.77
Minimize flooding*	275	4.13	4.00	.88	100	4.49	5.00	.75
Enhance the aesthetic values of the park*	389	4.13	4.00	.65	102	4.81	5.00	.42
Increase the ground water supply*	340	4.00	4.00	.74	95	4.43	5.00	.91
Upgrade the quality of the water*	335	4.03	4.00	.79	96	4.65	5.00	.75
Provide educational opportunities in the park*	386	4.19	4.00	.74	102	4.91	5.00	.32
Improve local air quality	355	4.34	4.00	.73	100	4.47	5.00	.86

**Pair wise comparison indicates significance differences between the public and landscape architect at P<0.001 significant levels.*

5.2.1 Public Attitudes toward Wetland Benefits

The scores for agreement with statements related to wetland benefits indicate that the public has high agreement for all the statements. Among the top rated statements are “wetlands can improve local air quality” (mean = 4.34), followed by “wetlands can provide educational opportunities in the park” (mean = 4.19), “wetlands can minimize flooding,” and “wetlands can enhance the aesthetic values of the park” (both means = 4.13). Among the lowest rated statements are “wetland increase wildlife and fish habitats” (mean = 4.11), wetlands can upgrade the quality of water” (mean = 4.04), and "wetlands increase the ground water supply” (mean = 4.00).

It was surprising that the public rated the statement “wetlands can improve air quality” the highest. This is, perhaps, because air quality is an important concern in many urban areas and any type of nature or green area would be seen as potentially improving air quality. Although there is considerable agreement with the two statements related to water quality, the fact that they were statements for which there was the least agreement indicates that at least some members of the public may not recognize the role of wetlands in increasing the water supply and improving water quality. However, it is interesting to note that these two items had lowest numbers of respondents expressing some form of agreement (n = 340 and 355). This means that 5.8% to 9.8% of participants responded “I don’t know” to these two items, suggesting at least uncertainty over the role that wetlands play in water quality. In conclusion, the

results indicate that the public agrees that wetlands are beneficial and have value in urban areas.

5.2.2 Landscape Architect Attitudes toward Wetland Benefits

The scores for statements related to wetland benefits indicate that landscape architects have very high agreement on all the statements related to wetland benefits and values (all above 4.40). The statement for which there is highest agreement is "wetlands provide educational opportunities in the park" (mean = 4.92), whereas landscape architects have the least agreement for the statement "wetlands increase ground water supply" (mean = 4.43). In conclusion, the landscape architects highly agree that wetlands are beneficial and valuable for urban green areas.

5.2.3 Comparison of the Public's and Landscape Architects' Attitudes toward Wetland Functions and Values

The data show that both the public and landscape architects have high agreement on wetland benefits to urban areas, although landscape architects displayed higher agreement than the public. To confirm the observation, independent t-tests were conducted, and results indicate that there are significant differences between these two participant groups in relation to their agreement on wetland benefits in urban areas (all p for t <0.00). However, the one item on which the groups do not significantly differ is "wetlands to improve local air quality" (public mean = 4.34; landscape architect mean = 4.47).

However, despite the significant differences between the public and landscape architects regarding wetland benefits, it should be noted that the public does not show disagreement with the benefits and values of wetlands. They simply do not express as much agreement as landscape architects. This may be due to the fact that landscape architects have more information about wetlands because they are more likely to learn about wetlands in college or through their work. The next question is, if the public were given information about wetlands, would their agreement on wetland benefits in urban areas change.

5.2.4 The Role of Information and Agreements on Wetland Benefits

Data about the agreements on wetland benefits indicate that the public has high agreement on wetland functions and values, and landscape architects have even higher agreement. However, if participants, particularly the public, were provided additional information about wetland functions and values, would their agreement change?

To answer this question, participants were asked to read a statement about wetland values and functions in urban areas and the government's intention to include wetlands in urban natural open spaces. Upon reading the statement, participants were asked to use a 6 point Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, 5 = agree and 6 = I don't know)[25] to rate their agreement on six statements related to wetland values and functions. The statements are similar to those related to wetland functions and values, with which they previously expressed agreement.

To analyze the data, a paired sample t-test was used to determine if their agreement differed after they were asked to read the statement about wetlands. For the public, the results indicate that the agreement for all statements changed significantly after they read the statement about wetland values and functions (all p for $F < 0.01$). For landscape architects, their agreement also changed significantly for four statements (p for $F < 0.01$), but not for two, "education opportunities" and "aesthetic values of open spaces" (p for $F > 0.05$). The insignificant change results are probably due to the fact that landscape architects' means for these two items already are very high, more than 4.80 on the 5 point Likert scale. The result suggests that information plays a role in changing people's attitudes toward wetlands and perhaps their preferences for wetlands as well.

After participants read the statement about the benefits of wetlands, they were asked to use a 6 point Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, 5 = agree and 6 = I don't know)[25] to rate their agreement on a government policy to restore wetlands in the urban areas. The results indicate that both the public and landscape architects agree with the stated policy (mean = 4.59 and 4.84, respectively). Further, the independent t-test result shows that

[25] For the analysis purposes in this study, the item score of "6 = I don't know" was assigned to missing system/values.

landscape architects have significantly higher mean agreement than the public regarding the government's policy to restore wetlands in urban natural open spaces ($t_{-4.518,}$ $p<0.01$)[26]. Nevertheless, aside from the differences of agreement between the public and landscape architects, the result suggests that the government probably will not have a major problem convincing the public to accept the idea of restoring wetlands in the urban areas. However, the public must be well informed and educated about wetland functions and benefits.

Questions remain regarding what should be restored and how planners should restore. Before these questions can be answered, it is important to determine if agreement regarding wetland benefits affects the public and landscape architects' preferences for wetlands.

5.2.5 The Influence of Agreement on Wetland Benefits to Preferences

To determine if participants' agreements about wetland functions and values affect their preferences for wetlands, I used much the same procedures as in the relational analysis between wetland activities and safety preferences. First, factor analyses were performed on both the public and landscape architect group responses. Consequently, both participants were grouped according to their mean scores for each category, as extracted from factor analysis based on the values of the categories' 33rd and 66th percentiles. MANOVA, ANOVA, and multiple comparison analyses were used to examine if agreement on wetland benefits related to preferences and to determine if the groups within each category had different wetland preferences.

5.2.5.1 Relationship between agreement on wetlands benefits and public preferences

For the public group, the factor analysis to the responses on the statements related to wetlands benefits extracted two categories. The first is related to the aesthetic and environmental quality, whereas the second category is related to wildlife habitat and water supply (Table 20). The results of the factor analysis indicate that the public has higher agreement for the wetland benefits category of "aesthetic and environmental quality" (mean = 4.19) than they do for "wildlife and water supply" (mean = 4.06).

[26] Participants were not asked to rate their agreement with government policies regarding wetland restoration before they read the statement about wetland benefits.

Consequently, the public participants were grouped based on their mean scores according to each category's 33rd and 66th percentile values (Table 21).

Table 20: Category for the public agreement on wetland functions and values

	Category and Items	Mean	Loading	Alpha
1	**Aesthetic and environmental quality**	**4.19**		**0.80**
	Provide education opportunities in the park	4.91	0.98	
	Improve local air quality	4.34	0.77	
	Upgrade the quality of water	4.04	0.66	
	Enhance the aesthetic values of the park	4.13	0.54	
2	**Wildlife and water supply**	**4.06**		**0.77**
	Increase fish and wildlife population	4.11	0.74	
	Increase the ground water supply	3.99	0.50	

Table 21: Group breakdown for the public agreement on wetland benefits

Environmental Benefit Dimensions	33rd Percentile value	66th Percentile value	Groups	Number (n)
Aesthetic and Environmental Quality	3.92	4.48	Less agreed	96
			Agreed	140
			Very agreed	159
Water supply and Habitat	3.79	4.35	Less agreed	83
			Agreed	186
			Very agreed	123

The MANOVA analysis results indicate that both categories significantly influence public preference for wetlands (aesthetic and environmental quality = $F_{15.988}$, $p<0.01$ and water supply and habitat = $F_{15.815}$, $p<0.01$). The univariate analysis of each category indicates that there are significant preference differences for all the preference dimensions among different level of agreement groups for the wetland benefit categories (all p for $F < 0.05$), except for preferences dimension 5: natural wetlands, access block (Table 22).

For the aesthetic and environmental quality category, the results of the multiple comparison analyses (Table 22) using the Bonferroni Post Hoc method suggest that people who agree that wetlands are beneficial for aesthetic and environmental qualities have higher preferences for wetland scenes as well as the parklike scenes. This is because, for preference dimension 1 (parklike setting with water; pleasant places to be)

and 4 (dirty water), the “very agreed” (mean = 3.85 and 3.14) group has significantly higher preferences than the “agreed" (mean = 3.45 and 2.86) and “less agreed” (mean = 3.10 and 2.63) groups. Also, for preferences dimension 1 (parklike setting with water; pleasant places to be) and 4 (dirty water) too, the “agreed” group (mean = 3.45) has significantly higher preferences than the “less agreed” group (mean = 3.10).

For preferences dimension 2 (parklike, access block), the “very agreed” group (mean = 3.19) has significantly higher preferences than the “less agreed” group (mean = 2.73) but had no significance differences from the "agreed" group (mean = 3.19). Also, for preference dimension 2, the “agreed” group (mean = 3.19) has significantly higher preferences than the "less agreed" group (mean = 2.74). For preference dimension 3 (Natural wetlands with smooth ground texture), the “very agreed” group (mean = 2.90) and “agreed” group (mean = 3.11) have significantly higher preferences than the “less agreed” group (mean = 2.67).

Table 22: MANOVA and Univariate results for wetland benefit category of aesthetic and environmental quality

	Groups' Means			MANOVA		Univariate	
Preference Dimensions	**Less Agreed**	**Agreed**	**Very Agreed**	**F**	**P<**	**F**	**P<**
Aesthetic & Environmental Quality				**15.988**	**0.000**		
1. Parklike setting with water; pleasant places to be	3.10	3.45	3.85			57.67	0.000
2. Parklike, access block	2.73	3.19	3.19			15.12	0.000
3. Natural wetlands with smooth ground texture	2.67	3.11	2.90			8.55	0.000
4. Dirty water	2.63	2.86	3.14			16.33	0.000
5. Natural wetlands; access block	2.33	2.29	2.32				not sig.

Note: the multiple comparison analyses will not be performed on the dimensions that are not significant in Univariate analysis.

Regarding the water supply and habitat category, results suggest that, the higher agreement that public participants have about wetland benefits for water supply and habitat, the higher their preferences will be for wetlands. This is based on the fact that the analysis results indicate that, for preference dimensions 1 (Parklike setting with water; pleasant places to be), 2 (Parklike, access block), 3 (Natural wetlands with

smooth ground texture), and 4 (Dirty water), the "very agreed" group has significantly higher preference means than the "less agreed" group.

Further, for preference dimensions 1 (Parklike setting with water; pleasant places to be), 2 (Parklike, access block), and 3 (Natural wetlands with smooth ground texture) the "agreed group" has significantly higher preferences than the "least agreed group". For preference dimension 4 (dirty water), the "very agreed" group (mean = 3.21) has significantly higher preferences than the "agreed" group (mean = 2.72).

In conclusion, based on the MANOVA, ANOVA, and multiple comparison analyses, it is clear that attitudes toward wetland benefits for urban areas affect public preferences for wetlands. The higher the participants' agreement toward wetland benefits, the higher their preferences for wetlands.

Table 23: MANOVA and Univariate results for wetland benefit category of water supply and habitat

	Groups' Means			MANOVA		Univariate	
Preference Dimensions	**Less Agreed**	**Agreed**	**Very Agreed**	**F**	**P<**	**F**	**P<**
Water supply and habitat				**15.815**	**0.000**		
1. Parklike setting with water; pleasant places to be	3.14	3.56	3.72			24.74	0.000
2. Parklike, access block	2.80	3.17	3.12			8.04	0.000
3. Natural wetlands with smooth ground texture	2.40	3.13	2.95			26.16	0.000
4. Dirty water	2.86	2.72	3.21			19.05	0.000
5. Natural wetlands; access block	2.29	2.31	2.33			not sig.	

Note: the multiple comparison analyses will not be performed to the dimensions that are not significant in Univariate analysis

5.2.5.2 Relationship between agreement on wetland benefits and landscape architect preferences

Similar to the public participants' data, landscape architects' attitudes toward wetland benefits, expressed as agreement with statements about wetland functions and value, were factor analyzed to determine if a relationship exists between attitudes toward wetlands and preferences for wetlands. The factor analysis on landscape architects' responses extracted two agreement dimensions but with different themes

(Table 24). The first category is related to environmental quality and the second category is related to wildlife habitat and aesthetics.

Table 24: Category for landscape architects agreement on wetland functions and values

	Dimension and Items	Mean	Loading	Alpha
1	**Environmental quality**	**4.51**		**0.79**
	Improve local air quality	4.47	0.87	
	Upgrade the quality of water	4.65	0.84	
	Increase the ground water supply	4.43	0.81	
2	**Wildlife habitat and aesthetic**	**4.79**		**0.63**
	Increase fish and wildlife population	4.63	0.95	
	Enhance aesthetic values of the park	4.81	0.74	
	Provide education opportunities in the park	4.91	0.61	

The purpose of the MANOVA, ANOVA, and multiple comparison analyses is to make comparisons among the independent variables subgroups. Therefore, as was done for the public, landscape architect participants were divided into groups. However, regarding to the landscape architects' attitudes toward wetland benefits categories, landscape architects could only be divided into two groups, as their agreement ratings were all very high, causing the ratings to become positively skewed. The positively skewed distribution caused a very small (less than 10 person) 0 - 33rd percentile group.

Table 25: Group breakdown for landscape architects agreement on wetlands functions and values

Agreement Dimension	50th percentile	Groups	Number (n)
Environmental Quality	4.76	Less agreed	49
		Agreed	53
Wildlife habitat and Aesthetic	4.87	Less agreed	33
		Agreed	69

Therefore, to reduce the problem of group imbalance, landscape architects were divided into two groups, based upon the median score [50th percentile][27] of each category (Table 25). Because only two groups would be involved in the analysis if the

[27] To get the 50th percentile value, the true mid (median) score was calculated and used

MANOVA and ANOVA results were significant, for multiple comparison analysis, an independent t-test would be used instead of the Bonferroni Post Hoc analysis method.

The results of the MANOVA analysis indicate that landscape architects with different attitudes toward wetland benefits do not have significantly different preferences for wetlands. Because there were no significant differences, there was no need to conduct multiple comparison tests. These results were not surprising because all landscape architects had very high agreement on wetland benefits. Further, the positively skewed distributions indicate that landscape architects are less varied in their attitudes toward wetland benefits than is the public.

5.3 PEOPLE'S MOTIVATION TO USE URBAN NATURAL OPEN SPACES

In addition to the public attitudes toward wetland activities, safety, functions, and benefits, another factor that may affect public preferences for wetlands is their motivation or desire to use urban open spaces. Different types of motivations to use urban open spaces may influence people's preferences for different types of park settings, including wetlands. It is likely that, if people perceive wetlands as not accommodating their desired uses for parks, they may refuse to support wetland restoration.

To measure people's motivation to use urban natural open spaces, they were asked to use a 6 point Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, 5 = agree and 6 = I don't know)[28] to indicate how important it is for them to participate in listed park activities (e.g., to play ball). The list contains four types of park and urban open spaces activities commonly identified to be important to people (Carr et al., 1995; Driver et al., 1991; Driver & Manfredo, 1996). These activity types, active, passive, social, and exploration, were broken into fifteen specific activities that were rated. However, before these items could be grouped according to their types, it was important to examine individual items' scores and rankings (Table 26).

[28] For the analysis purposes in this study, the item score of "6 = I don't know" was assigned to missing system/values.

Table 26: Motivation to use urban natural open spaces

Items	n	Mean	Median	Stand. Deviation
Spend times with friends	395	4.50	5.00	0.70
Observing lake scenery	395	4.50	4.00	0.70
Sitting and relaxing	394	4.45	5.00	0.64
Walking	394	4.32	5.00	0.84
Be together with family	394	4.31	4.00	0.60
Bring kids to the playground	394	3.61	4.00	1.28
View natural scenery	394	3.53	4.00	1.10
Be alone	384	3.50	4.00	1.23
Study about nature	394	3.33	3.00	1.15
Observe plants	395	3.31	3.00	1.07
Observe wildlife	390	2.65	2.00	1.05
Have a picnic	395	2.37	2.00	1.35
Play ball	387	2.22	2.00	1.21
Roller skating	395	2.20	2.00	1.29
Jogging	393	1.45	1.00	0.69

According to the data, the means for each activity range from 1.45 to 4.50 on the 5 point Likert scale. A ranked ordering of mean importance indicates that some of the most important activities for the public are to: “spend times with friends” (mean = 4.50), “observing lake scenery” (mean = 4.50), “sitting and relaxing” (mean = 4.45), “walking” (mean = 4.32), and “being together with family” (mean = 4.31). All of the activities that were rated highly are passive and socially oriented; this is not a surprise because research has shown that people in Malaysia prefer to use urban open spaces for social and passive activities (Suhardi, 2002). However, it is surprising to see that active activities such as jogging (mean = 1.45), playing ball (2.22), and roller skating (mean = 2.20) received the lowest importance, because these active activities, especially jogging, are common in urban open spaces in Malaysia.

To further examine the relationship between the uses of urban open spaces and preferences for wetlands, the activities were grouped according to the four pre-determined types of activity and reliability analyses were conducted on each group (Table 27). The results indicate that the Cronbach alpha for the mean importance of each of the four pre-determined activity types, based on the combined mean for all

activities within that type, ranges from moderate (0.57) to high (0.89)[29]. The ranking of the activity types according to their mean importance indicates that motivation for the passive (mean = 4.38) is the most important category, followed by social (mean = 3.43), nature exploration (mean = 3.37), and active (mean = 2.23).

Table 27: Public motivation to use urban natural open spaces

Dimension and Items		Mean	Alpha
1	**Passive***	**4.38**	**0.89**
	Walking	4.32	
	Sitting and relaxing	4.45	
2	**Active***	**2.23**	**0.78**
	Roller skating	2.20	
	Play ball	2.22	
3	**Social***	**3.43**	**0.57**
	To be with family	4.31	
	Bring kids to the playground	3.61	
	Have a picnic	2.37	
4	**Explore Nature**	**3.37**	**0.75**
	Observe plants	3.31	
	Observing lake scenery	4.01	
	View natural scenery	3.53	
	Observe wildlife	2.65	
	Study about nature	3.33	

*Note: *a few items were deleted from the passive, active, and social categories to ensure that the alpha values were no less than 0.50.*

To examine the relationship between the public's motivation to use urban natural open spaces and their wetland preferences, MANOVA, univariate analysis, and multiple comparison analyses were once again used.

5.3.1 Motivations to Use Urban Open Spaces and Preferences for Wetlands

The public participants were divided into three groups according to their mean scores for each category. Participants with a mean score below the 33rd percentile were considered to be less motivated, those with a mean score between 33rd and 66th percentiles were considered motivated, and those with a mean score above the 66th percentile were considered very motivated (Table 28). Below is the report for the

[29] A few items were deleted from the passive, active, and social categories to ensure that the alpha values were not less than 0.50.

MANOVA, ANOVA, and multiple comparison analysis results for each motivation type to use natural urban open spaces.

Table 28: Group breakdown for the public importance to use urban natural open spaces

Activity Types	33rd Percentile value	66th Percentile value	Groups	Number (n)
Passive	4.02	4.84	Less motivated	79
			Motivated	116
			Very motivated	199
Active	1.51	2.42	Less motivated	171
			Motivated	85
			Very Motivated	139
Social	3.07	3.65	Less motivated	138
			Motivated	92
			Very Motivated	165
Nature Exploration	2.93	3.44	Less motivated	118
			Motivated	146
			Very Motivated	131

5.3.1.1 Motivation for passive activity

The MANOVA indicates that passive motivation influence people's preferences for wetlands ($F_{20.476}$, $p<0.0001$). In addition, the Univariate analysis results indicate that differences on preference exist among the very motivated, motivated, and less motivated groups for all the preference dimensions (all p for $F <0.05$).

The results of the multiple comparison analyses suggest that participants with passive motivation prefer parklike landscapes to natural wetlands. This result is reasonable because passive activities include walking, sitting, and relaxing, and this group probably wants something that looks calm and serene. Furthermore, the multiple comparison analysis using the Bonferroni post hoc analysis method indicates that, for passive activities, the very motivated and motivated groups have significantly higher preferences than the less motivated group's similar preferences for dimensions 1 (Parklike setting with water; pleasant places to be), 2 (parklike, block access), and 4 (dirty water) (refer to the mean in the Table 29).

For preference dimension 3 (Natural wetlands with smooth ground texture), the multiple comparison analysis results suggest that there is no difference among the

passive motivation groups**.** For preference dimension 5 (natural wetlands; access block), the result of the multiple comparison analysis indicates that the "less motivated" group (mean = 2.40) have higher preferences than the "very motivated" group (mean = 2.14), but similar preferences to those of the "motivated" group (mean = 2.53).

