NATURE IN THE CITY:

Ecological Consciousness Development Associated with Naturalized Urban Spaces and Urban Forest Values in Calgary, AB and Halifax, NS

by

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Abstract

In an increasingly urbanized world, how cities are designed and built affect how urbanites connect to the natural world and develop an ecological consciousness. Findings indicate that people value different urban landscapes for unique reasons but that urban trees provide numerous aesthetic, psychological, social, educational, ecological, moral and economic benefits. Many urban forest values are interwoven across these value categories. How people defined nature, what emotional states the landscape engendered and how they were able to actively engage with natural elements within urban landscapes all influenced participants' sense of belonging to a broader natural community. Overall, findings support the notion that naturalized spaces, even small spaces, can invoke a sense of connectedness with nature within participants. Yet, many respondents suggest that urban nature experiences may not be enough for the general population to develop an ecological consciousness, rather that they require additional educational support.

List of Abbreviations Used

AB	Alberta
CBC	Canadian Broadcasting Corporation
HRM	Halifax Regional Municipality
km^2	Kilometers squared
NS	Nova Scotia
pop.	Population
UK	United Kingdom
US	United States of America
yr	Year

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"When one tugs at a single thing in nature,
you find it attached to the rest of the world."

- John Muir, Conservationist (1838 – 1914)

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Chapter 1 - Introduction

Escalating population growth in modern-day cities around the globe has led to a rapid expansion of metropolitan areas. Rapid urbanization and traditional patterns of urban development have detrimental effects on biodiversity and ecosystem health (Bryant, 2006). Increasing rates of land consumption and disturbance through the removal of native vegetation and conversion to impervious surfaces are major negative effects of today's growing cities on ecological integrity (Bryant, 2006; Heidt & Neef, 2008). Not only have our patterns of urban development led to serious environmental problems, but also, the built environment of modern cities contributes to the contemporary estrangement of urban society from natural systems (Barlett, 2005; Miller, 2005). Because of this, many municipalities are seeking more sustainable approaches to future urban planning and development.

City designers and planners are exploring the environmental benefits of reintroducing native vegetation and ecosystems into city landscapes, a process termed naturalization. Additionally, many municipalities are focusing their attention on a key component of urban ecosystems: trees. Various cities across North America have recently formed commissions to create urban forest management strategies aimed at improving the ecological functioning of the urban forest. Despite these positive shifts in urban development processes, an often-neglected dimension of sustainability approaches is the deep and meaningful ways that people relate with their surroundings.

Humans shape their environmental surroundings while at the same time our environmental surroundings shape humans. The production of nature and space within a city can be understood in at least two ways. The first is the physical production of nature and space. This is the physical modification of urban nature by builders and dwellers. The planting of a tree, flowers or lawn are simple and straightforward examples of the physical production of urban nature. The second production of 'nature' is less well understood, but is concerned with the conceptual and psychological meaning of nature within individuals or different social groups. How nature is defined by people can play an

important role in how nature is physically produced or managed within a city (Braun, 2005).

Cities are a fascinating context in which to explore the intense and dynamic interaction between ecosystems and human-social systems. While urban naturalization and trees can contribute towards restoring ecological health to the urban environment, they also present opportunities for citizens to re-engage with nature (Bryant, 2006). Nature-based experiences in urban areas are purported to contribute to the development of an ecological consciousness (Thomashow, 1995; Orr, 2004; Barlett, 2005). A strong ecological consciousness assists people to perceive themselves as an integral part of a larger ecosystem. This sense of belonging to a broader natural world leads to environmental concern and pro-environmental behaviours (Schultz & Zelezny, 1999; Schultz, 2000; Mayer & Frantz, 2004). Therefore, ecological consciousness development may contribute to successful resolution of issues related to ecological, social, and economic sustainability. Because the majority of the world's human population now lives within metropolitan areas, the values and attitudes they hold regarding the natural world can have far-reaching environmental impacts (Parkins, 2010).