Table 29: MANOVA, ANOVA and multiple comparison analysis result for the passive motivation

	Groups Means			MANOVA		Univariate	
	Less motivated	**Motivated**	**Very motivated**	**F**	**P<**	**F**	**P<**
Passive				**20.476**	**0.0001**		
1. Parklike setting with water; pleasant places to be	3.07	3.59	3.68			31.72	0.0001
2. Parklike, access block	2.42	3.17	3.29			52.81	0.025
3. Natural wetlands with smooth ground texture	2.87	2.77	3.02			3.74	0.0001
4. Dirty water	2.56	3.04	2.97			12.23	0.0001
5. Natural wetlands; access block	2.40	2.53	2.14			12.13	0.0001

5.3.1.2 Motivation for active activity

The MANOVA analysis indicates that active motivation influences people's preferences for wetlands ($F_{17.237}$, $p<0.0001$). In addition, preference differences exist among the very motivated, motivated, and less motivated groups for all preference dimensions (all F for $p<0.05$) (Table 30)

My results suggest that active participants might have preferred all type of scenes. For preference dimension 1 (Parklike setting with water; pleasant places to be) the "very motivated" group (mean = 3.67) has significantly higher preferences than the "motivated" group (mean = 3.29), but no difference in preference from the "less motivated" group (mean = 3.53). This result is logical, as the parklike landscapes seem to be able to accommodate a need for passive recreationists, who may be less motivated to engage in active activities.

For preference dimension 2 (Parklike, no access), the "very motivated" group (mean = 3.32) has significantly higher preferences than the "motivated" (mean = 2.63) and "less motivated" (mean = 3.11) groups, but the "less motivated" group has significantly higher preferences than the "motivated" group. For preference dimension

3 (Natural wetlands with smooth ground texture), the “very motivated” group (mean = 3.12) once again has significantly higher preferences than the “motivated” (mean = 2.62) and “less motivated” (mean = 2.90) groups; however, similar to the results of preference dimension 2, the “less motivated” group has significantly higher preferences than the “motivated” group.

Table 30: MANOVA, ANOVA and multiple comparison analysis result for active motivation

	Groups' Means			MANOVA		Univariate	
	Less motivated	**Motivated**	**Very motivated**	**F**	**P<**	**F**	**P<**
Active				**17.237**	**0.0001**		
1. Parklike setting with water; pleasant places to be	3.53	3.28	3.67			10.31	0.0001
2. Parklike, access block	3.11	2.63	3.32			27.87	0.0001
3. Natural wetlands with smooth ground texture	2.90	2.61	3.12			10.78	0.0001
4. Dirty water	2.63	2.68	3.39			60.69	0.0001
5. Natural wetlands; access block	2.32	2.13	2.40			3.68	0.026

For preference dimension 4 (dirty water), the “very motivated” group (mean = 3.39) has significantly higher preferences than the “motivated” (mean = 2.69) and “less motivated” groups (mean = 2.64). For preference dimension 5 (natural wetlands, access block), both the “very motivated” (mean = 2.40) and “less motivated” (mean = 2.33) groups have significantly higher preferences than the “motivated" group (mean = 2.13). All the results show that participants who are very motivated for active activity prefer all types; this is consistent with the claim made earlier.

5.3.1.3 Motivation for social activity

Social motivation influences people's preferences for wetlands ($F_{21.119}$, $p<0.0001$). In addition, differences on preference exist among the “very motivated”, “motivated”, and “less motivated” groups for all preference dimensions (all F for $p<0.05$), except preference dimension 5 (Natural wetlands; access block).

Regarding the motivation for social activity, the multiple comparison analyses results indicate that parklike and some natural settings are preferable for social

activities. This is because the multiple comparison analysis results indicate that, for preference dimensions 1 (Parklike setting with water; pleasant places to be), 2 (Parklike, access block), and 4 (Dirty water), those who are "very motivated" and "motivated" for social activities have significantly higher preferences than the "less motivated" participants ($p<0.05$) (Table 31).

Table 31: MANOVA, ANOVA and multiple comparison analysis results for social motivation

	Groups' Means			MANOVA		Univariate	
	Less motivated	**Motivated**	**Very motivated**	**F**	**P<**	**F**	**P<**
Social				**21.119**	**0.0001**		
1. Parklike setting with water; pleasant places to be	3.21	3.49	3.82			42.55	0.0001
2. Parklike, access block	2.54	3.22	3.38			51.16	0.0001
3. Natural wetlands with smooth ground texture	2.76	3.14	2.93			6.22	0.020
4. Dirty water	2.57	2.69	3.32			58.82	0.0001
5. Natural wetlands; access block	2.26	2.22	2.39				Not sig.

Note: the multiple comparison analyses will not be performed on dimensions that are not significant in Univariate analysis

For preference dimension 3 (natural with access), those who are "motivated" (mean = 3.14) have significantly higher preferences than those who are "less motivated" (mean = 2.76) and "very motivated" (mean = 2.93), and there is no significant difference in mean preferences between the "less motivated" and "very motivated" groups ($p>0.05$).

5.3.1.4 Motivation for nature exploration activity

Natural exploration motivation influences people's preferences for wetlands ($F_{31.648}$, $p<0.0001$). In addition, preference differences exist among the "very motivated", "motivated", and "less motivated" groups for all preference dimensions (all F for $p<0.05$), except preference dimensions 3 (Natural wetlands with smooth ground texture) and 5 (Natural wetlands, access block).

Table 32: MANOVA, ANOVA and multiple comparison analysis result for the nature exploration motivation

	Groups' Means			MANOVA		Univariate	
Park Activity Dimensions	**Less motivated**	**Motivated**	**Very motivated**	**F**	**P<**	**F**	**P<**
Nature Exploration				**31.648**	**0.000**		
1. Parklike setting with water; pleasant places to be	3.38	3.37	3.85			29.08	0.0001
2. Parklike, access block	2.76	3.03	3.43			31.85	0.0001
3. Natural wetlands with smooth ground texture	2.81	3.03	2.89			Not sig.	
4. Dirty water	2.42	2.74	3.56			141.70	0.0001
5. Natural wetlands; access block	2.27	2.31	2.35			Not sig.	

Note: the multiple comparison analyses will not be performed on dimensions that are not significant in Univariate analysis

When the motivation for natural exploration activity increases, the preferences for the dimensions also increase. The results also indicate that, when legibility and places for refuge are absent from a scene, the preference ratings decrease. For preference dimension 1 (Parklike setting with water; pleasant places to be), the "very motivated" group (mean = 3.84) has significantly higher preferences than the "motivated" (mean = 3.37) and "less motivated" (mean = 3.38) groups. Meanwhile, the "very motivated" (mean = 3.43) and "motivated" (mean = 3.03) groups have significantly higher preferences for dimension 2 (Parklike, access block) than do the "less motivated" group (mean = 2.76). The result is similar for preference dimension 4 (dirty water), in which the "very motivated" (mean = 3.56) and "motivated" (mean = 2.74) groups had significantly higher preferences than the "less motivated group" (mean = 2.41).

In summary, based on the MANOVA, ANOVA, and multiple comparison analyses, the motivations to use urban natural open spaces influence people's preferences for wetlands. Participants motivated for passive activities seem to prefer developed and parklike landscapes, while participants motivated for active activities prefer all types of landscapes. The participants with motivation for social activity seem to appreciate all types of settings, but they prefer parklike landscapes the most. Last, as expected, participants with a motivation for natural exploration prefer all types of

environment, especially natural wetlands landscapes; however, their preferences decrease when legibility and places for refuge are absent from the scenes.

5.4 LANDSCAPE ARCHITECTURE DESIGN APPROACH

When landscape architects prepare a landscape plan, they must choose a design concept, program, and criteria, as well as the materials to be used in their design. This is called their design approach, and it is assumed that landscape architects' preferences for wetlands may be influenced by their approach when they design a landscape. For example, if a landscape architect approaches his design from an ecological perspective, he or she may be more likely to prefer wetlands in a natural state. On the other hand, a landscape architect who approaches his or her design from an "architectural or fine art" perspective may be more likely to insert man-made elements in wetlands.

To measure landscape architects' approaches to design, they were asked to use a 5 point Likert scale (1 = disagree, 2 = somewhat disagree, 3 = neither agree nor disagree, 4 = somewhat agree, 5 = agree and 6 = I don't know)[30] to rate statements related to ways of achieving good landscape architectural designs (for example, "design must be grounded in nature") in terms of "how important" they believed each statement to be. The statements represent SCAPES, the six landscape design approaches proposed by Crewe and Forsyth (2003). These approaches (design as synthesis, cultivated experience, analysis, plural design, ecological design, and spiritual) were measured by 22 statements about good design (Table 33).

The mean scores for the statement regarding landscape architecture design approaches are vary, ranging from 2.45 to 4.69. Three items that received the highest score are "large scale landscape protection is needed" (mean = 4.69), followed by "nature should be preserved" (mean = 4.67), and "by protecting nature, designers can protect humans" (mean = 4.65). The high ranking of these three items indicates that landscape architects perceive nature or natural resources as something important that should be preserved for the wellness of human beings.

[30] For the analysis purposes in this study, the item score of "6 = I don't know" was assigned to missing system/values.

Table 33: Landscape architects' design approach

Good Design Statements	n	Mean	Median	Stand. Deviation
Large scale landscape protection is needed	104	4.69	5.00	0.58
Nature should be preserved	103	4.67	5.00	0.68
By protecting nature, designer can protect human	102	4.65	5.00	0.59
Nature should be a part of artistic expression	104	4.64	5.00	0.59
Deep connection between human and nature	102	4.63	5.00	0.60
Landscape architects are doing good for human and environment	103	4.62	5.00	0.76
Nature is a source for psychological and spiritual needs	103	4.57	5.00	0.60
Design should be based on natural resources and geography	103	4.45	5.00	0.76
Nature is a setting for human life	103	4.44	5.00	0.90
Interaction of professional and user should occur	103	4.38	5.00	0.76
Landscape is for human used if part of the purpose is to connect to nature	103	4.36	5.00	0.86
Design should be based on natural science knowledge	103	4.28	5.00	0.87
Nature is superior, we should follow its course	102	4.23	4.00	0.74
Design is intuition but also knowledge about psychology	100	4.20	4.00	0.88
In design, either nature or humans can be important	104	4.18	4.00	0.99
Participation of users in design process	103	4.17	4.00	0.94
Design should based on history and art criticism	100	4.16	4.00	0.88
Design must be grounded in nature	100	4.14	4.00	0.95
Design should be based on design and architectural theories	101	4.11	4.00	0.92
Citizens should have a say how design should be	103	4.01	4.00	0.92
Empowerment of users and citizens in making design decisions	102	3.93	4.00	0.96
Artistic design is for elite and the rich	103	2.45	2.00	1.51

The three items near the bottom of the list are "citizens should have a say how the design should be" (mean = 4.01), followed by "empowerment of users and citizens in making design decisions" (mean = 3.93). Meanwhile, "artistic design is for the elite and the rich" has the lowest score (mean = 2.45). The very low rating of this item indicates that landscape architects do not agree that landscapes should be designed exclusively for a particular group.

It is worth noting that the items related to public participation in design development are at the bottom of the list, but this does not suggest that landscape architects do not agree with the public participation process, as the mean rating for these items is still very high (all are above 4.0). The low ranking of the items related to

the public participation is perhaps related to the fact that the idea of public participation is very new in Malaysia and very few landscape architects have been involved in any public participation processes.

Table 34: Landscape architectural design approaches categories

	Categories and Items	Mean	Alpha
1	**Cultivated experiences**	**3.74**	**0.52**
	Design should be based on history and art criticism		
	Nature should be part of artistic expression		
	Artistic design is for the elite and the rich		
2	**Analysis**	**4.61**	**0.85**
	Design should be based more on natural resources and geography		
	By protecting nature, designers can protect humans		
	Nature should be preserved		
	Large scale landscape protection is needed		
3	**Plural**	**4.18**	**0.76**
	Citizen should have a say how design should be		
	Nature is a setting for human life		
	Empowerment of users and citizens in design decisions		
	Participation of users in design process		
	Interaction of professional and users should occurs		
4	**Ecological design**	**4.22**	**0.83**
	Design should be based more on natural science knowledge		
	Nature is superior, we should follow its course		
	Design must grounded in nature		
5	**Spiritual**	**4.43**	**0.79**
	Landscape is for human use if part of the purpose is to connect with nature		
	Deep connection between human and nature		
	Nature is a source for psychological and spiritual needs		

To further examine the relationship between landscape architectural design approach and landscape architects' preferences for wetlands, the "good design" statements were grouped according to design approach categories, and a reliability analysis was conducted on each design approach category. One design approach category, synthesis, was eliminated from the analysis because its Cronbach alpha was only 0.37. The Cronbach alpha for the remaining landscape architectural design approach categories ranged from moderate (0.52) to high (0.85) (Table 34). The landscape architecture design approach that received the highest mean rating was “analysis” (mean = 4.61), and the design approach that received the lowest mean was “cultivated experiences” (3.74).

5.4.1 The Relationship between Landscape Architecture Design Approach and Landscape Architects' Wetland Preferences

To test the relationship between landscape design approach and landscape architects' preferences for wetlands, landscape architects were divided into three groups according to their means scores for each approach. The 33rd and 66th percentile values were used to divide participants. Landscape architects with a score below the 33rd percentile made up the "less important" group, those with a score between the 33rd and 66th percentile constituted the "important group," and those with a score above the 66th percentile were placed in the "very important" group (Table 35).

Table 35: Group breakdown for landscape architecture design approach

Categories	33rd Percentile value	66th Percentile value	Groups	Number (n)
Cultivated experiences	3.28	4.02	Less important	29
			Important	46
			Very important	29
Analysis	4.54	4.93	Less important	36
			Important	16
			Very important	52
Plural design	3.87	4.60	Less important	35
			Important	37
			Very important	32
Ecological design	3.95	4.71	Less important	27
			Important	45
			Very important	32
Spiritual design	4.19	4.83	Less important	32
			Important	36
			Very important	36

Only the “analysis” ($F_{3.53}$, $p<0.001$) and “spiritual design” ($F_{2.043}$, $p<0.05$) approaches were related to landscape architects' preference dimensions (Table 36). Therefore, ANOVA analyses were performed only on these two approaches to examine differences among the groups for these approaches (the significant results are displayed in Table 36). A landscape architect who approaches design from an “analysis” approach looks at the landscape from the macro level. This approach tries to enhance the significance of natural resources by incorporating them in the design as protection, conservation, and open spaces, or simply as green areas. Therefore, landscape architects

who prioritize this approach prefer all types of landscapes that reflect environmental protection and conservation.

Table 36: MANOVA and Univariate analysis for landscape architects design approach

	Groups Means			MANOVA		Univariate	
Design Approaches	**Less important**	**Important**	**Very Important**	**F**	**P<**	**F**	**P<**
Analysis				**3.54**	**0.001**		
1. Diverse natural vegetation	4.03	4.14	4.31			Not sig.	
2. Visually pleasing wetlands	3.87	3.92	4.28			7.31	0.001
3. Natural wetlands	3.87	3.90	4.06			Not sig.	
4. Natural access block	3.18	3.69	4.07			3.38	0.038
5. Human influences	2.92	3.29	3.59			9.74	0.000
Spiritual				**2.04**	**0.031**		
1. Diverse natural vegetation	4.11	3.98	4.36			3.14	0.048
2. Visually pleasing wetlands	3.87	3.94	4.20			Not sig.	
3. Natural wetlands	3.91	3.90	4.00			Not sig.	
4. Natural access block	3.80	3.69	4.15			3.43	0.036
5. Human influences	2.93	3.17	3.64			6.55	0.002

Note: the multiple comparison analyses were performed on dimensions that have significant result in the Univariate analysis

For preference dimension 2 (Visually pleasing wetlands), landscape architects who give "high importance" to the analysis approach (mean = 4.31) have significantly higher preferences than groups rating analysis as "important" (mean = 4.13) and "less important"(mean = 4.03)**.** For dimension 4 (Natural access block), the "very important" group (mean = 4.08) has significantly higher preferences than the "important" (mean = 3.69) and "less important" (mean = 3.18) groups**.** For dimension 5 (human influences), the "very important" group (mean = 3.59) has significantly higher preferences than the "less important" (mean = 2.92) group, but not the "important" group (mean = 3.29).

The "spiritual" design approach looks at the design process and its products as a way to meet human spiritual needs, especially needs that relate to psychological and religious well being. For the "spiritual" approach, there are significantly different preferences for dimensions 1 (Diverse natural vegetation), 4 (Natural access block), and

5 (human influences) among importance groups. For these three preference dimensions, those rating this approach as “very important” have higher preferences than those who rate this approach as “important” and “less important” ($p<0.05$).

In summary, landscape architecture design approach influences the landscape architect’s wetland preferences. However, only two approaches, "analysis" and "spiritual," result in significantly different preferences for landscape architects.

5.5 PARTICIPANTS' BACKGROUNDS

In addition to factors identified previously, another important factor that may affect preferences for wetlands is the background of the survey participants. (Refer to Chapter 4, Tables 2 and 3 for the distribution of all the participants' backgrounds) For the public, this includes:

1. Socio-economic (gender, ethnicity, age, income and education level) and
2. Vicinity to and contact with nature (visitor to the park/neighbor, involvement in outdoor activities, involvement in volunteer work in the park and frequency of visits to the park).

For the landscape architects, their backgrounds include:

1. Socio-economic (gender, ethnicity, age and income),
2. Landscape architecture education (where they get the degree, art/design base education, science/life science base education and graduate education), and
3. Practice (type and length of practice).

All the background variables are categorical and nominal; therefore, MANOVA procedures were used to examine the relationships between preference and background variables. If the MANOVA result were significant, a Univariate analysis would be used to test if there are significant differences between variable groups in relation to wetland preferences dimensions.

To understand which group differs, the multiple comparison analysis would be applied and, once again, the Bonferroni Post Hoc method would be used, as it is

designed to analyze variables within a small number of groups. If there were only two groups involved, an independent t-test was used to test group differences**.** Only the significant results were reported.

5.5.1 The Public Background

The MANOVA analysis identified five public participant background variables that significantly related to the public participants' preferences for wetlands. These are monthly income ($F_{4.09}$, $p<0.0001$), visitors/neighbors ($F_{112.48}$, $p<0.0001$), ethnicity ($F_{2.150}$, $p<0.0019$), involvement with outdoor activity ($F_{2230.80}$, $p<0.000$), and frequency of visits to the park ($F_{5.80}$, $p<0.000$) (Table 37).

Table 37: MANOVA results for participants' background

Background	**Subgroups**			**MANOVA**	
				F	**P<**
Income	Below RM1000	RM1000 – RM3000	Above RM3000	4.09	0.0001
Visitor/Neighbor	Visitor	Neighbor		112.48	0.0001
Ethnicity	Malay	Chinese	Indian	2.150	0.019
Involvement with outdoor activity	Yes	No		2230.80	0.0000
Frequent visit to the park	Once 3 months	Once a month	Several a month	5.80	0.0000

To further understand how each variable influences or relates to preference dimensions, ANOVA and multiple comparison analysis were performed on every variable.

5.5.1.1 Monthly income

There are differences among the income groups for all the preferences dimensions (all p for $f < 0.005$). The lower income group has higher preferences for all the public wetlands preference dimensions. This suggests that people with higher incomes have lower preferences for wetlands (Table 38).

For example, for the preference dimension 1 (Parklike setting with water; pleasant places to be), the below RM1000/month group (mean = 3.65) has higher preferences than the above RM3000' a month group (mean = 3.32), and the RM1000-RM3000/ a month group (mean = 3.62) has higher preferences than the above RM3000

group (mean = 3.32). There is no significant difference between the below RM1000/ a month group and the RM1000 – RM3000/ a month group.

There are a few possible explanations for this result: first, perhaps the higher income people have enough money to vacation away from their homes or spend their leisure time in more established open spaces. Meanwhile, the low income group may not have extra money to go somewhere else. They may only have Kelana Jaya Municipal Park or other nearby parks for their leisure and recreational use. Thus, this nearby nature becomes a backyard for them to see and use because they have no other choice.

Table 38: Univariate analysis and multiple comparison analysis for the public income level

Background	**Groups' Mean**			**Univariate**	
				F	**P<**
Income	Below RM1000	RM1000 – RM3000	Above RM3000		
1. Parklike setting with water; pleasant places to be	3.65	3.62	3.32	10.07	0.0001
2. Parklike, access block	3.18	3.14	2.93	4.07	0.018
3. Natural wetlands with smooth ground texture	3.27	2.92	2.74	8.27	0.0001
4. Dirty water	3.10	2.97	2.74	5.85	0.0001
5. Natural wetlands; access block	2.60	2.31	2.18	6.88	0.001

To support this argument, the data indicates that 24.6% of the park visitors are from the below RM1000/a month group. Further, 61.8% of the public participants who have income below RM3000/month visit the park several times a month, in comparison to the above RM3000/a month group ($\chi_{26.54}$, $p<0.05$). This result inspires some important questions about environmental justice in Malaysia: do lower income people have adequate open spaces for their recreational and leisure needs? Further, what is the pattern of open spaces distribution in relation to income groups? These questions should be addressed in future research.