Urban forests are an important element of urban nature experiences. Certainly, they are positively valued by the urban community because they provide wildlife habitat, enhance the attractiveness of cities, and enhance urban health. As such, urban forests have become an important component of many urban sustainability strategies. As more and more municipalities set about planning what the urban forests of tomorrow will look like, planners and managers should consider the full spectrum of social, economic and ecological goals their designs could achieve. Generally, there is a much better understanding of ecology and economics than of social factors (Shindler et al., 2002). The social dimension of urban forestry considers people's values and attitudes regarding urban forests. It is important for decision-makers in urban development to recognize that their own decisions and actions, as well as, the decisions and actions of the constituents they serve are deeply influenced by values, emotions and social factors (Anderson, 1996).

Therefore, urban forest management plans should be framed around the abundant and diverse set of values citizens hold of the urban forest, even if they are somewhat difficult to quantify. Values are a reflection of what really matters to society and sensitivity to values provides insights for setting goals by identifying areas of priority, gaining stronger public support for policies, and allowing decision-makers to discover opportunities and new ideas (Xu & Bengston, 1997).

1.1 Thesis Objectives

The purpose of this thesis is to increase understanding of human connections with natural landscapes within urban contexts. The research was guided by the following questions. How do urban inhabitants value a key group of organisms in the urban landscape, the trees? Do different characteristics of urban nature landscapes have varying effects on the human-place relationship? What contributions do urban naturalized landscapes make to the development of an ecological consciousness (i.e., interconnectedness awareness) in individuals? Little research has been conducted on the ability of urban nature experiences to influence ecological consciousness within a diverse group of urban citizens in a Canadian context. Nor has much work been completed on citizens' values of the urban forest within Canada. This thesis will add to a growing body of literature on this subject.

Future sustainable development in Canadian cities depends strongly upon the values and perceptions citizens hold about urban nature, and indeed nature in general. Currently, there exists an uneasy tension between competing perspectives on how best to use valuable urban real estate. The results from this research may provide a better understanding of the contributions naturalized landscapes and urban trees make to society and may help convince businesses, community members and city planners of the true value of urban nature. Therefore, this research project will explore these questions and identify the connections between urban nature and urban inhabitants for the creation of better cities.

1.2 Outline of the thesis

The thesis is presented in five chapters. Chapter 2 is a description of the research methods used in the project. It details the research design, participant recruitment, data collection and analysis processes. Chapters 3 and 4 are two independent manuscripts intended for publication. Hence, they each include separate abstracts, introductions, literature reviews, methods, results, discussions, conclusions and reference lists. Chapter 3 explores how urban naturalized spaces affect urban citizens' ecological consciousness, while Chapter 4 summarizes and presents a preliminary list of values urbanites hold with regard to the urban forest. The fifth and final chapter is an overall summary and conclusion. This final chapter contains general reflections, research implications, and suggestions for future research.

Chapter 2 – Study Design and Research Methods

2.1 Overview of Research Strategy

The study aims to discover concepts, themes and ideas related to urban citizens' experiences with nature within an urban context. How individuals experience a place is very personal and personal reflections and perceptions are specific foci of qualitative research. For this reason, while my research adopted a mixed-method strategy whereby both qualitative and quantitative data were collected, priority was given to qualitative (descriptive) data.

The methods chosen for the project were inspired by the approach of Owen et al. (2009) as used to elicit values associated with old-growth forests. This approach was thought to allow greater ability to capture people's deepest reflections on the various urban landscapes while also further testing a nascent method. The approach allows the participant to engage all the senses (sight, sound, smell, taste, and touch) to create a viewpoint in and of the real world while also allowing the researcher to collect multiple sets sensory data for comparative purposes (Owen et al., 2009). Comparisons among sites can be a powerful analytical tool as they sharpen description and contribute to concept formation by bringing into focus suggestive similarities and contrasts between degrees of urban naturalization (Creswell, 2003).

One-day field trips and focus-group sessions were organized in Halifax, NS, and Calgary, AB, during the spring and summer months of June through September 2009. Groups of participants in each city participated in a research day, which included an initial survey of participants, a morning tour to six urban sites, with diary writing at each, and participation in an afternoon focus-group session. The same procedures were followed for each field trip to maintain consistency, thereby ensuring all of the participants would experience all of the field sites in the same order.

2.2 Participant Recruitment

Recruiting an adequate sample of participants who represent diverse ages and backgrounds, as well as both sexes, was challenging. Potential participants were asked to donate a significant portion of their day to complete the survey, tour and focus group. Numerous potential participants who contacted me for more information, were dissuaded by the six-hour commitment. Additionally, not all of the participants who registered to attend a research day showed up at the designated meeting place on the morning of the field trip. Despite these setbacks, advertisements posted in high-traffic locations (e.g., grocery stores and markets, shops, ferry and bus terminals, university campuses), two radio spots (CBC Radio *One*) and recruitment through social networks (i.e., snowball sampling) attracted 89 participants (Table 2.1).

Recruitment through social networks or snowball sampling proved to be the most successful method of recruitment. Sixty-six percent of the participants reported hearing about the project through friends or family. While less successful, the posted advertisements attracted 18% of the total sample. To attract an unbiased sample, the advertisements simply invited urban residents to participate in a field trip to various locations within their city so as to gather citizens' thoughts on urban outdoor spaces (see Appendix B). Initial attempts to recruit people through open invitations sent to various community and business organizations proved ineffective, as no persons related to any of the organizations ever contacted me (see Appendix A).

Upon agreeing to participate in the research project, participants were organized into small groups ranging from three to 15 people over 14 tour dates (six dates in Calgary, eight dates in Halifax). As a thank you for volunteering their time and thoughts to the project, participants were given lunch and snacks during the research day and received a modest thank-you gift at its conclusion. In Calgary, the gift was a behind-the-scenes experience with a grizzly bear at the Calgary Zoo, while in Halifax participants chose from a selection of art cards.

Participants came from a variety of age cohorts, and ethnic and educational backgrounds. However, one can conclude that they all had some interest in urban outdoor spaces given their agreement to participate in a day-long session. Within the subset of 89 participants, there were 41 males and 48 females. Age categories were chosen based on shared general cultural experiences of the world. The age categories and number of participants are:

- 16-30 yr (n = 35, 39%);
- 31-45 yr (n = 25, 28%);
- 46-59 yr (n = 11, 12%) and,
- Above 60 yr (n = 18, 20%).

In addition to age, participants self-reported their highest level of education achieved. Most were university educated, holding an undergraduate degree (n = 37, 42%) or graduate degree (n = 19, 21%), while the remainder reported education levels of college (n = 15, 17%) or high school or less (n = 16, 18%).

Table 2.1: Participant characteristics by age, sex and location

Age	***City***					
	Calgary		***Halifax***		***Total***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
16 – 30 yr	8	7	10	10	18	17
31 – 45 yr	6	7	6	6	12	13
46 – 59 yr	2	4	3	2	5	6
60+ yr	5	2	8	3	13	5
Total	21	20	27	21	48	41

2.3 The Study Areas

The settings for this study were two distinctly different Canadian cities Calgary, Alberta, and Halifax, Nova Scotia. Calgary is found in western Canada in an area of foothills and prairie, just 80 km from the front ranges of the Rocky Mountains and 102 km from Canada's oldest national park, Banff. Boasting a metropolitan population of 1.1 million people, Calgary is the largest city in the province (The City of Calgary, 2009). Economic activity in Calgary is centred on the petroleum industry and to a lesser extent on agriculture and tourism. Much of Calgary's urban development has followed the boom-and-bust cycles associated with the energy sector. As recently as 2008, Calgary was the fastest growing urban economy in the country. Associated with the vigorous economic activity, a relatively low-rise downtown in the 1960s quickly became dense with skyscrapers, and sprawling suburbs replaced surrounding agricultural land. The booming urban economy also attracted many new residents to the city. During the 2001-2006 census period, the population growth rate for the nation was 5.4%, while Calgary's was more than double at 13% (Statistics Canada, 2010). The annual average population growth rate over a twenty-year period (1989-2009) was 2.45% (The City of Calgary, 2009).

The city proper covers a land area of 726.5 km^2 and as such exceeds the land area of the City of Toronto (Statistics Canada, 2010). The population density of Calgary is 1,435.5/km^2. Two major rivers, the Bow and the Elbow, run through the city and converge near Calgary's downtown. Since the climate of the region is generally dry, dense vegetation naturally occurs only along the river valleys, on some north-facing slopes, and within Fish Creek Provincial Park.