5.5.1.2 Neighbors vs. park visitors

For the visitor/neighbor variable, because only two groups exist, independent t-tests were performed instead of ANOVA. Visitors to Kelana Jaya Municipal Park have

significantly higher preferences than the residents of Section 7, Kelana Jaya for all the wetlands preference dimensions (all p for t <0.05) (Table 39). One reason that this may be happening is that, currently, the park has a pollution problem and its neighbors' preferences might be influenced by its poor condition. Further, park visitors perhaps do not have public open spaces near their homes or their homes do not have backyards, so they may have more appreciation for nature than the neighbors of Kelana Jaya Municipal Park.

Table 39: Univariate analysis and multiple comparison analysis for the visitor/neighbor category

	Groups' Means			
Background			**t**	**P<**
Visitor/Neighbor	**Visitor**	**Neighbor**		
1. Parklike setting with water; pleasant places to be	3.97	3.34	106.41	0.0001
2. Parklike, access block	3.55	2.88	85.84	0.0001
3. Natural wetlands with smooth ground texture	3.06	2.86	5.26	0.022
4. Dirty water	3.75	2.55	514.85	0.0001
5. Natural wetlands; access block	2.47	2.24	8.61	0.004

To support this argument, 85% of park visitors earn an income of less than RM3000 a month; therefore, they possibly live in apartments or residences in which open spaces are limited. However, the study did not collect data related to the residence types of the participants, so the relationship between preferences and type of housing cannot be further validated.

In addition to the above argument, neighbors perhaps look at the park every day. As a result, they have become too familiar with it and thus do not perceive it to be as special as those who live further away. This, in turn, would lower their preferences. This is not to suggest that they do not care about the park in their vicinity, but rather they may be used to it and do not see it as being as special or unique. The phenomena is described by R. Kaplan and S. Kaplan in their study of rivers (Swift Run drain) in Ann Arbor Michigan (Kaplan & Kaplan, 1989), in which they found that people who live along the bad areas of the river prefer the parklike landscape that is located away from

their homes. My findings further validate the Kaplans' argument that familiarity and preferences are a complex phenomenon and influence people's preferences, depending on how familiar they are with an environment. Further study is needed to validate this argument.

Other background variables that relate to public participants' preferences for wetlands are ethnicity, involvement in outdoor activity, and frequency of visits to the park. However, although these variables were significant, multiple comparison analysis results indicate that the variables' sub-groups were not significantly different for all the preference dimensions.

5.5.1.3 Ethnicity

There are differences among ethnic groups for preference dimensions 1 (Parklike setting with water; pleasant places to be; $F_{3.17}$, $p<0.05$) and 5 (Natural wetlands, no access; $F_{3.57}$, $p<0.05$). For preference dimension 1 (parklike with pleasant places to be), the Malay (mean = 3.59) and Indian (mean = 3.49) groups have similar preferences and that both of their preferences are significantly higher than the Chinese (mean = 3.40). For preference dimension 5 (natural wetlands, access block), the Chinese (mean = 2.57) have significantly higher preferences than the Malay (mean = 2.25) and Indian (mean = 2.24) participants (Table 40).

Table 40: Univariate analysis and multiple comparison analysis for ethnicity

Background	**Groups' Means**			**Univariate**	
				F	**P<**
Ethnicity	**Malay**	**Chinese**	**Indian**		
1. Parklike setting with water; pleasant places to be	3.59	3.40	3.49	3.20	0.042
2. Parklike, access block	3.11	3.10	2.92	Not sig.	
3. Natural wetlands with smooth ground texture	2.97	3.13	2.38	Not sig.	
4. Dirty water	3.21	3.13	3.23	Not sig.	
5. Natural wetlands; access block	2.25	2.57	2.24	3.51	0.029

The results indicate that there are differences in preferences among the Malays/Indians and Chinese. The results are interesting because preference dimension 1

consists of scenes of developed and parklike landscapes and preference dimension 5 consists of natural wetland scenes. Why do Malays and Indians have higher preferences for developed and parklike landscapes while Chinese people have higher preferences for natural wetlands?

One possible reason may be that most Chinese have been raised, and live, in urban areas. They probably see nature as important either to improve the quality of urban life or as a destination for recreation outside the city. Furthermore, the Confucian philosophy that many Malaysian Chinese subscribe to emphasizes the importance of balance between the yin (soft) and yang (hard) (Hwang, 1998). Perhaps the Chinese have higher preferences than the Malay and Indians for natural wetlands because most Chinese lived in urban areas (yang) for a long time and feel the need to look for nature (yin).

The Malays and the Indians started to become urban dwellers in the early 1980s due to a rural-urban migration.[31] Many live on converted agricultural plantations[32] that are located on the periphery of urban areas. Cross-cultural comparison in any phenomena is a very important component of any investigation in Malaysia because Malaysia is a multicultural country; the findings from this study should be used to enhance cross-cultural relationships in Malaysia. However, further research is needed to understand the phenomena better.

5.5.1.4 Involvement in outdoor activity

Regard to involvement in outdoor activities, only two groups are involved, and there are differences between types of involvement in outdoor activities with relation to all preference dimensions (all p for $t < 0.05$), except for preference dimension 3 (Natural wetlands with smooth ground texture) (Table 41).

Participants who are involved in outdoor activities have significantly higher preferences for preference dimensions 1 (Parklike setting with water; pleasant places to

[31] The Malaysian government changed its development policy in the mid-1980s from an agricultural-based to an industry-based economy. As a result, many people, especially the Malay, migrated to cities such as Kuala Lumpur for better lives and job opportunities (Abdul Samad, 1998b).

[32] The majority of the Indian community has lived and worked in plantation areas since the British Colonial government brought them to Malaysia, starting in 1824 (Abdul Samad, 1998a; Suhardi, 2002).

be), 2 (Parklike, access block), and 4 (Dirty water). However, for preference dimension 5 (natural wetland, access block), public participants who are not involved in outdoor activities (mean = 2.36) have significantly higher preferences than participants who are involved in outdoor recreation activities (mean = 2.11).

Table 41: Univariate analysis and multiple comparison analysis for the involvement in outdoor activity

	Groups' Means			
Background			**t**	**P<**
Involvement with outdoor activity	**Yes**	**No**		
1. Parklike setting with water; pleasant places to be	3.98	3.42	7.44	0.000
2. Parklike, access block	3.39	3.01	4.12	0.000
3. Natural wetlands with smooth ground texture	2.88	2.93	Not sig.	
4. Dirty water	3.55	2.77	9.24	0.000
5. Natural wetlands; access block	2.11	2.36	-2.654	0.008

The results indicate that participants involved in outdoor activities prefer wetlands more so than those who are not involved in outdoor activities. This is logical, due to the fact that the participants who are involved in outdoor activities have been more exposed to nature; thus, they are not frightened by it. Even though participants who are not involved with outdoor activities have greater preference's mean for scenes in the preference dimension 5 (natural wetlands, access block), the result does not really reflect the real situation because, both groups' mean scores are lower than 2.5 meaning both groups less prefer natural wetlands with access block.

5.5.1.5 Frequency of park visits

For the frequent visitor to the park, differences for preferences exist for four preference dimensions: preference dimensions 1 (parklike with pleasant places to be; $F_{14.084}$, $p< 0.0001$), 2 (parklike access block; $F_{11.329}$, $p<0.00010$), 3 (natural with access; $F_{6.98}$, $p<0.001$), and 4 (mix: scruffy/messy water edges; $F_{8.24}$, $p<0.001$) (Table 42). People who visit the parks once every three months and once a month have a significantly higher preference for preference dimensions 1 (Parklike setting with water;

pleasant places to be) and 2 (parklike, access block) ($p<0.05$) than those who visit the park several times a month. It is interesting to note that these two preference dimensions consist of parklike landscape scenes.

This seems reasonable, as those who visit the park once every three months may be less interested in nature or park-related activities, lowering their preference ratings (67.8% of the participants who visit the park once every three months are not involved in outdoor recreation activities)($\chi_{8.21}$, $p<0.05$). These results indicate that familiarity with nature might play a role in affecting people's preferences.

Table 42: Univariate analysis and multiple comparison analysis for the frequent visit to the park

Background	**Groups' Means**			**Univariate**	
				F	**P<**
Frequent visit to the park	**Once 3 months**	**Once a month**	**Several a month**		
1. Parklike setting with water; pleasant places to be	3.76	3.67	3.38	14.084	0.000
2. Parklike, access block	3.24	3.27	2.92	11.329	0.000
3. Natural wetlands with smooth ground texture	2.79	3.14	2.82	6.98	0.001
4. Dirty water	2.25	2.90	2.83	8.24	0.000
5. Natural wetlands; access block	2.42	2.33	2.26		Not sig.

For preference dimension 4 (dirty water), participants who visit the park once a month (mean = 2.90) and several times a month (mean = 2.83) have significantly higher preferences than participants who visit the park once every three months (mean = 2.25). This suggests that, the more frequently people visit the park, the higher their preferences will be for a more natural scenes. This is logical because, the more frequently people visit the park, the more they develop a sense of attachment to the natural environment as well as familiarity with its natural environment. In summary, the results for frequency of visits indicate that people who visit the park less have strong preferences for a parklike landscape; as the visits become more frequent, their preferences will shift to more natural or watery scenes.

5.5.2 Landscape Architects

The MANOVA analysis for the landscape architects preferences found that none of the landscape architects' backgrounds significantly affect their preference for wetlands (all p for F >0.05). The results further suggest that all the landscape architect participants agree in their opinions for and perceptions of wetlands and nature

5.6 CONCLUSION

In conclusion, landscape architects have significantly higher agreement than the public about wetland activities, are less concerned about wetland safety and health than the public, and have significantly higher agreement than the public about the benefits of wetlands for urban natural open spaces. The results suggest that landscape architects are more comfortable and knowledgeable about wetlands, giving them higher and different preferences for wetlands than those of the public.

Further, several factors influence participants' preferences for wetlands. For public participants, these factors are their concerns about safety and health, enjoyment of wetlands, agreement on wetland benefits, and motivation to use urban natural open spaces. In addition, two of the public's background variables, income and ethnicity, affect their preferences. Finally, proximity of home to the park, ethnicity, involvement with outdoor activities, and frequency of visits to the park also affect the public's preferences. These variables indicate that familiarity with nature or wetlands greatly influences people's preferences for wetlands.

The results of the analyses above also suggest that public participants are a heterogeneous group of people, and it is important for planners and designers to cater to the needs of this diverse group when they plan and design wetland restoration projects. Regarding landscape architects, only design approaches affect their preferences, and the results suggest that they are much more homogenous in their wetland attitudes and preferences. This may be due to the fact that they had undergone similar professional training, speak a similar technical language, and perhaps hold similar values regarding wetlands or nature.

CHAPTER 6 : PREDICTING PREFERENCE AND INTERVIEW WITH PARK MANAGERS

This dissertation has identified several factors that influence people's preferences for wetlands in urban areas. For the public, these factors are attitudes toward wetland activities and safety, attitudes toward wetland benefits, motivations to use urban open spaces, and several background variables. For landscape architects, two landscape architecture design approaches have been identified as influencing the landscape architects' preferences for wetlands. However, all the factors are interrelated. There is a need to determine how these factors relate to preference, and which is the best predictor for wetlands preference. The answers to these questions are important for planners and designers to better design wetlands or restoration programs that are more responsive to people's needs. The first section of this chapter will discuss the findings for these questions.

The first section will discuss the relationship of each factor to the public's and landscape architects' preference dimensions; subsequently, it will analyze the results related to how each potential factor predicts the preference dimensions of both groups. The second section of this chapter also will discuss the outcome of interviews with park managers. This includes park managers' ability to anticipate the public's wetlands preference. In addition, interviews also focused on park managers' attitudes toward wetland restoration, conservation, and public participation in the design process.

6.1 PREDICTING PREFERENCE FOR WETLANDS

What is the best predictor for the public's and landscape architects' preference? To answer this question, correlation and multiple regression analyses were used. A correlation (Pearson method) analysis was used to examine the strength and magnitude of the relationship between preference dimensions and potential factors influencing preference. Consequently, a multiple regression analysis was used to explore factor(s) that best predict a particular preference dimension. The multiple regression analysis also was used to rank factors according to their significance in predicting each preference dimension. Tests were conducted separately for the public and for landscape architects, and all analyses were tested at a 95% significance level.

6.1.1 Predicting Public Preferences for Wetlands

Before multiple regression analysis can examine the best predictor for each preference dimension, it is important to understand how each factor relates to the preference dimensions. Correlation analysis results indicate that preference dimension 1 (Parklike setting with water; pleasant places to be) relates to all the factors available and has the strongest relationship with motivation for social use ($r=0.46$, $p<0.01$) and the weakest relationship with agreement on wetlands safety and health ($r=0.11$, $p<0.05$) (Table 43).

Table 43: Correlation between public preference dimensions and potential factors affecting preference

	Attitude toward wetland activity and safety		Attitude toward wetland benefits		Motivation to use natural open spaces			
	Safety and Health	**Enjoyment with Wetlands**	**Aesthetic and Environmental Quality**	**Wildlife and Water Supply**	**Passive**	**Active**	**Social**	**Nature**
1. Parklike setting with water; pleasant places to be	.11*	.19**	.42**	.27**	.34**	.27**	.46**	.44**
2. Parklike, access block	.11*	.24**	.18**	.23**	.35**	.26**	.43**	.39**
3. Natural wetlands with smooth ground texture				.21**		.17**		
4. Dirty water		.30**	.26**	.17**	.14**	.58**	.61**	.73**
5. Natural wetlands; access block	.18**	.18**			-.20**			

*Note: ** Correlation is significant at the 0.01 level (2-tailed) and * Correlation is significant at the 0.05 level (2-tailed).*

Preference dimension 2 (parklike, access block) also is related to all factors, and it has the strongest relationship with motivation for social use ($r=0.43$, $p<0.01$) and the weakest relationship with agreement on wetland safety and health ($r=0.11$, $p<0.05$). The results of the correlation analyses for these two preference dimensions suggest that public participants relate motivation for social use strongly with these two preference

dimensions. Perhaps this is due to the fact that scenes for preference dimensions 1 and 2 consist of parklike landscapes; participants with motivation for social uses prefer parklike landscapes. It also makes sense that agreement on wetland safety and health has the weakest relationship with preference dimensions 1 and 2 as participants may see parklike landscapes as safe places compared to the other dimensions, which consist of natural wetland scenes.

Only two factors relate to preference dimension 3 (Natural wetlands with smooth ground texture): wetland values on wildlife and water supply ($r=0.21$, $p<0.01$), and motivation for active use ($r=0.17$, $p<0.05$). It is reasonable for participants to relate dimension 3 with wildlife and water supplies because preference dimension 3 consists of scenes of natural wetlands with water features that are expansive and clean. For preference dimension 4 (Dirty water), all factors are related to it except the agreement on safety and health. Preference dimension 4 has the strongest correlation with the motivation for nature exploration ($r=0.71$, $p<0.01$) and the weakest relationship with motivation for passive use ($r=0.14$, $p<0.01$). In addition, preference dimension 4 also has a strong relationship with enjoyment with wetlands ($r=0.30$, $p<0.01$) and aesthetic and environmental qualities ($r=0.23$, $p<0.01$).

Only three factors correlate with preference dimension 5 (natural wetlands, access block); the strongest relationship is with motivation for the passive use ($r=-0.202$, $p<0.01$) and the weakest relationship is with safety and health ($r=0.181$, $p<0.01$). The motivation for passive use is the strongest factor related to preference dimension 5, but the direction of correlation is negative, meaning that the higher the motivation for passive activities, the lower the preference for preference dimension 5. This is perhaps due to the fact that preference dimension 5 consists of natural wetland scenes; participants with high motivation for passive activity have lower preferences for preference dimension 5.

Correlation analysis provides answers about the strength of relationships between preference dimensions and factors. However, do these factors predict public preference for wetlands? What is the best predictor? Could they significantly predict the public preference? To examine these questions, a multiple regression analysis with forward method was used. The forward method was used because it is able to rank the factors according to how significantly they predict each particular preference

dimension. Only factors with significant correlation results would be used or entered in the regression model, as using only the significant factors correlated with preference dimension reduces the problem of colinearity[33]. Multiple regression analyses confirm the correlations analysis regarding the strongest factors related with the preference dimensions (Table 44). However, justification criteria eliminated most of the weakest related factors as predictors for landscape preference.

Table 44: Multiple regression - the public

Variables		1. Parklike setting with water; pleasant places to be	2. Parklike, access block	3. Natural wetlands with smooth ground texture	4. Dirty water	5. Natural wetlands; access block
Attitudes on wetlands benefits	Education and environmental quality	2 (0.282)) +	5 (0.283) +		4 (0.559) +	
	Water supply and habitats		4 (0.274) +	1 (0.045) +		
Attitudes on wetlands activity and safety	Safety and health					3 (0.077) +
	Enjoyment with wetlands		3 (0.254) +			2 (0.065) +
Motivation to use urban open spaces	Passive	4 (0.331) +	2 (0.219) +			1 (0.040) -
	Active			2 (0.67) +	2(0.549) +	
	Social	1 (0.196) +	1 (0.183) +		3 (0.554) +	
	Explore nature	3 (0.302) +			1 (0.528) +	
R Square		**0.331**	**0.283**	**0.067**	**0.559**	**0.077**

Note: 1 Order of significance, ( ) Cumulative R^2, + and - Sign of Beta. All the significance predictors are significance at $p < 0.01$

For preference dimension 1 (Parklike setting with water; pleasant places to be), the best predictor is “motivation for social use,” followed by “education and environmental quality,” “motivation for explore nature use,” and “motivation for passive use." These results suggest that the motivation to use urban open spaces for social reasons is the best predictor for public preference dimension 1. Three of the four significant predictors related to motivations to use urban open spaces. The motivations for “social” and “passive” use are the two top predictors for preference dimension 2

[33] Colinearity is the situation in which two independent variables significantly correlate with each other hence affecting the results.

(parklike, access block). These are followed by “enjoyment with wetlands,” “wetland benefits of water supply and habitat,” and “wetlands benefits of educational and environmental quality.”

For preference dimension 3 (Natural wetlands with smooth ground texture), only two factors were found to significantly predict the preference: “wetland benefit of water supply and habitat” and “active use.” The results indicate that attitudes toward wetland values significantly predict the public preference dimension, but the R square of the regression model is below 10% (0.07), and the value is too small to justify the significance of the result. Similarly, for preference dimension 5 (natural access block), the R square or the variance explained by the model is only 0.08. For preference dimension 4 (Dirty water), once again motivations to use natural urban open space categories are the top predictors for preference. They are “motivation to explore nature” followed by “active use” and “social use.”

In summary, the public's preferences for wetlands are largely influenced by people’s desire or motives to use urban open spaces. The results suggest that what people want to do in a particular urban open space affects their preference toward the landscape setting. It is important for designers and planners, before any restoration activity takes place, to examine people's desires or motives for using wetland environments. The results are surprising because it was initially assumed that attitudes toward wetland benefits and agreement on wetland activities and safety largely would influence, and consequently predict, public participants’ preferences for wetlands. The results do not suggest that knowledge of wetland benefits is not important, but rather that the public puts priorities on the way they can use urban open spaces for their needs and satisfaction.

6.1.2 Predicting Landscape Architects Preference for Wetlands

Similar to the public participation section, correlation analyses had to be done to understand which factor was the best predictor for landscape architects' preference. The correlation analysis results show that many factors do not correlate significantly with landscape architects’ preference dimensions; one of the preference dimensions, dimension 3 (natural least complex), is not significantly related to any of the factors (Table 45).

Three factors were related to preference dimension 1 (detail diverse vegetation). Two design approach categories "ecological design approach" ($r=0.27$, $p<0.01$), and "analysis approach" ($r=0.21$, $p<0.05$), and "wetlands benefits for wildlife habitat and aesthetic" ($r=0.207$, $p<0.05$). It is notable that two of these factors are design approach categories. It is reasonable for preference dimension 1 to correlate significantly with the ecological design approach and values of wetlands for wildlife habitat and aesthetics because preference dimension 1 consists of scenes with various wetlands plants; this may indicate biodiversity, which is an important concept in ecological design and wildlife habitats. Further, the diversity of vegetation provides visual complexity that perhaps increases the aesthetic values of the landscapes.

Table 45: Correlation between landscape architect preference dimensions and potential factors affecting preference

Variables	Attitude on wetland activity and safety		Attitude about wetland benefits		Landscape architecture design approaches				
Category	Safety & Health	Enjoyment with wetland	Environ. quality	Wildlife habitat & aesthetic	Cultivated Experience	Analysis	Plural	Ecological	Spiritual
1. Diverse natural vegetation				.21*		.21*		.27**	
2. Visually pleasing wetlands							.20*		
3. Natural wetlands									
4. Natural access block		.22*							
5. Human influences						.29**	.32**		.30**

*Note: * Correlation is significant at the 0.05 level (2-tailed), and ** Correlation is significant at the 0.01 level (2tailed).*

For preference dimension 2 (visually pleasing wetlands) only one factor, the "plural design approach" ($r = 0.20$, $p<0.05$), related to it. For preference dimension 4 (natural, access block), only one factor significantly correlates with it, the attitude toward wetland activity and safety category – "enjoyment with wetlands" ($r = 0.22$, $p<0.05$). For preference dimension 5 (human influence), three factors significantly correlate with the preference dimension; interestingly, all the factors are the design

approach categories. The first is the “plural design approach” ($r=0.32$, $p<0.001$), and this is not a surprise, because it is about designing with the user in mind. Therefore, it is logical for the factor to be strongly related to it because the scenes contain many elements that are perceived as important to people's needs. The other factor significantly related to preference dimension 5 is the “spiritual design approach” ($r=0.30$, $p<0.01$); similar to the plural design, the spiritual design approach centers around people's needs, although it involves spiritual needs.

The “analysis approach” is another factor related significantly to preference dimension 5 ($r=0.29$, $p<0.01$). Landscape architects who use this design approach look at planning and design from a macro level and aim to include natural resources protection within landscape planning. In addition, one way to protect natural resources is by converting natural areas into a place that people can use. Based on the analysis approach philosophy, it seems reasonable for landscape architects with an analysis approach in mind to relate strongly to preference dimension 5 because they see the landscape in this dimension as serving dual purposes; natural resources protection and human use areas.

Correlation analysis provides answers about the strength of the relationship between landscape architects' preference dimensions and factors affecting the preferences. However, can these factors accurately predict preference? If they do, what is the best predictor? Similar to the process involving public participants’ data, multiple regression analysis was used to find the best predictor variables for landscape architects’ preferences. Only the factors with significant correlation were entered into the regression model to avoid the problem of colinearity. The multiple regression analysis results involving landscape architects’ preference dimensions and the factors affecting their preference show that the R^2 value for all the regression models were less than 0.10, meaning that the significant predictors could only explain less than 10 % of the total variance in wetland preferences. Variance values of less than 10% are too low to make meaningful conclusions about landscape architects' preferences and their predictors. This study couldn’t prove the hypothesis strongly enough, and future studies may be needed to verify this result.

6.1.3 Summary of Predicting Preference for Wetlands

In summary, the correlation and multiple regression analyses results indicate that some factors are correlated significantly with, and can predict preference dimensions, especially in the case of the public's preference dimensions. For public participants, almost all the factors are related significantly with the preference dimensions, but it is interesting to note that the factors that strongly correlated with the preference dimensions are in the motivations to use urban open spaces category.

The multiple regression analysis results confirm the results above, and it is concluded that, for the public participants, a desire or motive to use urban open spaces affects their preference for wetlands and significantly predicts their preference. The results perhaps suggest that urban open spaces should be designed in response to user motivations for use of the spaces. Related to wetland restoration in urban open spaces, the results provide clues about what kind of activities the public might accept in the restored wetland areas.

For landscape architects, not all of the factors correlate significantly with landscape architects' preference dimensions. Correlation analysis indicates that the factors that are related significantly to landscape architects' preferences are the design approaches category. Further, a conclusion cannot be drawn from the multiple regression analysis because the results show very little variance and explain less than 10% of the variance.

6.2 PARK MANAGERS INTERVIEWS

One of my study's objectives is to examine park managers' expectations of the public's preferences and their attitudes regarding wetland restoration in urban open spaces. Nine park managers from five local authorities were interviewed. Specifically, they were asked about their:

1. expectations of the public preference for wetlands,
2. attitudes regarding factors affecting preference,
3. attitudes on the compatibility of park activities with wetland areas,
4. attitudes toward wetland restoration in the urban open spaces, and

5. attitudes on incorporating people's needs in the planning and design process

6.2.1 Anticipation of Public Preference for Wetlands

To examine park managers' expectations of the public's preference for wetlands, park managers were shown 64 wetland scenes[34]. They were asked to pick five scenes that they believed the public would most prefer and five scenes that the public would least prefer. The scenes that had been selected later were compared with the public preference dimension scenes.

6.2.1.1 Anticipation of the wetlands' scenes the public prefer

In total, 26 scenes were chosen by park managers as the most preferred scenes by the public, and the five scenes most frequently chosen by park managers are scenes 38 (13.3%), 32 (8.88%), 21 (8.88%), 8 (6.66%) and 25 (6.66%) (Figure 15). Content analysis of the top five scenes reveals that scene 38 consists of natural wetlands with diverse wetland plants with some visible water, whereas scenes 32 and 21 are parklike landscape scenes with structures (boardwalks and pathways). Scenes 8 and 25 consist of parklike landscapes with plants along the water edges and inside the waters. Elements of mystery and legibility are present in all these scenes.

Based on how frequently each scene was chosen, the results indicate that the park managers' expectations of public preference are varied and it is a mix of natural wetlands scenes and developed or parklike landscapes. Therefore, to further analyze and understand park managers' anticipation for public preference, the scenes chosen were listed according to the public preference dimensions.

The listing of the scenes according to the public preference dimension indicates that scenes from preference dimension 1 (parklike with pleasant places to be) were frequently chosen (41 times or 31.11%) by park managers (Table 46). Preference dimension 1 was followed by preference dimension 2 (parklike access block), in which the scenes in preference dimension 2 were chosen 11 times (24.44%). The scenes from none of the dimensions were chosen 10 times (22.22%) and ranked third, followed by

[34] The scenes were similar to those the public and the landscape architects participants rate in the survey

the scenes from preference dimension 5 (Natural wetlands; access block; 5 times or 11.11%), scenes from preference dimension 4 (Dirty water; 4 times or 8.89%), and scenes from preference dimension 3 (Natural wetlands with smooth ground texture; 1 times or 2.22%).

Table 46: Expectation of the scenes the public prefers based on the public preference dimensions

Dimension	Preference dimension	Frequency	Percentage (%)
1	Parklike setting with water; pleasant places to be	14	31.11
2	Parklike, access block	11	24.44
3	Natural wetlands with smooth ground texture	1	2.22
4	Dirty water	4	8.89
5	Natural wetlands; access block	5	11.11
	Not in any dimension	10	22.22
Total		**45**	**100.00**

The results suggest that park managers are able to anticipate public preferences for wetland scenes by choosing scenes from preference dimension 1 and 2 the most (25 times or 55.55%). Surprisingly, scenes from preference dimension 5, which was rated the last by public participants, were chosen five times by park managers, enough to rank the dimension in fourth place. However, the public chose only one scene (55) from preference dimension 5 as a preferred scene (Figure 15), which consists of natural mangrove wetlands with strong elements of mystery.

To further understand the reasons behind park managers' anticipation of the public preference, park managers were asked to state their reason(s) for choosing particular scenes. Park managers' responses varied, but the most frequent answer related to the naturalness of the scenes (five responses), the balanced or good mix of the man-made and natural landscapes (two responses), and good maintenance (two responses). In comparison, based on the content analysis of the public's verbal descriptions of the scenes[35], the public prefers scenes in preference dimensions 1 and 2 because of the maintenance (cleanliness), the positive spatial quality, and the available facilities.

[35] See Chapter 4 on the analysis of the public verbal description of the scenes for further information.

Figure 15: Scenes anticipated by park managers to be preferred by the public (continue)

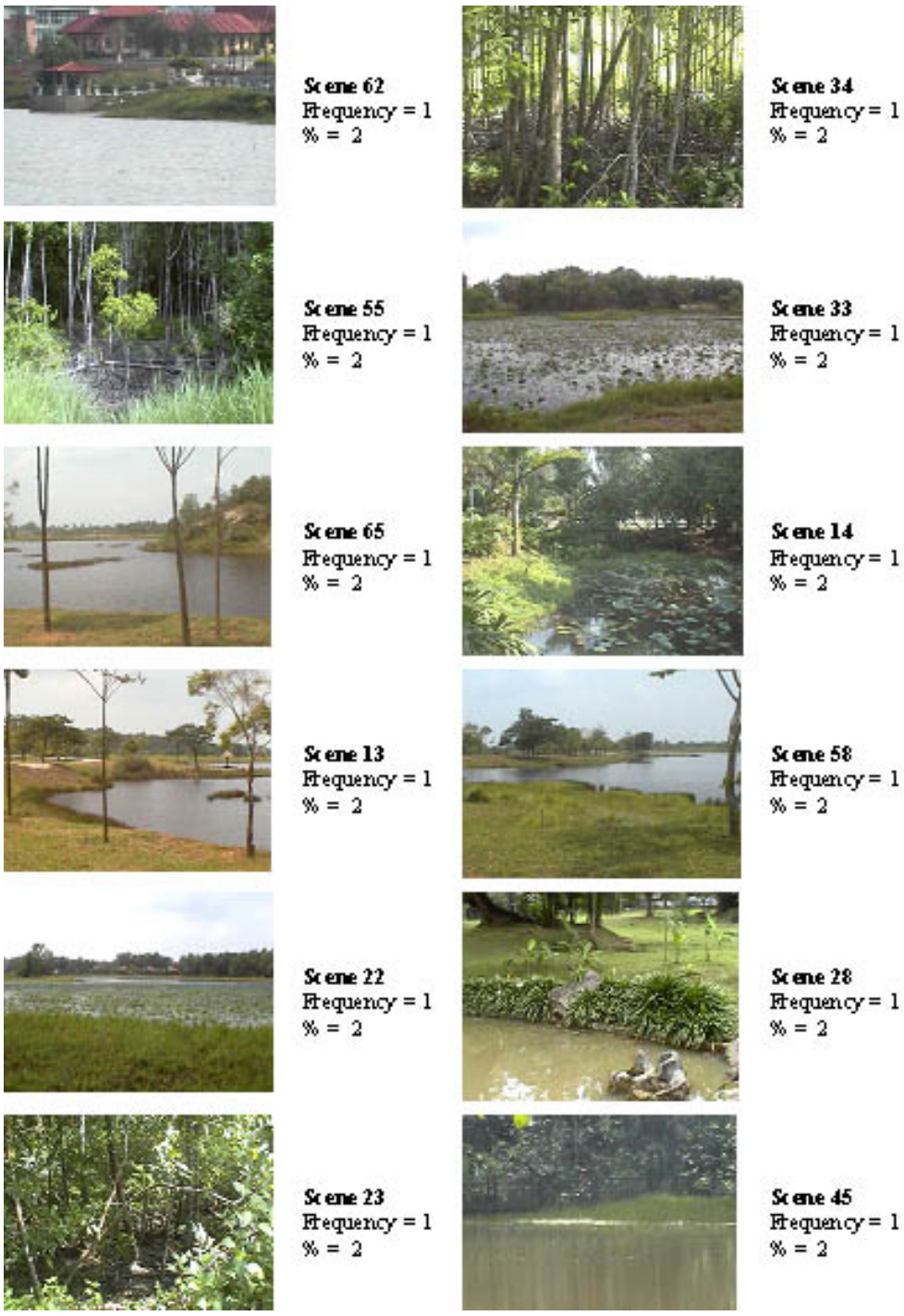


Figure 15: Scenes anticipated by park managers to be preferred by the public (continue)

Scene 48
Frequency = 1
% = 2

Scene 53
Frequency = 1
% = 2

Figure 15: Scenes anticipated by park managers to be preferred by the public

The above comparison indicates that the reasons park managers chose the scenes differ from the public. Park managers rely heavily on the naturalness of the scenes as a basis for people's preference, but the public is more concerned with appearances, spatial qualities (perhaps for safety and direction), and the way the landscape can be used.

The differences in verbal descriptions between the public and park managers may make it difficult for park managers to convince the public to accept wetland restoration in urban open spaces. To convince the public regarding a wetland restoration project, a good strategy has to be formulated by combining visual and verbal descriptions of the future wetland restoration projects. The analysis above provides understanding about park managers' expectations for the scenes the public prefers. However, can park managers anticipate the scenes the public least prefers? The next section will discuss the results of the analysis.

6.2.1.2 Anticipation of least preferred public wetland scenes

Similar to the process of anticipating the scenes public participants prefer, park managers were asked to choose five scenes that they thought the public would like the least from the total 64 scenes. In total, 28 scenes were chosen by park managers to be the least preferred by the public. The five scenes most frequently chosen by park managers were scenes 62 (17.85%), 40 (14.28%), 17 (10.71%), 34 (10.71%) and 5 (7.14%) (Figure 16). Content analysis of the top five scenes reveals interesting findings. Scenes 62, 40 and 17 consist of very developed landscapes, with buildings or structures in them. Meanwhile, scene 34 consists of the natural mangrove wetlands and scene 5 consists of parklike landscapes with a lawn and some structures (fences and drain outlet).

The results indicate that park managers have diverse attitudes about the scenes that the public least prefers. On one hand, they seem to expect that the public will least like parklike landscapes, but on the other, they seem to expect a dislike of scenes that contain natural wetlands. To further understand park manager's expectations for the scenes least preferred by the public, all the scenes chosen were listed according to the public's preference dimensions (Table 47). The listing of scenes chosen by park managers to be the least preferred scenes according to the public preference dimension indicates that scenes from preference dimension 1 (Parklike setting with water; pleasant places to be) were chosen 21 times (46.67%).

Table 47: Expectation of the scenes the public least prefers according to the public preference dimensions

Dimension	Preference dimension	Frequency	Percentage
1	Parklike setting with water; pleasant places to be	21	46.67
2	Parklike, access block	4	8.89
3	Natural wetlands with smooth ground texture	1	2.22
4	Dirty water	2	4.44
5	Natural wetlands; access block	9	20.00
	Not in the dimension	8	17.78
Total		**45**	**100.00**

In second place is preference dimension 5 (natural wetlands, access block), which were chosen nine times (20.0%). Next are scenes that do not belong in any of the preference dimensions, which were chosen eight times (17.78%) and are followed by preference dimension 2 (parklike, access block), preference dimension 4 (Dirty water), and preference dimension 3 (Natural wetlands with smooth ground texture).

The results indicate that park managers expected that the public would dislike scenes from preference dimension 1 (Parklike setting with water; pleasant places to be) the most. This anticipation directly contradicts the public's preferences because preference dimension 1 is their most preferred dimension. However, close examination of the scenes chosen from preference dimension 1 reveals that scenes thought to be least preferred by the public consists of those that have obvious human influences, such as buildings.

Figure 16: Scenes expected by park managers to be least preferred by the public (continue)

Figure 16: Scenes expected by park managers to be least preferred by the public (continue)

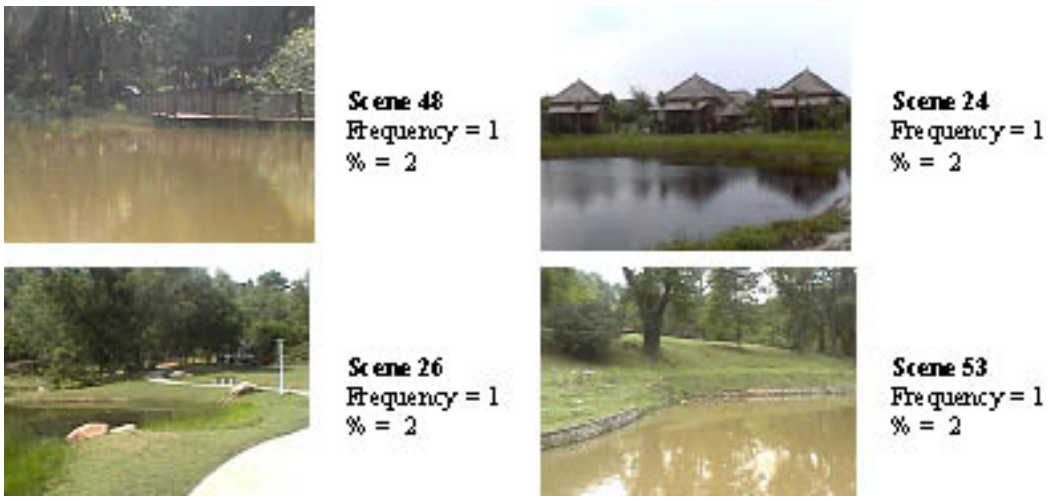


Figure 16: Scenes expected by park managers to be least preferred by the public

Park managers may believe that the public least prefers scenes that have been modified by humans. Interestingly enough, park managers also strongly expect the public to least prefer scenes from preference dimension 5 (natural wetlands, access blocked). Accordingly, from the analysis of the least preferred dimension, preference dimension 5 is ranked last (see discussion in Chapter 4). This indicates that the expectations of park managers are the scenes the public prefers the very least. On one hand, park managers expect the public to least prefer scenes that are heavily modified, and on the other, they expect the public to least prefer scenes that highly natural.

The interview also asked park managers the reasons behind their choices of the public's least preferred scenes. Answers given by park managers are: failure of the design to blend man-made and natural elements, too much human influence (five responses), too natural and messy (three responses), and no access to the areas (one response). It is interesting to note that the reasons are opposite the reasons park managers gave for scenes most preferred by the public. In summary, the park managers are not really able to anticipate scenes the public least prefers because their expectations of the public's preference for the wetland scenes are varied.

6.2.1.3 Conclusion to the park managers' expectations of the scenes

The analysis of park managers' expectations for the public's most and least preferred scenes show that they are able to predict scenes most preferred by the public; however, they are unable to predict scenes that are least preferred by the public. The

result suggests that park managers are unable to understand people's preferences and needs. This inability is probably one reason that some urban open spaces in Malaysia are still underutilized and regarded by the public as uninteresting. The understanding of human needs and preferences must become more critical if landscape architects, planners, and park managers are to proceed with wetland restoration in urban areas.

6.2.2 Anticipation of Potential Factors Affecting Public Preference

In addition to being asked about their expectations of scenes that the public most and least prefers, park managers also were asked about factors they think might affect the public's preferences for wetlands. They were shown a list of potential factors that might affect the public's preferences, and were asked to choose the factor(s) they believed were affecting the public's preferences (Table 48). Later, the frequency of each potential factor was counted.

Table 48: Factors affecting the public preference, as anticipated by park managers

List of factors		Frequency	Percentage
1	Frequency of use of urban green areas	9	100.00
2	Participation in volunteer activities	7	77.78
3	Participation in outdoor activities	8	88.89
4	Live closer to wetlands/natural areas	8	88.89
5	Education level	8	88.89
6	Income	3	33.33
7	Age	2	22.22
8	Gender	2	22.22
9	Ethnicity	2	22.22

Park managers believe that exposure to wetlands and knowledge about wetlands (factors number 1 – 5; Table 48) are the major factors that influence public preference for wetlands. All of these factors were chosen by park managers more than 30%, or three times. When park managers were asked about the reasons behind their choices, they argued that experience with wetlands would increase participants' preference because experiences will:

1. create awareness about the benefits offered by the wetlands,

2. create awareness about the values of bio-diversity,
3. increase a person's interest in nature, and
4. increase people's concerns with nature's well being

The park managers believe that preferences based on innate characteristics, such as income, age, gender, and ethnicity might change with continuous education or environmental exposure. Therefore, the innate characteristics are not really relevant or important in affecting the public's preferences. The results of park managers' expectations of the public preference are interesting because they indicate that managers value education and knowledge as important factors that can shape people's perceptions of nature and wetlands.

How do park managers plan to include education in their planning, design and management of natural open spaces? Future studies should address this question thoroughly. These results also are intriguing because park managers do not see innate characteristics as important factors in shaping people's perceptions. Natural open spaces are a public realm and the public is a heterogeneous, multi-ethnic group. More research needs to be done to understand the significance of the relationship between people's backgrounds and natural open spaces in Malaysia.

6.2.3 Compatibility of Park Activities in the Wetlands Areas

Apart from discussing their expectations of preference and factors they believe affect preference, park managers also were asked questions related to park activities and wetlands, wetland restoration, and public participation in the design process.

For questions related to park activities and wetlands, park managers agreed that wetland areas could be suitable for passive and educational activities. However, they expressed opinions that wetland areas should not be limited to specific types of activities, and landscape architects and planners should be more creative in suggesting varieties of activities for wetland areas. Besides their support for a variety of activities in the wetlands areas, park managers expressed concern that certain activities that require massive wetlands modification, such as soccer, should be prevented because they may disturb people who come to the wetland/natural areas for passive and educational reasons. Furthermore, they argued that these activities and facilities might destroy the natural ecosystem of the wetlands. In addition to these activities, one park

manager also expressed concerns about having playgrounds in wetlands because the colors of the playground, which are usually bright, may disrupt wildlife, and children might be in danger because of the wet soil, bugs, and dangerous wildlife.

6.2.4 Park Managers' Attitudes toward Wetland Restoration in Urban Areas

Park managers were asked about their attitudes regarding wetland restoration in urban open spaces as means to understand their general attitudes regarding wetland restoration, preservation, and conservation in urban areas. As expected, all park managers agreed that it is important to preserve and conserve natural wetlands in urban areas.