The second study site, Halifax, is situated in eastern Canada on the Atlantic shore of Nova Scotia. Halifax existed as a separate city until 1996 when it was amalgamated by the Government of Nova Scotia with the former Halifax County, Bedford, Dartmouth and other towns to become Halifax Regional Municipality (HRM). HRM covers an area of 5,850 km^2. Despite the size of its landmass, the population of the municipality is heavily

concentrated in an urban core settled around the Halifax Harbour with rural communities located along the south and eastern shoreline. While the largest city in Atlantic Canada, Halifax's population of 385,000 (2009 estimate, HRM, 2009) is significantly smaller than Calgary's. Within the urban core the population density is 1,077.2/km^2, while the surrounding municipality's population density is 65.4/km^2. Halifax's population growth rate for the 2001-2006 census period was 3.8% (Statistics Canada, 2007). The annual average population growth rate for the same period was 0.76%.

Despite its small size, HRM is the primary centre for education in eastern Canada with six degree-granting post-secondary education institutions. While these education facilities contribute greatly to Halifax's economic activity, much of the city's economy is related to its port, which consists of a military naval base, two major container terminals, oil refineries, and numerous cargo piers. Renowned for its unique historic buildings and cultural events, Halifax is a central tourist attraction in Atlantic Canada. The climate of HRM is moist and relatively mild in temperature due to its proximity to the Atlantic Ocean. The vast majority of the area encompassing HRM's urban core is composed of a dense combination of mixed Acadian and coniferous forests, and wetlands.

2.4 The Field Tour

Two field tours occurred in each of June, July and August in Calgary. In Halifax, a total of eight field tours took place over a two-week period in September. Research participants were asked to meet at a pre-determined location at 8:30 am on the date of their tour. After initial introductions and instructions, each participant was handed a diary booklet and asked to complete PART A: Survey and Initial Impressions. Once finished, participants were transported in passenger vans to each of the six field locations. Site visits at each location lasted 15 minutes to allow participants to experience the site and complete PART B: Individual Diary Entry. The morning tour lasted about three to four hours and included a refreshment break - an outdoor picnic - after visiting the fourth site (Table 2.2).

Table 2.2: Outline of the field day

Time	*Activities*
8:30 am	Meet at pre-determined location for introductions and instructions. Participants complete Part A: Initial Impressions of diary.
9:30 am – 12:30pm	View Sites 1-6 and write in Part B of diary. Each visit is 15 minutes in duration for individual reflection and writing. Mid-morning refreshment break.
12:30 pm	Indoor lunch provided.
1:15 – 2:30 pm	Focus-Group Session: a set of questions are posed to each group. The discussion is digitally recorded and captured on flipcharts.
2:30 – 3:00 pm	Wrap-up: Participants record final thoughts in their diaries, Part C: Final Impressions and demographic information. In Halifax, participants select an art card, while in Calgary, they receive a behind-the-scenes tour at the Calgary Zoo as thank-you tokens.

Numerous criteria had to be met in the selection of six suitable field sites in two distinctly different cities. First, to reduce travel time between sites, each potential location had to be within close proximity to the others, as well as within the urban centre's boundaries. Second, the site had to be representative of a typical urban landscape, (i.e., one that could be found in almost any Canadian city). Third, each field location was chosen to represent a specific degree of naturalization. The selected sites ranged from a highly altered, human-built landscape with little to no vegetation (e.g., a commercial streetscape) to a predominantly natural mixed-forest urban green space (e.g., a forested park). Urban nature and urban green spaces can take many forms. To ensure a range of type and quality amongst field locations in each city, I selected (1) a residential street lined with mature trees, (2) a commercial streetscape, (3) an athletic field (4) a forested park, (5) a naturalized schoolyard and, (6) a botanical garden (Figures 2.1 and 2.2).