Park managers said that preservation and conservation were important to improve urban ecosystems, increase biodiversity, preserve land for future generations, and balance rapid urban development. They also agreed that wetlands should be restored in urban areas; however, all raised questions about the implementation of wetland restoration work. They argued that, unlike preservation and conservation efforts that are more or less about taking care of the existing wetlands, restoration deals with creating or introducing wetlands into urban landscapes, so restoration may have problems with:

1. Lack of policy regarding restoration (one response),
2. High development costs (two responses),
3. Ethical problems. Park managers argued that wetlands should be protected first, and therefore, efforts to restore wetlands may find resistance from tax payers or citizens (two responses), and
4. A lack of available spaces that can be restored to become wetlands because land is so precious in urban areas (three responses).

To further understand problems related to the restoration of wetlands in urban areas, specific questions were asked of each park manager about barriers they believe exist to the implementation of policies related to wetland restoration. According to the park managers, these barriers are:

1. The public, developers, and politicians regard wetlands as landscapes with no value. As a result, natural wetlands are easily

converted or developed into more profitable land uses, such as commercial spaces, housing, and agriculture. Furthermore, because wetlands are considered valueless, non-governmental organizations (NGOs) and interested individuals have found it hard to find grassroots or public support to protect wetlands. Lack of support results in a lack of political pressure on the government and developers.

2. Unclear policy and guidelines regarding wetland restoration, preservation and conservation. For example, the land surrounding protected ecological sites can be developed, and that development can affect the ecosystem of the protected areas. Furthermore, unclear guidelines also can cause developers and citizens to be ignorant about the need to protect, conserve and restore wetlands.
3. Lack of financial resources to finance wetland conservation and restoration efforts.
4. Overlapping jurisdiction over wetland areas among government agencies. Too many agencies are involved in the management of wetland areas but none specifically oversees the protection of wetlands. For example, the Department of Irrigation and Drainage is only interested in flooding and agriculture irrigation, and the Department of Environment is only interested in water pollution issues.

Besides being asked about the problems related to wetland restoration and conservation, park managers also were asked to provide suggestions to enhance preservation and restoration of wetland activities in Malaysia. Their suggestions are:

1. Policies regarding wetland preservation, conservation, and restoration must be adequate and strongly enforced.
2. Collaboration among government agencies is needed for the efficient monitoring of policy implementation and law enforcement.

3. There is a need to increase environmental education programs, not only for the public, but also for politicians and developers.
4. There is a need for greater involvement and pressure from non-governmental organizations and other groups.
5. Research on wetlands should be increased.

In summary, park managers have a positive attitude toward wetland preservation, conservation and restoration, but they are skeptical about implementation. In Malaysia, policies regarding wetland preservation, conservation, and restoration are not strong and lack enforcement. To make matters worse, public awareness regarding the value of wetlands, according to park managers, is low and lacks the necessary grassroots support to pressure the government. Further, due to weak policy regarding wetlands and the public awareness about wetlands, financial support is hard to get and sustain.

6.2.5 Considerations Regarding People's Needs in Planning and Design

Lastly, park managers were asked about incorporating people's needs in design and planning. Interestingly, the data indicate that park managers are divided on this issue. Five park managers supported the idea, and four park managers were against the idea of incorporating people's needs in planning and design. Park managers who supported the idea argued that, by considering people's needs, users would enjoy the spaces more, the value of spaces would increase, problems in maintaining the areas would decrease, and the process of public participation will help the public understand the policy better. Additionally, these park managers argued for the importance of restoring wetlands according to people's needs and preferences, as the process would create awareness among people about the importance of wetlands. Consequently, the public would support the project and have a sense of belonging that is important for the sustainability of wetlands restoration projects.

Park managers who were against the idea of incorporating people's needs in design and planning argued that there is no need to involve the public because the law doesn’t require public involvement in any professional decision making. Further, they argued that designers or planners should not be pressured to follow public needs and preferences. They argued that designers are supposed to be free to design and plan

according to their design philosophies and expert knowledge. Furthermore, they strongly believe that the public would like their designs, no matter what the designers provide.

It is surprising to see park managers divided on the issue of incorporating people's needs and preferences in their designs and getting the public involved in the design and planning process. Previously, it was assumed that all landscape architects would like to hear from people and design according to users' needs and preferences. However, park managers who agreed to consider people's needs in their designs have implemented the AGENDA 21[36] program, which requires public participation in the planning process.

6.2.6 Summary of the Park Managers Interview

In summary, nine park managers from five local authorities were interviewed regarding their expectations for public preferences, factors affecting public preference, attitudes on the compatibility of park activities with wetland areas, attitudes toward wetland restoration in the urban open spaces, attitudes on incorporating people's needs in planning and design, and involvement of the public in the design process,

Park managers seem to be able to anticipate the public's most preferred scenes for wetlands; however, they were unable to anticipate the public's least preferred scenes. Besides the physical characteristics of the wetlands, park managers also thought that exposure to wetlands and knowledge about wetlands is important in influencing the public's preference for wetlands. Park managers agreed that wetlands should have passive and educational activities but they do not want the activities to be limited and they expressed concerns that some activities might damage the natural ecosystem of the wetlands.

When asked about wetland restoration and conservation, all park managers understood the function and value of wetlands, and they agreed that wetlands should be protected and conserved. However, while they agreed that restoration of wetlands is important, they have doubts on how wetland restoration projects can be accomplished successfully. They argued that restoration efforts may face problems, such as lack of

[36] Agenda 21 is the program initiated by the United Nations to support environmental protection and was launched during Rio Declaration 1992

financial support, lack of space, lack of policy, and lack of public support. To overcome these problems, park managers suggested changes to the current policy related to wetland protection, conservation and restoration to make them stronger by enhancing collaboration among government agencies, and empowering enforcement agencies.

In addition, environmental education and grass roots programs must be built and strengthened. Last, it is interesting to note that park managers are divided on incorporating people's needs in the design process. However, park managers who support the idea of incorporating people's needs already have public participation processes in place in their offices, whereas those who are against the idea do not. Park managers' interviews expanded the understanding of problems related to wetland restoration in Malaysia and the reasons that conflict occurs. Further, the interviews also provided good suggestions and ideas on how to solve some problems pertaining to wetland restoration in Malaysia.

CHAPTER 7 : SUMMARY OF THE MAJOR FINDINGS, IMPLICATIONS AND CONCLUSION

There are four parts in this chapter. The first part summarizes the major findings of the study, discussing how they relate to certain environmental perception theories. The second part discusses the implications of the finding for wetland restoration projects in urban areas. The third part discusses the limitations faced by this study and suggestions to improve it. Finally, the fourth part discusses avenues for the future research and concludes the study.

7.1 SUMMARY OF THE MAJOR FINDINGS

My study began with a question: why do certain segments of the public oppose wetland restoration programs in urban natural open spaces? Presumably, the reason for this opposition is the fact that the public has different perceptions of wetlands than the experts, in particular landscape architects (who generally plan and design wetland restoration projects). If not resolved, this conflict of perception will undermine environmental protection programs, government accountability, and landscape architecture project intention and professionalism.

Therefore, the main objective of my study was to discover if the public and landscape architects have different preferences for wetlands and to explore factors that significantly influence both groups' preferences. Kelana Jaya Municipal Park was chosen as the study site because the lakes in the park face environmental problems (poor water quality) and the local authority responsible for the lakes (the Petaling Jaya Municipal Council) plans to solve the problem by restoring natural wetlands in the lake. However, certain segments of the Kelana Jaya population oppose the idea of restoring the wetlands, favoring a more developed and parklike landscape.

To examine people's preference for wetlands, I surveyed 397 residents of Section 7, Kelana Jaya, Malaysia and visitors to the Kelana Jaya Municipal Park, as well as 105 landscape architects from the Kelang Valley Region. In addition, I also interviewed nine park managers from five local authorities to examine their ability to anticipate public preferences for wetlands. Park managers also were interviewed to uncover their attitudes toward wetland conservation and restoration and their feelings

regarding public participation in the design process. Below is the summary and discussion of the significant findings of the study.

7.1.1 The Public and Landscape Architects' Preferences for Wetlands

The main research question of this study is: what are the public's and the landscape architects preferences for wetlands and do these preferences differ significantly? The preference analysis indicates that the public has strong preferences for parklike landscapes that contain evidence of human influences and provide the potential for human involvement. Parklike landscapes also can be construed as those that appear to be well maintained, clean, and often have the presence of water.

From a theoretical point of view, the fact that the public prefers landscapes with evidence of human influence is consistent with arguments by R. Kaplan and S. Kaplan (1989), who found that people prefer landscapes that are tamed and well maintained. Nassauer (1997b) further suggests that people prefer tamed, well maintained and orderly landscapes because they are used to them. These types of landscapes can be found nearly everywhere in Malaysia, especially around houses and in most public spaces.

It is not surprising that scenes with water are highly preferable, as many researchers have found water is a good predictor of preference. According to Balling and Falk (1982), and R. Kaplan and S. Kaplan (1989), people prefer scenes with water because they offer the potential for food, and Knopf (1987) argues that people prefer scenes with water because they have strong biological and spiritual connections to it. Hammit (1978) found that people preferred bog environments that contained water. However, water is present in almost all the scenes for this project, so it is hard to conclude if water is the main predictor for wetland preferences in this instance.

Parklike landscapes provide the potential for involvement. Arguably, this is enhanced by the spatial qualities of mystery and legibility. R. Kaplan and S. Kaplan (1989) and S. Kaplan and R. Kaplan (1982) argue that the spatial qualities of mystery and legibility have been found to be good predictors of preference. The quality of mystery makes people anxious to enter further into the environment, while enhancing people's understanding or cognitive image of the landscape. Therefore, curiosity and good understanding of the a landscape and know it is structured and the ways it

functions makes people feel comfortable, so they want to enter and become more involved with the environment. The parklike landscape also contains structures such as playgrounds and benches that, according to Gibson (1979), enhance the environment's “affordability” to provide something useful to the viewers.

Landscape architects have strong preferences for scenes and dimensions that contain natural wetlands and are visually pleasing. For my study, visually pleasing natural wetlands can be qualified as scenes that have their spaces well defined, are visually coherent, and visually complex. The result it is not a surprise, as landscape architects are typically very aware of the importance of natural wetlands (Suhardi, 2003) Being knowledgeable about wetlands may cause landscape architects to see the environment through a different lens than the public. In addition, mystery and legibility play a role in influencing landscape architects' preferences, but that these are not as important as coherence and complexity. Landscape architects seem to be more concerned with the 2-dimensional aspects of the Kaplans’ preferences framework than the 3-dimensional ones. Perhaps this is because landscape architects have been trained to see and evaluate the aesthetic character of a landscape from a 2-dimensional perspective.

Among the least preferred scenes, the public least prefers natural wetlands scenes, especially those that are perceived to be dirty, and have tangled and disorganized vegetation. These findings are similar to those of by Herzog (1985), who found that natural wetlands are people's least preferred waterscapes. The findings also reaffirm the point that if one aspect of the preferences framework (mystery, legibility, complexity and coherence) is missing, the scenes are unlikely to be preferred.

In contrast, landscape architects to least preferred scenes that are developed or have strong evidence of human influence. They may assume that wetlands that are less natural or have obvious signs of human influences do not carry much ecological value for urban areas or environments. This makes sense given the strong preference that landscape architects have for natural wetlands. However, it cannot be concluded strongly that landscape architects totally reject scenes with development and signs of human influences, as some scenes containing built elements received high preference ratings.

In conclusion, the findings about the public and landscape architects' preferences for wetlands confirm the hypothesis that these two groups have different preferences for wetlands; as a result, a conflict about wetland restoration is more likely to occur. These differences occur because the public highly prefers parklike scenes with the evidence of human influence that provides the potential for human involvement. In contrast, landscape architects prefer scenes that look natural and have strong visual characteristics of coherence and complexity.

While the differences related to the content of the scenes (human influence and parklike quality), are very much understood, the important finding is that the public is very concerned about the 3-dimensional aspects (the qualities of mystery and legibility) of the R. Kaplan's and S. Kaplan's (1989) preferences framework. Consequently, they are concerned about what they can do in the landscapes related to their desire and need for involvement with nature. On the other hand, landscape architects are more concerned about the appearance of the landscapes, which inherently is more related to the 2-dimensional aspects of the preferences framework (coherence and complexity). One possible result of this is landscape architects' failure to design wetland restorations with sufficient human involvement and imageability in the landscape.

These findings are similar to those of R. Kaplan and S. Kaplan (1989) regarding the preferences of experts in the natural resources field, which include design professionals such as landscape architects. Kaplan and Kaplan argue that experts have different preferences than the general public because they (the experts) have more knowledge about the environment.

7.1.2 Knowledge about Wetlands Functions and Values as a Factor Influencing Preferences for Wetlands

One of the important research questions of my study is which factors influence people's preferences. It was argued earlier that landscape architects have more knowledge about wetlands because they have been educated about the environment, and thus they have significantly higher preferences for wetlands than the public. However, is it actually the case that knowledge about the environment plays a significant role in influencing landscape architects preference for wetlands?

To validate this hypothesis, the public and landscape architect participants were asked to rate their agreement to statements about wetland benefits (functions and values) in urban areas[37]. The results indicate that landscape architects have significantly higher agreement than the public for almost every item related wetland functions and values, demonstrating that agreement or knowledge about wetland functions and values significantly influence people's preferences for wetlands.

However, it should be noted that my findings do not suggest that the public has low knowledge of or low agreement regarding wetland functions and values; rather, their agreement ratings are significantly lower than those of landscape architects. This is because the public's lowest mean score for the statement was 3.99 on a 5-point Likert scale. The public gave higher ratings to statements related to the wetlands functions and values that appear to benefit them directly (such as wetland values for open spaces, recreation, and education) than to statements related to wetland benefits for the integrity of urban ecosystems (for example, statements like "wetlands function to supply, store and upgrade the quality of fresh water").

To further validate the hypothesis that knowledge of wetland benefits and values influences the public's preferences, public participants with higher agreement for two sub-categories of wetland benefits (aesthetic and environmental quality and water supply and habitat) have higher preferences for wetlands. Further, means for the two sub-categories of wetland benefits correlate positively with enjoyment of wetlands (a sub-category of wetland activity and safety) and correlate negatively with concern about wetland safety (another sub-category of wetland activity and safety). Therefore, it is suggested that, when the public's agreement or knowledge about wetland functions and values increases, their enjoyment of wetlands also increases, while their concern about wetland safety decreases.

The role of knowledge in influencing the public preferences is further validated by results that indicate that public participants' agreement on wetland functions and values became significantly higher after they read a paragraph about wetland values and functions that was cited from reliable resources. The effect was so strong that the public

[37] The participants' agreement on wetland functions and values is interpreted as a metric of their level of knowledge about wetlands.

overwhelmingly supported the implementation of restoration policies after reading the paragraph.

Landscape architects' higher agreement on wetland functions and values is not surprising because of their prior knowledge regarding the importance of wetlands and other natural resources; further, they often are involved with wetland ecosystems in their professional practices. They are comfortable with wetlands, a fact which is demonstrated by their high rating for enjoyment with wetlands (mean = 4.53 on a 5-point Likert scale) and their minimal concern about wetlands safety (mean = 3.86 on a 5-point Likert scale).

Agreement or knowledge about wetland benefits to urban areas plays a significant role in influencing participants' preferences for wetlands; by virtue of having higher agreement about wetland functions and values, landscape architects have higher preferences for wetlands than the public. This reaffirms findings by R. Kaplan and Herbert (1987), who noted that members of the Australian Wildflower Society had higher preferences for Eucalyptus trees than Australian and American student groups, because they had more knowledge about Eucalyptus. These findings also can be regarded as a sign that familiarity with nature or wetlands in particular, will influence people's preferences for wetlands[38].

The public also has high agreement regarding wetland value and functions, but their ratings are not high enough to be similar to landscape architects' ratings and don't really influence their preferences for wetlands. Is there any other factor that potentially influences the public's preferences? If there is any, how significant is it in comparison to their knowledge about wetland value and function?

7.1.3 Influence of Motivation for Using Urban Open Spaces and Public Preferences for Wetlands

As hinted at above, apart from knowledge about wetland functions and benefits, another factor potentially influences public preferences for wetlands. Based on the review of the literature, it is hypothesized that motivations to use urban natural opens spaces influence people’s preferences for wetlands. Driver, Brown and Petterson (1991)

[38] Discussions about the influence of familiarity with preferences will be addressed later in this chapter.

and Driver and Manfredo (1996) argue that people's motivations for leisure and nature influence their choice of leisure and recreational settings. Similarly, Ryan (1997) also found that the way people use open spaces influences their attachment to them.

Four types of motivations to use urban natural open spaces (passive, active, social and nature exploration) were examined to determine if they significantly influence public preferences. All type of motivations significantly influences public preferences for wetlands. Further, public participants with passive motivation prefer parklike landscapes with signs of human influences, tamed vegetation, the presence of water, and have the potential for involvement. Participants with active motivations prefer all types of settings. However, they might be concerned with how conveniently they can access the environment. Arguably, the preferences of users with active motivation may not be influenced by the type of setting because their minds are fully occupied by their particular activity. Similar results have been found in sport, recreation and leisure research, which indicates that canoeists at Boundary Waters Wilderness Areas concentrate so hard on their activity that they are only concerned about the water flow, not with the surrounding wilderness areas (Lewis, Lime, & Anderson, 1996).

Last, participants with a motivation for natural exploration activities prefer more natural wetland scenes, but their preferences decrease when the scenes' legibility decreases and these natural settings offer less refuge. This finding is related to Appleton's (1975; 1984) arguments that people prefer scenes that have a high prospect (opportunities to see) and refuge (places to hide). This could be because these qualities are particularly important to nature explorers because they emphasize seeing and understanding the scenes (prospect) and at the same time participants are sheltered (refuge).

My findings confirm the hypothesis that motivations for using natural open spaces have a significant influence on public preferences for wetlands. This finding is important because it informs us that there are other factors influencing people's preferences besides their knowledge about wetland function and value. However, how significant is the motivation to use urban natural open spaces in influencing public preferences for wetlands in comparison to their knowledge about wetlands values and functions?

A multiple regression analysis was used to answer the question, and the results indicate that motivations to use urban natural open spaces are a better predictor of the public's preferences for wetlands than their knowledge about wetland function and value. Therefore, it is clear that the public bases their preferences more on their motivations or desire to use urban natural open spaces than their knowledge about wetland functions and values. Thus, when designing and planning a wetland restoration program, landscape architects and park managers cannot disregard public motivations to use the urban natural open spaces because if the public perceives wetlands areas as being incompatible with their motivations to use urban natural open spaces, they may oppose or reject the restoration plans.

To this point, this study has suggested that wetland characteristics, knowledge about wetland functions and values, and motivations to use urban natural open spaces significantly influence preferences, but there also is a need to determine if participants' backgrounds influence their preferences for wetlands.

7.1.4 Participants' Backgrounds: Influence of Familiarity with Nature and Public Preferences for Wetlands

Based on the hypothesis that participants' backgrounds will influence their preferences, several aspects of participants' backgrounds, such as gender and ethnicity, were tested to examine if they, too, influence preferences. For landscape architects, none of their backgrounds significantly influences their preference for wetlands. However, for the public, a few background variables significantly influence their preferences for wetlands.

Visitors to the park who do not live nearby, participants who frequently visit the park and participants who are involved in outdoor activities all have higher preferences for wetlands. Participants who belong to the above groups probably have higher preferences for wetlands because they are more familiar with nature or wetlands. This finding is supported by R. Kaplan and S. Kaplan (1989) and S. Kaplan and R. Kaplan (1982) who found a relationship between familiarity and preferences. Ryan (1998) also reported similar findings about local citizens' preferences for rivers, and Kaltenborg and Bjerke (2002) reported findings about farmers' preference for farmlands in Norway.

Familiarity with a particular environment causes people to feel more comfortable because they know it, which make them feel safe. However, familiarity also can cause preferences to be weak, especially if the environment is in poor condition (Kaplan & Kaplan, 1989). A similar conclusion can be drawn from my findings in which people who live around the Kelana Jaya Municipal Park (the neighbors) prefer wetland scenes less in comparison to visitors. Perhaps this is because the neighbors have negative feelings about current park conditions and believe the idea to restore the wetlands may further deteriorate the parks' conditions.

In conclusion, familiarity with nature or wetlands influences people's preferences for wetlands and thus the level of familiarity of potential users for a particular type of environment is an important consideration when designing and planning wetland restoration projects. In addition to familiarity, cultural backgrounds and income levels also influenced public preferences for wetlands. Malays and Indians prefer parklike and developed landscapes, whereas the Chinese indicated stronger preferences for natural wetlands. The higher a participants' income, the lower their preferences for wetlands but there is no other data or arguments (specific study) to support this phenomenon, and further research is needed to validate these findings.

7.1.5 Low Predictability of the Public Preferences by the Park Managers

Besides surveying the public and landscape architects' preferences, several park managers also were interviewed. Primarily, they were asked to predict public preferences for wetlands. Park managers only occasionally predicted the scenes the public most prefers, but failed to predict the scenes the public prefers the least. They hypothesized that scenes that have a balanced mix of man-made and natural landscapes would be strongly preferred by the public, whereas scenes that indicate strong evidence of human influence would be least preferred by the public. However, the public typically preferred scenes showing strong evidence of human influence.

Therefore, park managers have a low capacity to predict public preferences of wetlands the finding shows that another problem related to public opposition toward wetland restoration is the fact that the park managers perceptions about wetlands differ from the public. Low predictability of public preferences happens because park managers base their predictions on the level of the scene's naturalness and visual

characteristics, so the prediction of public preferences is somewhat similar to landscape architect's preferences. The similarity of park managers' prediction with landscape architects' preferences is not surprising because all park managers interviewed have a qualification or education related to natural resources management, parks and recreation, or landscape architecture.

7.1.6 Park Managers' Attitudes toward Wetlands Conservation and Restoration in the Urban Natural Areas

In addition to questions about their predictions about public preferences, park managers also were asked about their opinions regarding wetland conservation and restoration in urban areas. Park managers all agree that natural wetlands should be conserved and restored in urban areas. They cited biodiversity, the need to balance rapid urban development with green areas, and the need for urban green spaces as reasons for wetland conservation and restoration in urban areas.

Park managers argued that conservation of wetlands should be easier to implement than restoration because conservation only involves protection and maintenance of existing natural wetlands. Restoration of wetlands is not easy because the process requires large expenditures to acquire lands and technical expertise on how to return natural wetlands to disturbed urban systems. Park managers also worried that wetland restoration projects will meet resistance from the public because the public will be concerned that wetland may impact to their quality of living negatively. Further, they also worry that the public will question the use of tax money for wetland restoration. Finally, park managers expressed concern that wetland restoration may not be easy to implement because there is lack of a clear and sound policy regarding wetland conservation and restoration in Malaysia. When asked about needed improvements to enhance wetland conservation and restoration efforts in Malaysia, park managers agreed that there is a need for a strong policy regarding wetlands protection, environmental education, research, and development.

In conclusion, park managers see the importance of conserving and restoring natural wetlands in urban areas, but they see some problems or barriers to the implementation of conservation and restoration plans for wetlands ecosystem. Park managers' suggestions to enhance conservation and restoration activities are similar to

some of the suggestions outlined by the AGENDA 21[39] (1992) declaration to achieve sustainability. This is not surprising because Malaysia signed the AGENDA 21 declaration, so these park managers, who work at the local government level, are well aware of the AGENDA 21 framework.

However, it is puzzling that none of the park managers highlighted the need to include the public or users' opinions in the process of planning and designing wetlands conservation and restoration project, even though community involvement in environmental management is one of the key recommendations outlined by the AGENDA 21 framework. Therefore, the next question asked of park managers was related to the idea of incorporating people's preferences and needs into the planning and design process.

7.1.7 Park Managers' Attitudes towards the Incorporation of People's Needs in the Planning and Design Process

Park managers were asked their opinions regarding incorporating people's preferences and needs in the planning and design process. Park managers were divided on this issue; five park managers support the idea; the other four do not. Some park managers believe that, by soliciting and responding to public opinions, users will enjoy the space better, the value of the open spaces will increase, maintenance problems related to human behavior can be minimized, and the public will have a better understanding about certain government policies regarding wetlands and open spaces.

In contrast, park managers who do not support the idea of incorporating people's preferences and needs believe that there is no law requiring them to elicit public preferences/needs before planning and design project can be implemented. Many of these managers also believe that designers should not be in a position to respond to people's preferences and needs because this can curtail designers' creativity. They believe that scientists and designers know better and people at the end will like whatever is provided for them by the designers. Park managers who support the idea of incorporating public preferences and needs into the planning and design process are

[39] AGENDA 21 is a UN declaration to promote sustainability. The declaration was signed by U.N. members on June 14, 1992 in Rio de Janeiro, Brazil.

already implementing the AGENDA 21 program, which calls for greater public participation in the decision-making process.

In conclusion, my findings indicate that the idea of incorporating the public in the decision making process still is not accepted completely by some park managers in Malaysia. There still may be a lack of understanding about the importance of incorporating people's preferences and needs into the design process, since public participation in Malaysia is still relatively new. My findings suggest that park managers and many landscape architects should be informed or educated about the importance of incorporating people's preferences and needs into the design and planning process.

7.1.8 Other Notable Findings: Design Approach and Landscape Architects Preferences

My study examined factors that potentially may cause differences among landscape architects regarding to their preferences for wetlands. The hypothesis derived from the literature review suggests that a landscape architect's design approach may influence his or her landscape preference. Of the six approaches examined in the study, only the "analysis" and "spiritual design" approaches appeared to influence landscape architect's preferences for wetlands, and the differences are only for a few of the preference dimensions. Therefore, the influence of a landscape architect's design approach on wetland preferences could not be conclusively made.

Landscape architects in Malaysia appear to be relatively a homogenous group who hold similar values and perceptions about wetlands. The homogeneity probably is due to the fact that the total number of landscape architects is small (less than 400), and most have similar educational backgrounds. This homogeneity probably is good for them when it comes to championing certain issues related to the landscape architecture profession and environment, but it may be a weakness when it comes to understanding the needs of the users.

As a profession responsible for planning and designing public places, it is a potentially significant obstacle when landscape architects have sharply different attitudes than those the public particularly if they do not actively solicit public input into project planning and design. It is, therefore, crucial for landscape architects in

Malaysia to understand people's perceptions and preferences for wetlands and incorporate this understanding in their designs.

7.2 IMPLICATIONS OF THE FINDINGS

This section discusses the implications of research findings regarding wetland restoration in urban areas. The main finding of the study is that the public has significantly lower preferences for wetlands than landscape architects. This is the result of different attitudes and perceptions regarding wetlands. Therefore, there is a need to close the gap of preference differences between these two groups. The suggestions for doing this are related to environmental education about wetlands, public participation in the design process, and strategies for improving wetland restoration design and planning through the formulation of policy and the development of planning and design guidelines.

7.2.1 Environmental Education for the Public

It is recommended that an environmental education program be provided to the public because according to my findings, one of the factors that cause preference differences is that the public has significantly lower knowledge about wetlands than do landscape architects. Further, my findings of the study also indicate that, when information about wetlands was presented to the public, their agreement about wetlands functions and values changed significantly. Thus, providing useable information (knowledge) about wetlands to the public may reduce differences between the public's and landscape architects' attitudes regarding wetlands.

According to Schneider (1992), environmental education programs are one of the tools that can be used to solve a conflicts in environmental management because these programs can create awareness about the relationships between ecosystem functions, human intervention and ongoing management activities. Environmental education programs also have been found to change people's environmental attitudes, beliefs, and emotions (Pooley & O'Conner, 2000). However, there is a question about what should be taught to the public about wetlands, as there is vast information about wetlands. Therefore, it is important to know what types of information need to be conveyed.

Ideally, the public should be educated about wetlands as much as possible, but this maybe impractical due to time and cost constraint. It is proposed that environmental education programs concentrate on educating the public about wetland functions and values in urban areas. Emphasis should be given largely to wetland functions and values because my findings indicate that the public has lower agreement on these functions and values than do landscape architects. The public's lower understanding about wetland functions and values results in concerns about the effect of wetlands on safety and health, as well as their potential for enjoyment near wetlands. Since part of their concern centers on wetlands with aquatic vegetation and brownish water and their assumption is that these are not healthy; this may not be the case, as they may be more biologically productive than clear blue water. If the public is more knowledgeable about wetland functions and values, they will become less concerned about wetland safety and will likely enjoy seeing the wetlands. Consequently, they may actually prefer wetlands, and hence support wetland restoration programs.

However, it can be argued that wetlands have multiple benefits and functions so what wetland functions and benefits should be taught to the public? According to my findings, the public agrees on wetland functions that obviously benefit them directly, such as those of open spaces, recreation and education. However, they agree less on functions that are related to the integrity of urban ecosystems such as the supply, storage and quality of fresh water. This may be due to the fact that the public can not imagine or visualize how wetlands' ecological functions can be beneficial to them.

Therefore, I recommend that environmental education programs emphasize that wetlands are part of a larger ecological system that is both influenced by surrounding land use activity, as well as serve societal needs through ecological functions. The public will be more receptive to the idea of wetland restoration if the environmental education program can demonstrate how wetlands could solve some of environmental problems and increase the quality of life in urban areas. For example, educational program could point to the importance of wetlands to curb flooding because flash flooding is one of the problems faced by urban areas/dwellers in Malaysia.

The public should be educated about how wetlands can reduce flooding by restoring them within urban storm management system by using techniques such as vegetation swales, rain gardens and bio-retention ponds. In this regards the public

would have an opportunity to see wetlands as an important ecosystem that relates to many aspect of their life. Having considered what information is needed, the question remains, what is the best delivery method?

There are many ways to teach the public about wetlands. However, the environmental education program should place emphasis on “activity based learning programs” in addition to more typical lectures. Activity based learning programs directly exposes participants to the real environment (Hudson, 2001). Among these programs' activities are visits to established natural or restored wetland areas and the planting of wetland vegetation. Further, participants can be taught to monitor the health of wetland areas by measuring the stability of the plants, water quality indices, and wildlife populations (including micro-invertebrates which serve as indicators of water quality). By becoming more familiar with wetlands through hands-on activities, the public's familiarity and attachment to wetlands will increase. This learning method is suggested because my findings indicate that participants who have greater familiarity with the outdoor or natural environment have higher preferences for wetlands. When the public becomes more familiar with wetland environments, their preference for wetlands will increase, consequently they will support the idea of wetland restoration.

The public comprises many groups and individuals, so to make the environmental education effective, we must know who needs to be educated. According to environmental education's general rule, the people that are directly affected by a particular environmental management program should be educated (Schneider, 1992). Therefore, for this study, the public who live around the site (its neighbors) should be encouraged to become involved with the environmental education program. In addition to following the environmental education general rule, this recommendation is based on the finding that neighbors of the wetlands have lower preference for wetlands than do the visitors. Wetland neighbors should be involved in the environmental education program and be educated about the ability of wetlands to solve problems faced by the park and increase their quality of life.

7.2.2 Engaging the Public in the Planning and Design Process

My study indicates that landscape architects have different preferences for wetlands than the public, and that park managers have low predictability of public

preferences for wetlands. There will be a serious problem if landscape architects and park managers continue to ignore public needs and preferences because if wetland restoration projects are done without thorough understanding of the public preferences for wetlands, they likely will face public opposition. Therefore, it is suggested that park managers and landscape architects engage the public in the planning and design process for wetland restoration projects.

Input from the public is important because members of the public would like to protect their interests and the opportunity to participate in the design process encourages them to express their concerns, opinions, and preferences. According to Ortolano (1997), involving the public in the planning and design process follows the ideal of the democratic process, and Keuhl (2001) notes that public participation will enhance environmental education, civic involvement, and voluntary action.

As we know, the public is comprised of many different groups and individuals, so whose opinions and preferences should matter? According to Ortolano (1997), people who live in close proximity, and users of the project areas are among the public most likely to be affected by a management plan[40]. The opinions of these two groups of the public should be sought. My study indicates that neighbors have low preferences for wetlands. The frequent park users, even though they have higher preferences for wetlands than do the neighbors, they are some of the primary users of the park and their opinions should matter. Furthermore, frequent visitors, as members of the public, still have lower preferences for wetlands than landscape architects. In addition, these two groups likely will be the most influenced if a wetland restoration project is carried out.

By understanding these two groups' opinions, park managers and landscape architects can plan and design responsively to their needs. According to R. Kaplan, S. Kaplan, and Ryan (1998), the most inappropriate question to ask the public is, "what do you want?" because many people will have no answer (p. 134). Therefore, two types of information need to be obtained: first, what are the public preferences for wetlands and second, how is the existing site used? This information should be used to develop design guidelines for future wetland restoration planning and design.

[40] Other people who probably need to involve in the public participation process are those live downstream from wetlands system because the downstream areas could easily be flooded or polluted if wetlands are not restored above them

7.2.2.1 Public preferences for wetlands

This study recommends that information about public preferences for wetlands be obtained, examined and used to inform the design of wetland restoration projects because the public has different preferences for wetlands from landscape architects and park managers. However, because I already have the information about people's preferences for wetlands, it will be useful to use the findings from this study to develop design guidelines for future wetland restoration projects. Please refer to *Section 7.2.4.2* for the recommended design guidelines based on the findings from this study.

7.2.2.2 Public use of urban open spaces

In addition to the public's preferences for wetlands, the way the public uses existing urban open spaces also should be examined before any wetlands restoration takes place. My study indicates that the public prefers landscapes that have the potential for involvement. Additionally, motivations to use urban natural open spaces significantly influence preferences for wetlands.

Understanding the way the public uses open spaces can help planners and designers to design the wetland restoration areas in a way that is compatible with the need for open space, recreation, and leisure. Careful analysis of public use of open spaces and wetlands can help ensure that compatible park activity is located within the sensitive wetlands areas.

Information on how people use existing urban natural open spaces can be obtained through observation and interviews. Landscape architects, planners, and park managers can go to urban natural open spaces and systematically observe how people use the areas. Observation also can be done remotely by video, and later the data can be transcribed and analyzed. Planners and designers should be taking notes on the areas that are most used, the number of people using the areas, how people use them, when they used them, and who is using them. This information is important because my finding indicates that people use urban open space in many different ways and utilize different types of landscapes. By understanding the ways people use landscapes, the planners and designers can restore wetlands according to people's activities. For example, wetlands might not be suitable for restoration in areas that are popularly used for passive and group activities.

During the interview process, people need to be asked to draw their mental map of the natural areas affected by the project. The mental mapping technique is used to yield information about people's images of a particular environment. This technique was introduced by Lynch (1960) to elicit ordinary people's or local citizens' image of the city of Boston. The images[41] revealed by his exercise were relevant to the participants' concept of the character of the city.

For wetland restoration purposes, the information that should be obtained from the mental mapping exercise are the patterns of spatial distributions indicating areas people use the most. In addition, the mental mapping exercise should be able to identify the importance and the strength of existing natural area's public image and character in the urban context. The information gathered through the mental mapping exercise should be useful to designers on how familiar people are with the place, and how meaningful the places are to them. If people regard the place as very meaningful, the wetland restoration program should try to protect the existing image and character because familiarity affects people's preferences for the environment and can either support or undermined proposed planning/design intention. If the image and character of the place is not very strong, then designers and planners should enhance the new images of the place by effectively using wetlands.

Information about people's preferences for wetlands and ways people use existing urban open spaces should be employed to develop guidelines for the wetland restoration project's design. However, public participation should not stop here, and engaging the public in the design process means that landscape architects and park managers needs to obtain public feedback on the proposed design.

The public has different preferences from the experts, and that differences are caused by their levels of knowledge. Therefore, landscape architects and park managers should be very careful when presenting the design to the public. If the public cannot understand what has been proposed, even though the designers try to meet people's needs, landscape architects and park managers will have difficulty obtaining constructive feedback and approval from the public.

[41] Lynch found five types of images pertinent to city character; landmark, edge, nodes, path and district. For further discussion see Lynch (1960).

Therefore, what is needed is a method of presentation that can convey the idea of wetland restoration design easily and directly to the public. The method also should shy away from using technical and scientific jargon. Therefore, environmental simulation through visual images and models[42] should be used to present the wetland restoration idea to the public. A study by S. Kaplan, R. Kaplan, and Deardorff (Kaplan & Kaplan, 1982) found that people react the same way to highly detailed models and conceptual models.

7.2.3 The Need for a Policy Regarding Urban Wetlands Protection, Conservation and Restoration

In my interviews with park managers, they said one of the problems related to urban wetland management is that there is a lack of policy regarding wetland conservation and restoration. The lack of a clear policy on wetland management has led the destruction of natural wetlands in urban areas. Therefore, there is an urgent need to formulate a strong policy advocating natural wetland conservation and restoration in urban areas.

The policy should state clearly objectives, provide a framework, mandate inter-agency coordination and responsibilities, and provide a long-term strategy for achieving objectives. The policy should be comprehensive enough to ensure that it covers all aspects of wetland management. Below are some recommendations for the formation of a policy.

7.2.3.1 Focus on goals and objectives toward urban wetland protection and restoration

An urban wetland conservation and restoration policy must have clear goals and objectives. The goals and objectives should provide a framework for urban wetland ecosystem inventory, as well as monitoring and protection these resources in the city. Wetlands should be regarded as an important ecosystem in the urban areas that serve both ecological and societal needs. In addition, the goals and objectives should lay a foundation for research on wetlands and their resources, and develop a strategy to

[42] Visual images and models can be in combination of physically constructed models, hand drawn plans and perspectives, and computer digital modeling to convey the changes wetlands restoration could bring.

protect urban wetlands ecosystem through comprehensive planning guidelines and law enforcement. My study indicates that park managers currently do not have such a framework to carry out wetland restoration, planning, and design.

7.2.3.2 Forming a one-stop wetlands management agency

According to park managers, one of the problems regarding wetland management in Malaysia today is overlapping tasks amongst agencies. This results in complication and delays in wetlands restoration and conservation work. I recommend that the government changes its organizational structures and agency charges to assure that coordination take place. This might be done in different ways. Perhaps and agency could be given oversight responsibility or a new agency could be form to oversee wetland and river management issues in Malaysia. By having this one-stop agency, a problem of overlapping jurisdiction and tasks among agency could be reduced. The urban wetland policy should have a mandate to form this new agency at all the federal, state and local government levels. The new agency should also be the guardian or enforcer of the new urban wetland policy.

7.2.3.3 Focus on increasing public education and participation

It was proposed earlier that environmental education and public participation be included in the planning and design process of wetland restoration. Additionally, park managers agreed on the importance of environmental education for wetland management. It is further recommended that public education regarding the importance of wetland ecosystem be placed partly on the government's shoulders. Public education about wetlands must be done in conjunction with storm water management education as well because they are critically linked. Higher awareness on the part of the public about the importance of wetland ecosystem will encourage them to become involved in the planning process for wetland conservation. Public participation in the planning and design of wetland projects should be required through governmental policy. Public input is vital to ensure that conservation and restoration efforts are successful.

7.2.3.4 Focus on developing planning and design guidelines for urban wetlands restoration and conservation projects

Earlier, it was proposed that parks managers and designers engage the public in the planning and design process. One way to engage the public is through the identification of their preferences for and uses of urban natural areas. This information should be used to design wetland restoration programs and to develop planning and design guidelines for urban wetlands restoration and conservation projects. Below are suggested wetland restorations planning and design guidelines based on the findings from this study.

Planning for diversified types of open spaces in urban areas

One of the important findings in this study is that public preferences are based on motivations to use urban natural open spaces. Therefore, people's motivations for using open space should be taken into consideration when planning open spaces such as parks and natural areas within the city. It is recommended that types of open spaces in the city should be diversified to cater to various people's motivations for leisure and recreation.

Currently in Malaysia, the planning of natural open spaces in the city is based on the ratio of population to open spaces size, and the ratio of built-up areas to open space areas. However, no emphasis is given to the type of open spaces that should be provided; as a result, most of the urban natural open spaces that are developed look very similar. Therefore, given that people's preferences are based on their motivations to use urban natural open spaces, I recommend that urban natural open spaces be planned according to people's motivations to use them. This can be done by designating potential urban natural open spaces according to activity (Diagram 1).

In a city where multiple open spaces exist, different open spaces can be designated for different activities. Therefore, there would be specific places for nature exploration and environmental education, sports and recreation, and less intensive and group activities. By diversifying, the types of natural open spaces available, people will have choices based on their preferences and leisure needs. Further, conflict between users also can be reduced, and conflicts between the planner/designers and the public

about the management of the urban natural open spaces, including the decision to restore wetlands in urban open spaces.

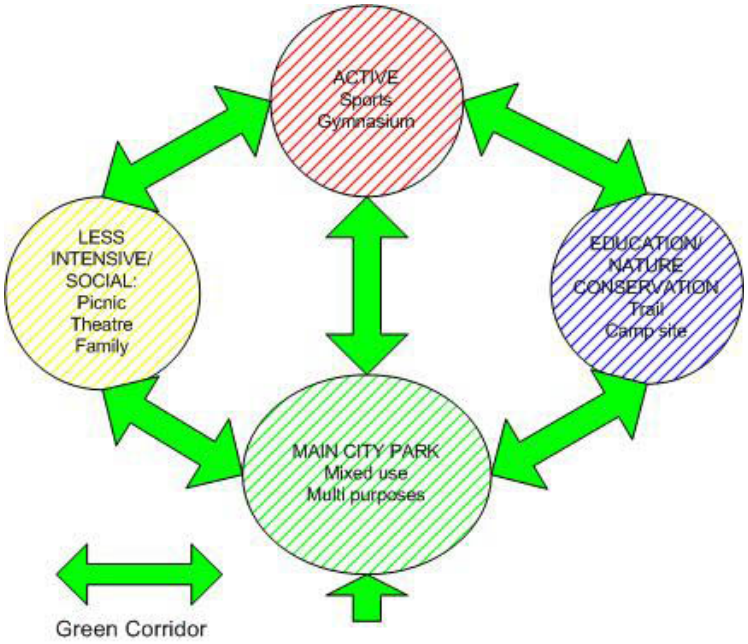


Diagram 1: Distribution of city open spaces based on activity types

The planning of open spaces based on activity types can help planners and landscape architects achieve pre-emptive protection and conservation of existing natural wetlands areas because developers and designers of the area will have to follow planning guidelines so that existing wetlands cannot be replaced or destroyed.