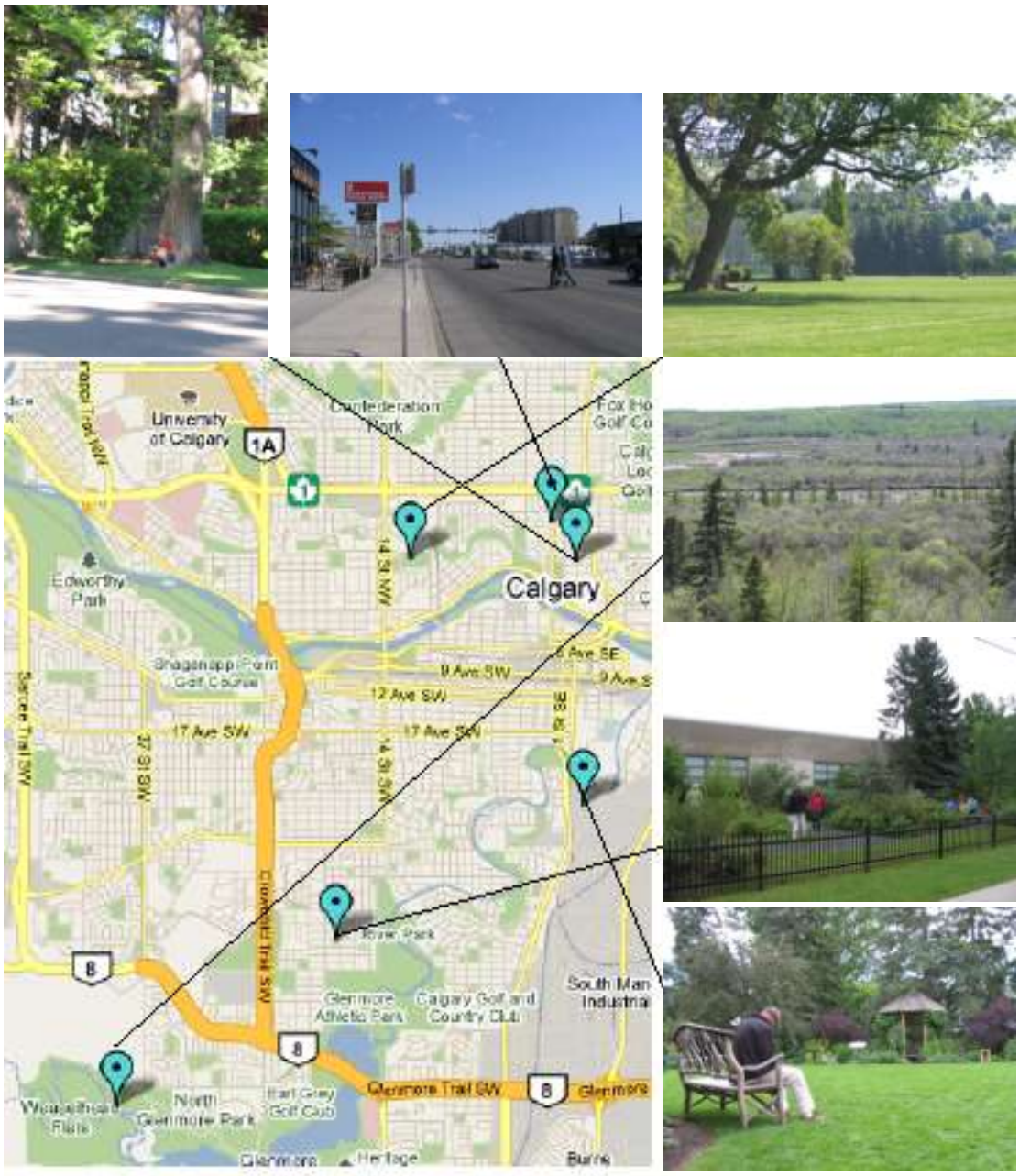

Figure 2.1: Map and photos of field tour sites in Calgary, AB. Clockwise from top left: (1) Mature tree-lined street, (2) Commercial streetscape, (3) Athletic field, (4) Forested park, (5) Naturalized schoolyard, and (6) Botanical garden.