Design an urban natural open space to meet people's motivation

It was recommended earlier that urban open spaces should be planned according to people's motivations for using urban open space. However, it is also important to take into consideration people’s motivations when designing a wetland restoration program in an urban natural open space. It is recommended that the site be broken down into activity zones, for example, in one open space; there will be specific zones for active nature exploration as well as other needed, desired and appropriate activities (Diagram 2).

Park zoning will help reduce conflicts that may arise among users, and lesser conflicts between users and nature. Further, zoning will help designers plan each zone

according to an activity. However, if planning of urban natural open spaces in the city already is based on a variety of particular activities, then why do we need zoning within a particular open space? The zoning proposal is not to undermine planning decisions but rather to provide multiple experiences because people experience leisure and places in many ways (Hull, Michael, Walker, & Roggenbuck, 1996; Ryan, 2000).

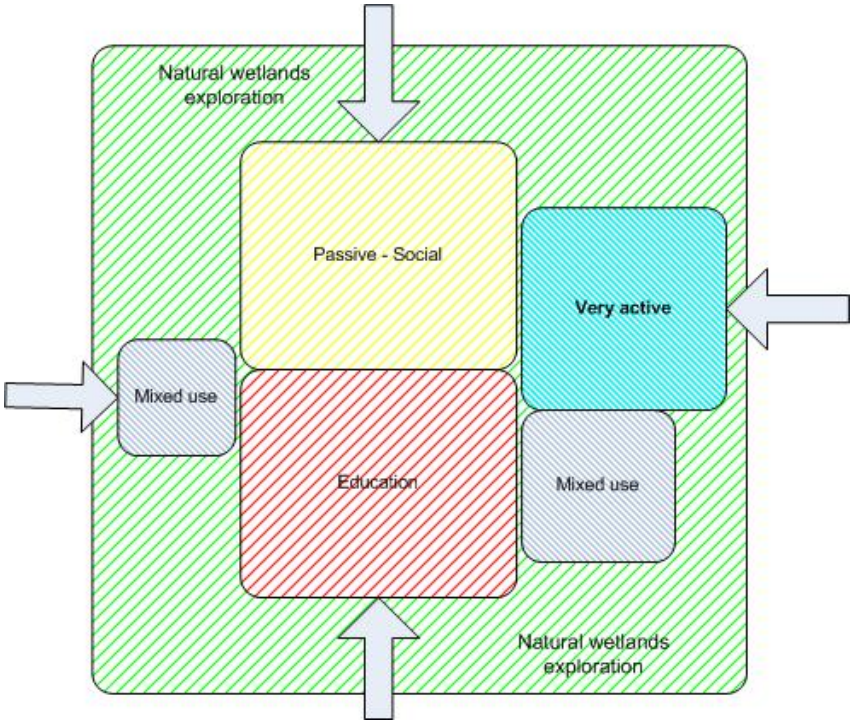


Diagram 2: Zoning of parks that accommodate wetland restoration areas

Design to meet people's preference

One of the important findings of this study is that people's preferences for wetlands are different from the experts'. Therefore, it is important to use people's preferences to develop guiding design principles for wetlands restoration and conservation. Below are some guiding principles for the design of wetlands restoration projects, developed by using the public's preferences for wetlands.

Make the water visible at key location

The public prefers scenes with the presence of open water without a lot of vegetations. Therefore, these types of areas in wetlands should be seemed as viewing

opportunities for users whenever possible. Viewing opportunities can be made possible by using these strategies:

1. Do not cover the entire available area with wetlands plants. Provisions should be made for the creation of ponds, streams, or lakes in the restored areas (Figure 17).
2. Allow people to see open water at key location (along trails or when they enter the site) in addition to the wetlands plants. The view of water as a focal point will attract users to the area (Figure 17).
3. Locate passive recreation areas, such as picnic areas so that the users can see open water if possible
4. The major walkways in the restored areas should be aligned adjacent to the water at key point where this does not conflict with water quality and habitat functions to provide opportunities for people to glimpse the water (Figure 18).

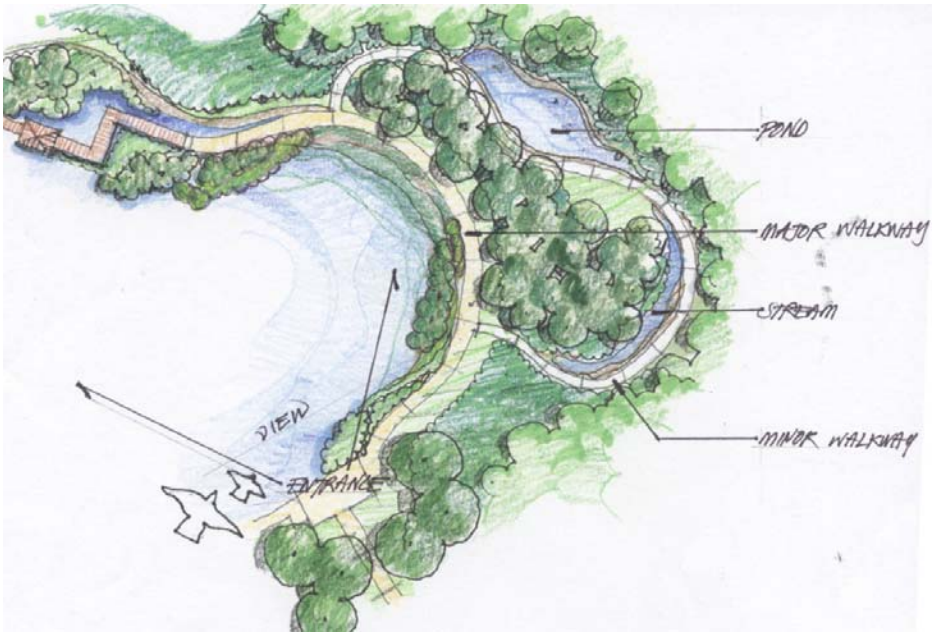


Figure 17: Plan indicating restored areas not completely covered with wetland vegetations allowing people to see the water from the entrance

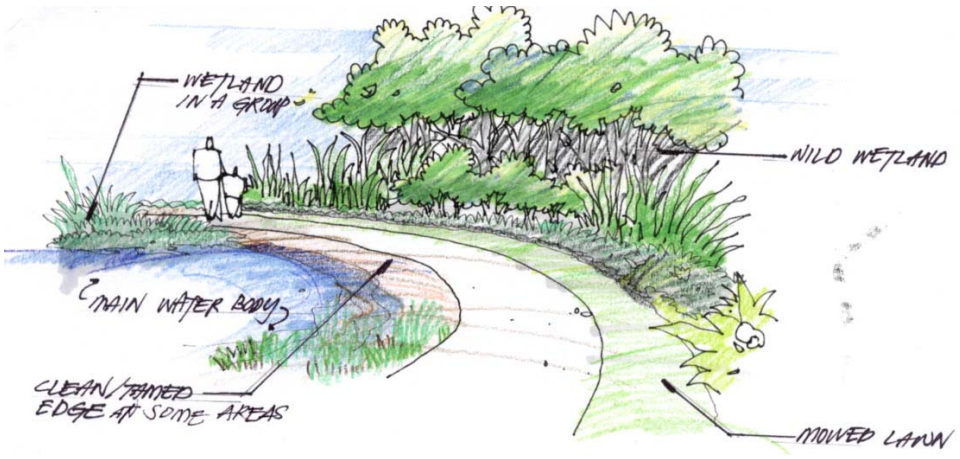


Figure 18: Major walkway with a glimpse of the water

5. Along the minor walkways, where wetlands are thick and dense, create “water openings” so people can see open water occasionally. Provide stopping points at these “water openings” so people can enjoy the scenic and tranquil aspects of wetlands (Figure 19).

Figure 19: Enhance minor walkways with "water openings"

Blend the restored wetland areas with man-made structures

The study indicated that the public prefers landscapes that show signs of human influence. Therefore, it is proposed that man-made structures should be introduced to the restored wetland areas. However, the introduction of the man-made structures must be done in a manner that does not jeopardize the ecological integrity of the wetlands.

The man-made structures must blend harmoniously with the landscape. Among the strategies that can be taken into consideration are:

1. Introduction of small human structures in the restored wetland areas, such as bird houses, signage, information sign or benches and introduce boardwalks in sensitive wetlands areas (Figure 20).

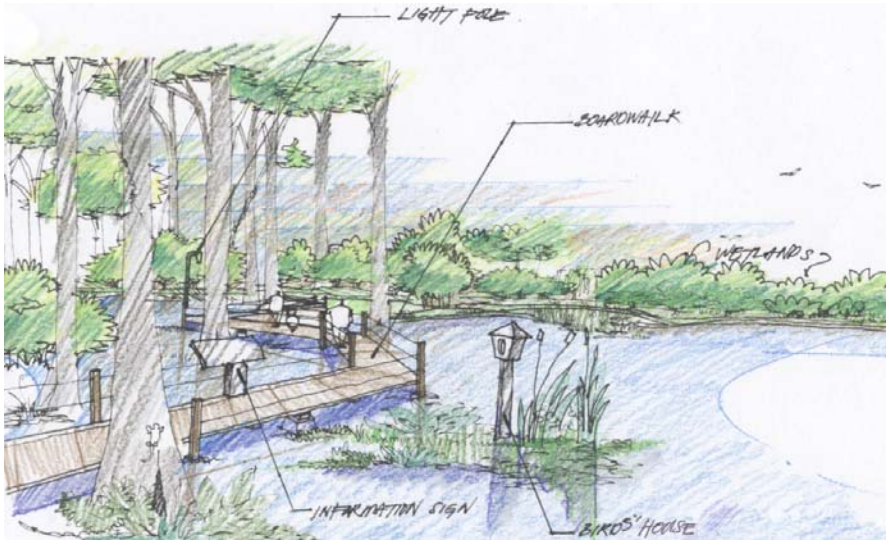


Figure 20: Blending natural wetlands with man-made elements

Tamed and maintained landscapes around the restored wetlands

The public prefers landscapes that look tamed, smooth, and very well-maintained, and they do not prefer scenes of natural wetlands with tangled vegetation and scruffy edges. Therefore, to increase the public's preference for wetlands and the potential acceptance of wetland restoration projects, landscapes around the restored wetlands could be tamed and maintained in high user traffic zones. This is because the findings from the study suggest that passive and social activity users like to see tamed and highly maintained landscapes. On the other hand, in low volume and active zones, wetland areas can be less manicured, denser, and somewhat wild, because active users prefer all types of setting and nature explorers like natural wetlands settings. The landscapes can be tamed and manicured by:

1. Introducing a strip of mowed lawn[43] along and around wetlands where they are trails and walkways, especially along the primary walkway and in areas with high volumes of passive and social activity users (Figure 21).
2. Groom wetlands along the primary walkway and in areas of high volume of passive and social activity users by pruning and thinning (Figure 21).
3. Introduce color (with flowering wetlands plants) along the primary walkway and in areas of high volume of passive and social activity users.

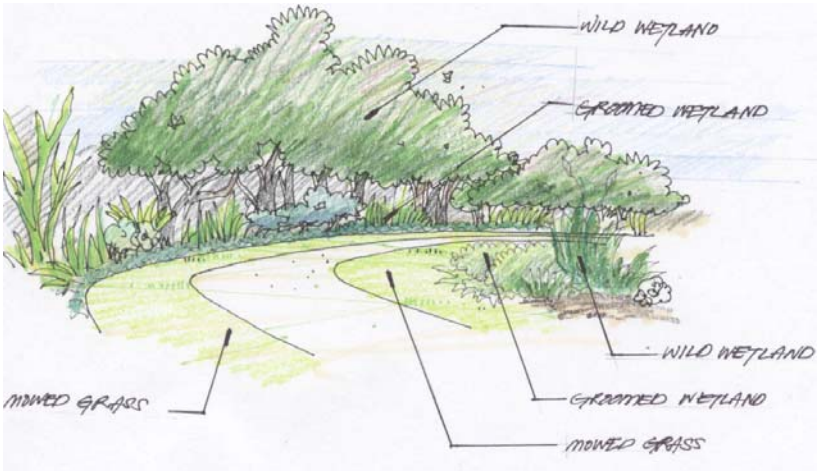


Figure 21: Surrounding wetlands with tamed and groomed landscapes

Increase the legibility of the restored wetland areas

Legibility of the scenes is another factor influencing the public's preferences for wetlands. Legible scenes mean that a person can understand the landscape and easily find their way through it. Therefore, given that natural wetlands usually are dense, dark, and sometimes seem unorganized, legibility is a very important factor to be increased in the restored wetlands areas. To increase legibility, the following strategies can be applied:

[43] Mowed grass only needs to be 1-3' wide (one mower pass on each side to minimize pollution and create clean edge)

1. Introduce a memorable and distinctive feature in the wetlands areas. The feature can be a specially shaped tree, an arbor or place specific marker (signage). The features should be located so that it can serve as a landmark for users (Figure 22).
2. Create openings within the wetland in certain areas so people can see through the wetland plants (Figure 22).
3. Provide signage with maps, in appropriate areas, so users can locate themselves within the wetland (Figure 22).

Figure 22: Legibility of wetland areas enhanced by landmarks, such as an arbor and a sign (map)

Enhance the of mystery in wetlands

Similar to legibility, the public also prefers scenes with high mystery. Mystery occurs when there is a sense or promise of additional information in a landscape if the viewer could move farther in. Therefore, the restored wetland areas should be enhanced with curvilinear walkways, with partially blocked views, and interesting features with plants or other landscape elements (Figure 23).

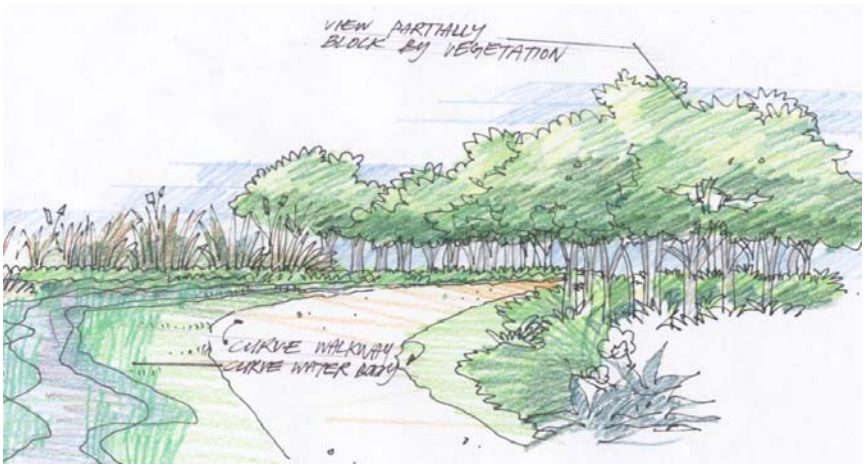


Figure 23: Mystery enhanced with curvilinear pathway

Increase visual coherence of the wetlands areas

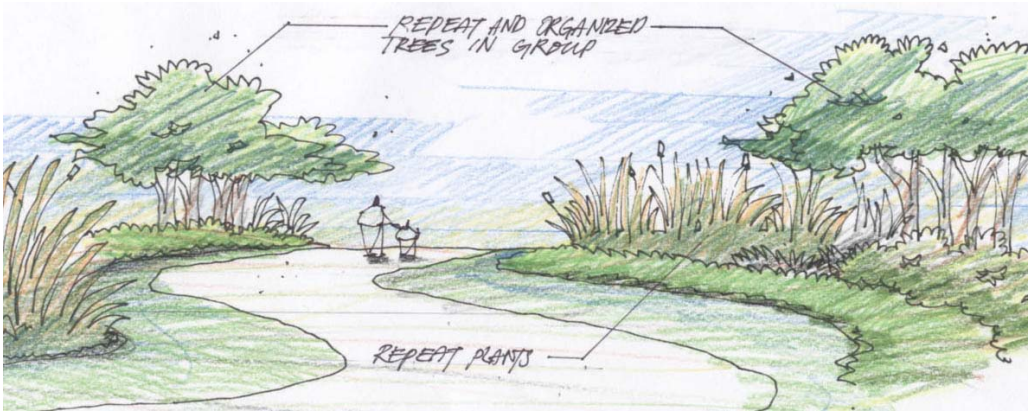


Figure 24: Visual coherence of the scene enhanced by organizing various elements in the landscape

Similar to legibility and mystery, the public prefers scenes with high visual coherence. Coherence refers to the organization of the elements in the scenes. The organization must allow the environment to be broken up into distinct areas or spaces so people easily can understand the scene. Coherence can be increased by repeating similar elements in the spaces but the element cannot be repeated overwhelmingly because it will invoke boredom (Figure 24).

7.2.4 Continuing Education for Landscape Architects and Experts

Landscape architects have significantly more knowledge regarding wetlands than the public and park managers have low predictability of the public's preferences for wetlands. Further, some of park managers are reluctant to allow the public to become involved in the design process on the basis that “designers know everything and whatever we provide will be liked by the people.” This result suggests that some landscape architects and park managers may have a problem understanding people's preferences. This may be due to the fact that they were educated during an era when public participation processes were never been of or simply because very few public participation processes currently exist in Malaysia.

Therefore, strategies are needed to allow landscape architects and park managers to continue obtaining knowledge to upgrade their professional competence regarding public participation methods and techniques. There are opportunities for landscape architects to continue their education at the graduate level in many colleges but these efforts require a long-term commitment, far beyond what is needed to improve public participation processes. There is a need to provide avenues for short-term education programs for landscape architects. Two avenues are possible for the purposes above: publications and continuing education programs.

7.2.4.1 Publications

The landscape architecture profession in Malaysia needs to have high quality publications to disseminate knowledge to landscape architects and planners. Currently, there is Landscape Architecture Magazine Malaysia, published six times a year by Institute Landscape Architecture of Malaysia (ILAM). However, the magazine reports on completed projects and product news. Few of the articles discuss research type, evaluations or studies, such as information about the use of people's preferences in planning and design. Therefore, this magazine should begin to publish articles about landscape architects' research findings, such as new design processes, theories, and methods. This magazine is the best tool to disseminate knowledge to landscape architects because many landscape architects in Malaysia read it.

Another type of publication that can help disseminate knowledge to landscape architects is a journal. It is suggested that the Council of Educators of Landscape

Architecture Malaysia start publishing its own journal. They can publish the journal in cooperation with ILAM and it should be circulated to all landscape architects in Malaysia. However, in order to have a journal that can be read and understood by all landscape architects, not all of the articles should be strictly regulated by academic writing protocol. The journal should accept articles that are relatively light, but scholarly written and focusing on new ideas that can be useful to the practice of landscape architects.

7.2.4.2 Continuing education programs

Another way to disseminate knowledge to landscape architects is by setting up continuing education programs. ILAM should cooperate with universities that have landscape architecture programs in Malaysia to set up programs to meet the need for landscape architects' continuing education. The center can provide short courses (2-3 weeks or 2-3 days) to teach newest principles, theories and methods related in landscape architecture and design (for e.g., theories and methods of public participation in the design of urban natural areas)

7.3 LIMITATIONS AND IMPROVEMENT TO THE STUDY

An objective of my study was to understand public preferences for wetlands in comparison to landscape architects' preferences. The findings have broadened our understanding about people's preferences for wetlands and factors that influence their preferences. However, further study can be made better with several improvements. Below are my recommendations.

7.3.1 Encompass as Many Types of Wetland as Possible

Sixty four scenes of wetlands from Malaysia were used in this study. However, these scenes do not encompass all types of wetlands available in Malaysia because the study only focuses on the existing and natural wetlands that currently associate with the urban areas. Therefore, it is proposed that future studies include other types of wetlands in Malaysia. In addition to natural wetlands, it is also important to examine people's preferences for constructed wetlands because they have gained popularity among environmental advocates, designers, and planners in many parts of the world. The

inclusion of many types of wetlands will enrich our knowledge about people's reactions to different kinds of wetlands and increase the reliability and validity of findings regarding perceptions of wetlands.

7.3.2 Include Multiple Sites and Participants

My study used Kelana Jaya Municipal Park as its study site. Further, participants in my study were limited to the Section 7, Kelana Jaya residents and visitors to the park. As a result, my findings may be limited primarily to the Kelana Jaya or Petaling Jaya area only. Therefore, to increase the external validity of the findings, it is proposed that multiple sites be included in future studies.

7.3.3 Ensure Enough Participants from Various Sub-groups

My study focused on public preferences for wetlands in comparison to landscape architects. To that end, this study made an effort to ensure that every sub-group (ethnicity, income, gender, etc) was well represented. Even though my findings indicate some significant results related to the sub-groups' preferences, there is a need to do additional research to provide more substantial data and to draw stronger conclusions. Enough participation from various sub-groups is important because the study focused on the urban areas where cultural diversity exists. It is also important because Malaysia is a multi-racial country, and understanding the perceptions of each culture regarding wetlands is vital for any broad-based support for wetlands and natural resources management.