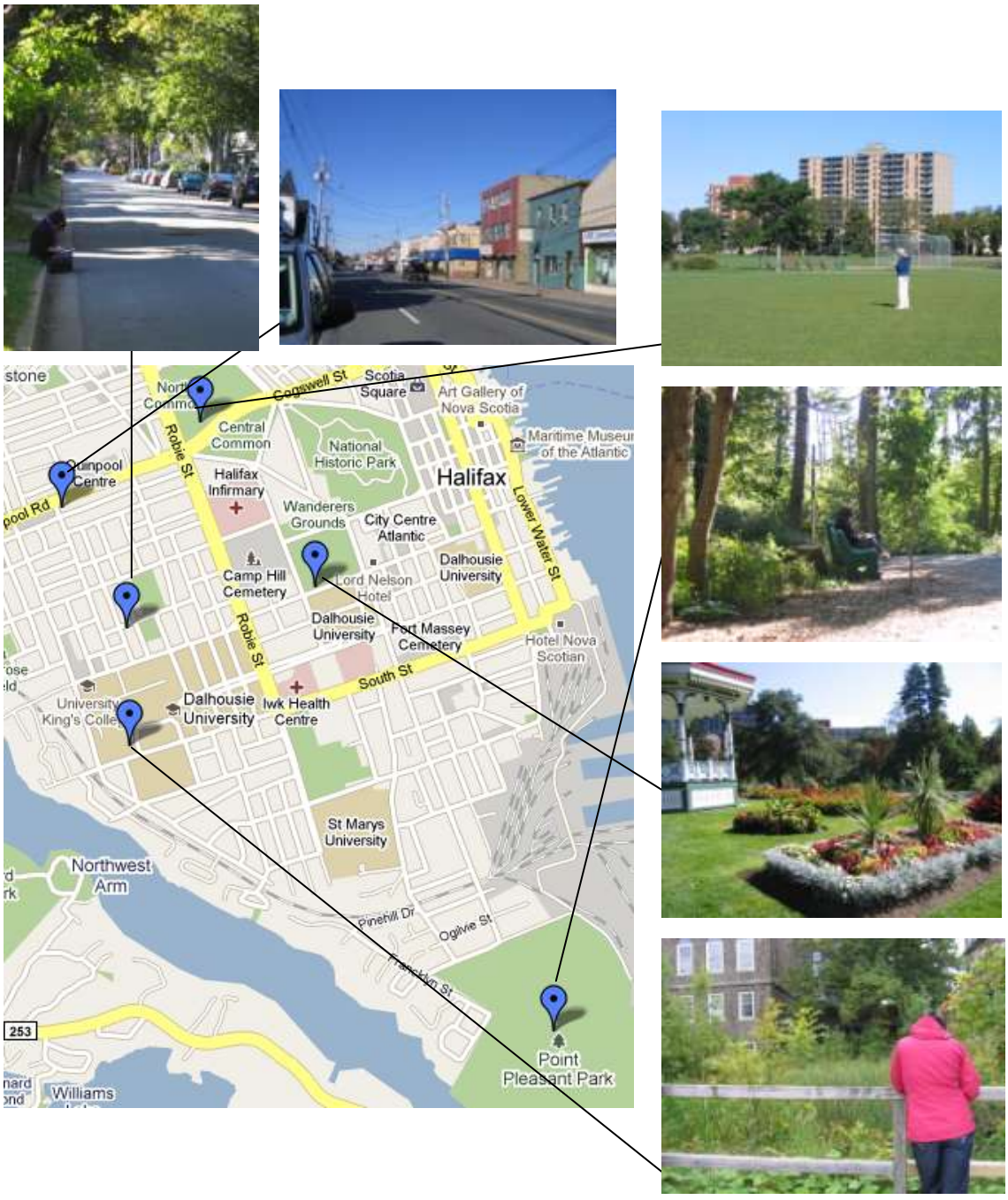

Figure 2.2: Map and photos of tour sites in Halifax, NS. Clockwise from top left: (1) Mature tree-lined street, (2) Commercial streetscape, (3) Athletic field, (4) Forested park, (5) Botanical garden, and (6) Naturalized schoolyard.

To maintain consistency of the field tour experience between cities, an attempt was made to keep the same order in which participants visited the six sites. This was accomplished except for the final two locations on the tour. In Calgary, the Botanical Garden was the final destination after visiting the Naturalized Schoolyard. In Halifax, the participants visited the Botanical Garden and then completed the tour at the Naturalized Schoolyard (Table 2.3).

Table 2.3: Field tour sites in Calgary, AB and Halifax, NS. The chronological order of visit is indicated by the numbers in brackets.

Site Type	*Calgary location*	*Halifax location*
Mature Tree-lined Street	(1) 7th Avenue & 2nd St, N	(1) Walnut Street
Commercial Streetscape	(2) Centre Street, N	(2) Quinpool Road
Athletic Field	(3) Riley Park	(3) North Commons
Forested Park	(4) Weaselhead Natural Area	(4) Point Pleasant Park
Naturalized Schoolyard	(5) Altadore Elementary School	(6) Dalhousie University
Botanical Garden	(6) Reader's Rock Garden	(5) Public Gardens

Canadian weather is unpredictable so poor weather conditions and mid-day weather changes during the field tours were cause for concern. While participants were asked to register for an alternate tour date should inhospitable or uncomfortable weather require us to cancel the research day, not a single outing needed to be postponed.

2.5 The Diary

A diary booklet composed of three parts was handed to each participant at the beginning of the day. Respondents were asked to avoid identifying themselves by name in the diary. PART A included a survey (consisting of closed and open-ended questions) and an initial-impressions diary entry (open-ended questions) to assess participants' levels of

ecological consciousness before the field tour. PART B was divided by field site, and participants completed an entry at each (see Appendix C). For the most part, PART B was open format and included only a few prompting questions, allowing participants to write down thoughts and feelings in their own words. Participants were asked to refrain from talking to each other about their site observations as the diary-writing time was for individual personal reflection. In addition to the written entry, participants were asked to draw a circle diagram that best represented their connections to nature while visiting the space. The concluding section of the diary, PART C, was completed after the focus-group session. These final diary pages allowed participants to express any final reflections on their experiences during the day. Once completed, the diaries were collected.

The three-section structure of the diary served two important functions. First, PART A and PART C of the diary were designed to assess participants' level of eco-consciousness before and after the field trip and focus group. This created a pre- and post-test comparison tool by establishing where on the map of ecological awareness or consciousness a participant would place himself or herself. Perspective shift may have occurred from participation in the research process, so it was important to have a method of capturing and describing this shift.

The second benefit of the diary format is that it allowed people the time and personal space to reflect on their thoughts and feelings while and after visiting each of the urban landscapes. Participants' personal reflections were hypothesized to answer the research questions more fully. Additionally, having personal reflections written in the diary may have provided different information than focus-group sessions as sometimes issues of "group think" can emerge in sessions.

2.6 The Focus Group

Focus groups were used to capture group data and to ignite deeper discussion and provide individuals with an opportunity to clarify or justify their perspectives (see Appendix D). Focus groups after the field trips and personal reflections allowed group members to

express their viewpoints and to be exposed to others' viewpoints. The focus-group approach can allow people to probe each other's reasons for holding a particular view while also introducing topics or feelings that an individual may not have considered on one's own (Bryman & Teevan, 2005). The technique allows the researcher to develop a clearer understanding as to why people feel the way they do about a particular topic. A focus group offers an opportunity to study how individuals "collectively make sense of phenomenon and construct meaning around it" (Bryman & Teevan, 2005, p. 195). Flip-chart notes and digital recordings were made during each focus-group session to ensure accuracy in data collection.

2.7 Data Analysis

A combination of analytical techniques, namely, frequency analysis, analysis-of-variance tests, non-parametric statistics and content analysis was used to interpret the data. The content of participant diaries and the focus group audio-recordings were transcribed as separate text files. The files were entered into NVivo8 (QSR International Pty Ltd., 2008), a qualitative research software program, which can aid the process of comparing, conceptualizing, and categorizing qualitative data (Bryman & Teevan, 2005). Coding themes were recognized and categorized as they emerged. Replies consisting of similar words or meaning were taken to address the same underlying value and thus categorized under the same representative theme.