7.4 FUTURE RESEARCH CONSIDERATIONS

My findings have shed light on people's preferences for wetlands in Malaysia and the implication for wetland restoration in Malaysia. However, the efforts should not stop here; continuity is important so our understandings about people's relationships with wetlands are broadened. Below are suggestions for future research topics.

7.4.1 Further Inquiry about the Roles of Knowledge in Determining Preferences for Wetlands

One of my study findings is that an understanding of wetland functions and values influence people preferences for wetlands. However, despite these notable and promising findings, the study does not-test if participants' preferences change after they are provided with information about wetland function and value. It can be argued that this study finds that participants' agreement about the importance of wetland values and functions significantly changed after they read the statement about wetlands. However, it can be counter argued that it was participants' verbal agreement, and what they feel about wetlands after reading the statement on wetlands functions and values may not translate into their actions or preferences. Therefore, there is a need to examine if people's preferences for wetlands change after they are given more substantive information about wetland functions and values.

7.4.2 Expert Attitudes toward Public Participation Process

One of the proposals to improve the planning and design of wetland restoration areas is to include the public in the planning and design process (i.e., public participation). However, for public participation to be successful and meaningful, experts such as planners, landscape architects, and park managers (especially in Malaysia) first must embrace the concept of public participation. However, little is known about experts' attitude towards public participation. Therefore, the question remains, are the experts ready or willing to embrace public opinions and preferences for the planning and design process of the wetland restoration or the management of any natural areas?

This question is important in the Malaysian context because the idea of public participation is relatively new. Some park managers interviewed for this study disagreed with the necessity to have the public participate in the planning and design process. The findings of this inquiry will help promote the types of public participation that are most effective.

7.5 CONCLUSIONS OF THE STUDY

My study validates the hypothesis that opposition towards wetland restoration in urban natural areas, in particular at Kelana Jaya Municipal Park, is due, at least in part, to the fact that the public has significantly different preferences for wetlands from those of landscape architects. In addition, the problem (public opposition to wetland restoration) is exacerbated because park managers have low predictability of public preferences for wetlands. If urban wetlands restoration, conservation, and protection programs are to be successful, the experts (landscape architects, planners, or land managers) cannot exclude people's preferences from their planning and design of these programs.

Public involvement in the planning and design process is needed to reconcile existing differences between public and expert opinions. If the differences are not addressed, there will be continuous and mounting opposition by the public to wetland restoration programs and a lack of long-term protection and support for future environmental programs. Information from the public should be used to inform policy regarding urban wetlands. Public involvement allows people to provide feedback on the proposed plans. The differences between experts and the public must be reconciled to have a successful wetland restoration project. Aside from the public involvement in the planning and design process, the role of knowledge should not be neglected. Environmental education is vital in bridging the gap in between the experts and the public.

Wetland restoration is a wonderful, ecological important and pragmatic way to solve some of the environmental problems the world faces today. However, science alone cannot execute wetland restoration because a project of this scope requires extensive human resources and capital to maintain and care for the restored landscapes. Broad public support is needed to ensure the project is maintained, not only for the short term but also over multiple generations. These projects have to be negotiated by society because the landscapes that we have are a reflection of societal values toward the environment as a whole.

My study provides new information about people's preferences for wetlands and the factors that influence those preferences. My findings also are a starting point to increase base of knowledge regarding people's preferences for wetlands and people's

attitude toward wetland restoration in Malaysia. More studies are needed in the future to further validate this study's findings, to broaden our understanding about the relationship of man and nature, and to find a way to make the world a better place.

REFERENCES

Abdul Samad, H. (1998a). Opening the peninsula: Colonial impacts. In Sham Sani (Ed.), *The Encyclopedia of Malaysia: The Environment* (Vol. 1, pp. 86-88). Kuala Lumpur: Archipelago Press.

Abdul Samad, H. (1998b). Post independence development. In S. Sani (Ed.), *The Encyclopedia of Malaysia: The Environment* (Vol. 1, pp. 86-87). Kuala Lumpur: Archipelago press.

Appleton, J. (1975). *The experience of landscape*. London: Wiley and Sons.

Appleton, J. (1984). Prospect and refuge revisited. *Landscape Journal, 3*(2), 91-103.

Balling, J. D., & Falk, J. H. (1982). Development of visual preference for natural environments. *Environment and Behavior, 14*(1), 5-28.

Carls, E. G. (1974). The effects of people as man induced conditions on preferences for outdoor recreation landscapes. *Journal of Leisure Research, 6*(2), 113-124.

Carr, S., Francis, M., Rivlin, L. G., & Stone, A. M. (1995). *Public space*. Cambridge, MA: Cambridge University Press.

Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2 ed.). New Jersey, NJ: Lawrence Elbaum Associates.

Craik, K. H., & Feimer, N. R. (1979). *Setting technical standards for visual impact procedures.* Paper presented at the Our National Landscape Conference, Berkeley, CA.

Crewe, K., & Forsyth, A. (2003). LandSCAPES: A typology of approaches to Landscape Architecture. *Landscape Journal, 22*.

Crowe, S. (1978). *The landscape of forest and woods* (Vol. 44). London, U.K.: British Forestry Commission.

Daniel, T. C. (2001). Whiter scenic beauty? Visual landscape quality assessment in the 21st Century. *Landscape and Urban Planning, 54*, 267-281.

Daniel, T. C., & Vining, J. (1983). Methodological issues in the assessment of landscape quality. In I. Altman & J. F. Wohlwill (Eds.), *Behavior and Natural Environment* (Vol. 6, pp. 39-80). New York: Plenum Press.

D'Cruz, R. (1999). Lowlands and wetlands. In S. Sani (Ed.), *The Encyclopedia of Malaysia: The Environment* (Vol. 1, pp. 52-54). Singapore: Archipelago Press.

Driver, B. L., Brown, P. J., & Petterson, G. L. (Eds.). (1991). *Benefits of leisure*. State College: PA: Venture Publishing.

Driver, B. L., & Manfredo, M. J. (1996). Measuring leisure motivation: A Meta analysis of the recreation experience preference scales. *Journal of Leisure Research, 28*(3), 188-213.

Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston, MA: Houghton-Mifflin.

Gobster, P. H. (2001). Vision of nature: Conflict and compatibility in urban park restoration. *Landscape and Urban Planning, 56*, 35-51.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5 ed.). Sadle River, NJ: Prentice Hall.

Hammit, W. E. (1978). *Visual and user preferences for a bog environment.* Unpublished PhD, University of Michigan, Ann Arbor.

Herzog, T. R. (1984). A cognitive analysis for field and forest environment. *Landscape Research, 9*, 10-16.

Herzog, T. R. (1985). A cognitive analysis of preferences for waterscapes. *Journal of Environmental Psychology, 5*, 225-241.

Herzog, T. R. (1987). A cognitive analysis of preference for natural environment: mountains, canyons and deserts. *Landscape Journal, 6*, 140-152.

Herzog, T. R. (1995). A cognitive analysis of preference for urban nature. In A. Sinha (Ed.), *Landscape Perception* (pp. 65-82). New York: Academic Press.

Howell, D. C. (2002). *Statistical methods for psychology* (5 ed.). Pacific Groove, CA: Duxbury Thomson Learning.

Howes, J. (1999). Mangroves. In Sham Sani (Ed.), *The Encyclopedia of Malaysia: The Environment* (Vol. 1, pp. 56-58). Singapore: Archipelago Press.

Hudson, S. J. (2001). Challenges for environmental education: Issues and ideas for the 21st century. *BioScience, 51*(4), 283-288.

Hull, R. B., Michael, S. E., Walker, G. J., & Roggenbuck, J. W. (1996). Ebb and flow of brief leisure experience. *Leisure Science, 18*, 299-314.

Hull, R. B., & Revell, G. R. B. (1989). Issues in sampling landscapes for visual quality assessments. *Landscape and Urban Planning*(17), 323-330.

Hwang, S. (1998). *Ancient wisdom for the new age, Feng Shui, the secrets of harmony*. New York: New Holland.

Jackson, J. B. (1970). The imitation of nature. In E. H. Zube (Ed.), *Landscapes: Selected Writings of J.B. Jackson* (pp. 76-87). Amherst, MA: University of Massachusetts.

Jordan, W. R. (2000). Restoration, community and wilderness. In P. H. G. a. R. B. Hull (Ed.), *Restoring Nature: Perspective from the Social Sciences and Humanities* (pp. 21-36). Washington D.C.: Island press.

Kaltenborn, B. P., & Bjerke, T. (2002). Associations between environmental value orientations and landscape preferences. *Landscape and Urban Planning, 59*, 1-11.

Kaplan, R. (1973). Predictors of environmental preferences: designers and clients. In W. F. E. Peiser (Ed.), *Environmental Design Research*. Stroudsburg, PA: Dowden, Hutchinson and Ross.

Kaplan, R. (1977). Preferences and everyday nature: Method and application. In D. Stokols (Ed.), *Perspective on Environment and Behavior: Theory, Research and Applications*. New York: Plenum Press.

Kaplan, R. (1983). The role of nature in the urban context. In I. Altman & J. F. Wohwill (Eds.), *Behavior and Natural Environment* (pp. 127-162). New York: Plenum Press.

Kaplan, R., & Austin, M. E. (2004). Out in the country: Sprawl and the quest for nature nearby. *Landscape and Urban Planning, 69*, 235-243.

Kaplan, R., & Herbert, E. J. (1987). Cultural and sub cultural comparison in preference for natural settings. *Landscape and Urban Planning, 14*, 281-293.

Kaplan, R., & Kaplan, S. (1989). *The Experience of Nature: A Psychological Perspective*. New York: Cambridge University Press.

Kaplan, R., Kaplan, S., & Ryan, R. L. (1998). *With people in mind: Design and management of everyday nature.* Washington, D.C.: Island Press.

Kaplan, R., & Talbot, J. F. (1988). Ethnicity and preference for natural settings: A review and recent findings. *Landscape Planning, 15*, 107-117.

Kaplan, S. (1979). *Perception and landscape: Conceptions and misconceptions.* Paper presented at the Our National Landscape Conferences, Berkeley, CA.

Kaplan, S., & Kaplan, R. (1982). *Cognition and environment: Functioning in an uncertain world*. New York: Praeger Publisher.

Kaplan, S., Kaplan, R., & Wendt, E. (1972). Related preferences and complexity for natural and urban visual material. *Perception and Psychophysics, 12*, 354-355.

Kaplowitz, M. D., & Kerr, J. (2003). Michigan residents perceptions of wetlands and mitigation. *Wetlands, 23*(2), 267-277.

Keuhl, D. (2001). *From collaboration to knowledge: Planning for remedial action in the great lakes.* Unpublished PhD, Virginia Polytechnic Institute and State University, Blacksburg.

Knopf, R. (1987). Human behavior, cognition, and effect in the natural environment. In I. Altman & D. Stokols & L. S. Wrightsman (Eds.), *Handbook of Environmental Psychology*. New York: John Wiley and Sons.

Larson, J. S. (1975). *Evaluation models for public management of freshwater wetlands.* Paper presented at the 40th North American Wildlife and Natural Resources Conference, Washington, D.C.

Laurie, I. C. (1975). Aesthetic factor in visual evaluation. In E. H. Zube (Ed.), *Landscape Assessment: Values, Perceptions and Resources* (pp. 102-117). Stroundsburg, PA: Dowden, Hutchinson and Ross.

Lekagul, A. (2002). *A preference study of the traditional Thai Market Place: A management and preservation tool for vernacular environments.* Unpublished PhD, Virginia Polytechnic Institute and State University, Blacksburg.

Leopold, L. (1969). Quantitative comparison of some aesthetic features among rivers. *US Geological Service Circular*(620).

Lewis, M. S., Lime, D. W., & Anderson, D. H. (1996). Paddle canoeist' encounter norms in Minnesota Boundary Waters canoe area wilderness. *Leisure Science, 18*, 143-160.

Light, A. (2000). Ecological restoration and the culture of nature: A pragmatic perspective. In P. H. Gobster & R. B. Hull (Eds.), *Restoring Nature: Perspectives from the Social Sciences and Humanities* (pp. 49-70). Washington D.C.: Island Press.

Litton Jr, R. B. (1968). *Forest landscapes description and inventories: A basis for land planning and design* (PSW-49). Berkeley, CA: U.S. Forest Service and University of California Berkeley.

Lothian, A. (1999). Landscape and philosophy of aesthetic: Is landscape quality inherent in the landscape or in the eye of the beholder. *Landscape and Urban Planning, 44*, 177-198.

Lynch, K. (1960). *The image of the city*. Cambridge, MA: MIT Press.

Malaysian Department of Statistic. (2001). *Malaysian Census 2000*. Kuala Lumpur: Department of Statistic.

Malaysian Wetland Working Group. (1989). Malaysia. In D. A. Scot (Ed.), *A Directory of Asian Wetlands* (pp. 809-890). Cambridge, U.K.: IUCN.

Miller, P. A. (1984). *Visual preferences and implications for coastal management: A perceptual study of the British Columbia Shoreline.* Unpublished PhD, University of Michigan, Ann Arbor.

Miller, P. A. (1987, May). *A landscape ecology approach to visual resources management.* Paper presented at the First Symposium of the Canadian Society for Landscape Ecology and Management, University of Guelph.

Mitra, A., & Lankford, S. (1999). *Research methods in park, recreation and leisure services*. Illinois: Sagamore Publishing.

Mitsch, W. J., & Gossenlink, J. G. (2000). *Wetlands*. New York: Wiley and Sons.

Mustafa Kamal, M. S. (1994). *A cross cultural comparison of visual landscape preferences for the natural environment.* Unpublished PhD, Colorado State University, Fort Collins.

Nassauer, J. I. (1980). A non linear model of visual quality. *Landscape Research, 5*(3).

Nassauer, J. I. (1997a). Messy ecosystem, orderly frames. *Landscape Journal, 14*(2), 161-170.

Nassauer, J. I. (2004). Monitoring the success of metropolitan wetlands restoration: Cultural sustainability and ecological function. *Wetlands, 24*(4), 756-765.

Nassauer, J. I. (Ed.). (1997b). *Placing nature: Culture and landscape ecology*. Covelo, CA: Island Press.

Nassauer, J. I., Kosek, S. E., & Corry, R. C. (2001). Meeting public expectations with ecological innovation in riparian landscape. *Journal of American Water Resources Association, 37*(6), 1439-1443.

Nik Hassan, N. S. (1999). Kuala Selingsing: A mangrove settlement. In Sham Sani (Ed.), *The Encyclopedia of Malaysia: Early History* (Vol. 1, pp. 70-72). Singapore: Archipelago Press.

Office of Technology Assessment. (1984). *Wetlands: Their use and regulation* (OTA-O-206). Washington, D.C.: U.S. Congress.

Ortolano, L. (1997). Public participation and environmental dispute resolution. In L. Ortolano (Ed.), *Environmental Regulation and Impact Assessment* (pp. 402-421). Toronto, Canada: John Wiley and Sons.

Perbadanan Putrajaya, & Putrajaya Holdings. (1999). *Putrajaya Wetlands*. Kuala Lumpur: Perbadanan Putrajaya.

Pitt, D. G., & Zube, E. H. (1987). Management of natural environments. In D. Stokols & I. Altman (Eds.), *Handbook of Environmental Psychology* (Vol. 2, pp. 1009-1042). New York: Chuck Wiley and Sons.

Pooley, J. A., & O'Conner, M. (2000). Environmental education and attitudes: Emotions and belief is what is needed. *Environment and Behavior, 32*(5), 711-723.

Rapoport, A. (1977). *Human aspects of urban form: Towards a man-environment approach to urban form and design*. New York: Pergamon Press.

Rea, L. M., & Parker, R. A. (1997). *Designing and conducting survey research* (2 ed.). San Francisco: Jossey Bass Publisher.

Rossman, G. B., & Rallis, S. F. (2003). *Learning in the field: An introduction to qualitative research* (2 ed.). Thousand Oak, CA: Sage.

Ryan, R. L. (1997). *Attachment to urban natural areas: Effects of environmental experience.* Unpublished PhD, University of Michigan, Ann Arbor.

Ryan, R. L. (1998). Local perceptions and values for Midwestern river corridor. *Landscape and Urban Planning, 42*, 225-237.

Ryan, R. L. (2000). A people centered approach to designing and managing restoration project: Insights from understanding attachment to urban natural areas. In P. H. Gobster & R. B. Hull (Eds.), *Restoring Nature: Perspectives from the Social Sciences and Humanities* (pp. 209-228). Washington, D.C.: Island Press.

Ryan, R. L. (2006). Comparing attitudes of local residents, planners and developers about preserving rural character in New England. *Landscape and Urban Planning, 75*(1-2), 5-22.

Schneider, H. (1992). Introduction: Concepts and issues. In H. Schneider & J. Vinke & W. Weekes-Vagliani (Eds.), *Environmental Education: An Approach to Sustainable Development* (pp. 13-25). Paris: Organization for Economic and Co-operation and Development.

Scott, M. J., & Canter, V. C. (1997). Picture or place? A multiple sorting study of landscape. *Journal of Environmental Psychology, 17*, 263-281.

Sham Sani. (1998). Environmental awareness in action. In S. Sani (Ed.), *The Encyclopedia of Malaysia: The Environment* (Vol. 1, pp. 128-129). Kuala Lumpur: Archipelago Press.

Shuttleworth, S. (1980). The use of photographs as an environment presentation medium in landscape studies. *Journal of Environmental Management, 11*, 61-76.

Silverman, D. (1993). *Interpreting qualitative data: Methods for analysis talk, text and interaction*. Thousand Oak, CA: Sage Publication.

Smardon, R. C. (1975). Assessing visual cultural values of inland wetlands in Massachusetts. In E. H. Zube (Ed.), *Landscape Assessment: Values, Perception and Resources*. Stroudsburg, PA: Dowden, Hutchinson and Ross.

Smardon, R. C. (1976). Visual cultural sub-model for wetlands evaluation. In J. S. Larson (Ed.), *Models for Assessment of Freshwater Wetlands* (pp. 35-51). Amherst: Water Resources Research Center, University of Massachusetts.

Sommer, B., & Sommer, R. (1997). *A practical guide to behavioral research: Tools and techniques* (4 ed.). New York: Oxford University Press.

Steinitz, C. (2001). Visual evaluation models: Some complicating questions regarding memorable scenes. *Landscape and Urban Planning, 54*(1-4), 283-287.

Suhardi, M. (2002). *Seremban urban park: A preference study*. Unpublished Master, Virginia Polytechnic Institute and State University, Blacksburg.

Suhardi, M. (2003). Wetlands and landscape architecture. *Iranian Architecture Quarterly, 3*(12 and 13), 25-29.

Thomson, I. H. (2000). *Ecology, community and delight*. New York: F & N Spon.

Tuan, Y. F. (1977). *Topophilia: A study of environmental perception, attitudes and values*. Englewoods Cliffs, NJ.: Prentice Hall.

Ulrich, R. S. (1977). Visual landscape preferences: A model and application. *Man-Environmental System, 7*, 279-283.

Ulrich, R. S. (1983). Aesthetic and affective response to natural environments. In I. Altman & J. F. Wohwill (Eds.), *Human Behavior and Environment*. New York: Plenum Press.

Unwin, K. I. (1975). The relationship of observer and landscape in landscape evaluation. *Transactions of the British Institute of British Geographers, 66*, 130-133.

Wetlands International. (2006). *RAMSAR sites information service*. Available: http://www.wetlands.org/RSDB/Default.htm [2006, March 1, 2006].

Wherrett, J. R. (1999). Issues in Using the Internet as a Medium for Landscape Preference Research. *Landscape and Urban Planning, 45*, 209-217.

Winter, C. (2005). Preferences and values for forest and wetlands: A comparison of farmers, environmentalists and general public in Australia. *Society and Natural Resources, 18*, 541-555.

Wohlwill, J. F. (1979). What belongs where: Research on fittingness of manmade structures in natural setting. In T. C. Daniel & E. H. Zube & E. L. Drivers (Eds.), *Assessing Amenity Resources Values* (pp. 48-57). Fort Collins: CO: Rocky Mountain Forest and Range Experiment Station.

Wohlwill, J. F., & Harris, G. (1980). Response to congruity or contrast for manmade features in natural setting. *Leisure Science, 3*(4), 349-365.

Woods, J. D. (1995). *Environment factors that influence preferences of the price expectations of commercial landscapes and store-fronts.* Unpublished PhD, Virginia Polytechnic Institute and State University, Blacksburg.

Xu, Y. (1993). *A cross cultural study of prospect refuge theory.* Unpublished MLA, Virginia Polytechnic Institute and State University, Blacksburg.

Yang, B. E., & Kaplan, R. (1990). The perception of landscape style. *Landscape and Urban Planning, 19*, 251-262.

Yu, K. (1994). Cultural variations in landscape preference: Comparison among Chinese sub groups and Western design experts. *Landscape and Urban Planning, 32*(2), 107-126.

Zube, E. H., Pitt, D. G., & Evans, G. W. A. (1983). A lifespan developmental study of landscape assessment. *Journal of Environmental Psychology, 3*, 115-128.

Zube, E. H., Sell, J. L., & Taylor., J. G. (1982). Landscape perception: Research, application and theory. *Landscape Planning, 9*, 1-33.