All quantitative data from PART A of the diary were processed using SPSS 16.0 software (SPSS, Inc., 2007). The first step of analysis was generation of simple frequency tables to characterize the sample. The second stage involved running independent-sample *T* tests to compare means of one variable across independent groups to discover whether the samples were indeed independent. *T* tests were run using age, sex, education and city to determine whether these variables influenced question responses. The third stage tested hypotheses about the relative proportion of cases falling into several mutually exclusive groups using chi-square probability distribution.

The chi-square test (x^2) is a large-sample test requiring an expected frequency exceeding five in each cell. Therefore, all quantitative results were amalgamated or recoded into broader categories. For example, responses to survey questions using the Likert scale (i.e., strongly agree, agree, undecided, …etc.) were lumped into the broader categories of agree, undecided and disagree, before x^2 statistics were performed.

All 534 diagrams from PART B were digitally scanned and placed into a table format. Columns represented the six field site locations while the rows represented the 89 participants. Two faculty members and six graduate students from the Dalhousie School for Resource and Environmental Studies sat in on a group discussion to ascertain what themes or trends, if any, could be observed from the aggregated data. The results from the discussion became theme codes by which each diagram was later categorized. The results from this pictorial data set were not used in this thesis report, but will be used for some future research project.

Chapter 3 - Nature in the City

Ecological Consciousness Development Associated with Naturalized Urban Spaces

Abstract

Urban form and structure contribute to the contemporary estrangement of urban society from natural systems. Naturalized urban spaces can positively affect human ecological consciousness development. Results indicate that how urban inhabitants define nature, the psychological states an urban landscape engenders and the size and scale of natural elements relative to built elements influences their ability to feel a sense belonging to a broader natural community within an urban context. Additionally, the amount and quality of urban nature at a location symbolizes an environmental ethic and make major contributions to providing a sense of place. Findings also support the notion that naturalized spaces, even small spaces, can invoke a sense of connectedness with nature within participants. However, others may require a more active, tactile interaction with natural elements or additional social support to feel connected to nature.

3.1 Introduction

In this century, for the first time in human history, a majority of the world's population will live in cities (United Nations, 2008). Rapid urbanization, patterns of urban development and the associated landscape changes increasingly isolated people from experiences of nature (Miller, 2005). As cities continue to expand, there are fewer opportunities for direct contact with the natural environment for a growing number of people. This is of profound concern because there are numerous benefits associated with interactions with the natural environment, at both individual and societal levels (Fuller et al., 2007).

Given the global extent and seriousness of our current environmental crises, many writers recommend renewed relationships with natural systems as a source of inspiration for less environmentally damaging life-ways (Kahn, 1999; Hough, 2004; Orr, 2004; Barlett, 2005). A significant benefit derived from urban nature experiences is thought to be the development of ecological consciousness amongst urban inhabitants. Nature experiences are hypothesized to foster a sense of connectedness with nature that shapes environmental values and behaviours, which in turn, could foster sustainable development (Schultz, 2001; Orr, 2004; Bartlett, 2005; Dutcher, Finley, Luloff & Buttolph-Johnson, 2007). What is lacking is an understanding of the contribution urban natural landscapes make to the growth of an ecological consciousness (i.e., a sense of connectedness with nature) in individuals. As well, little is known about how various qualities of urban nature landscapes may affect people's sense of connectedness. Can we gain a better understanding of the effects of various types of naturalized urban parks on the development of an individual's ecological consciousness?

The purpose of this study is two-fold. The first is to investigate the effects of naturalized urban spaces on development of human ecological consciousness development in a Canadian context. The second is to discover whether certain types of urban landscapes are better than others at encouraging people to reflect on their direct relationships with the natural world. Results from this research could be used to develop better urban environments, both for the benefit of urban inhabitants and the ecological systems that sustain us.

3.1.1 Defining nature and naturalization

Definitions of nature are complex and contested. Nature is a human concept or social construct that varies over time, both among cultures and from person to person (Thomashow, 1995). Traditionally, natural scientists have used the term nature to mean "our non-human surroundings" (Simmons, 1993, p.11 in Clayton & Opotow, 2003). In the realm of social science, Schultz's (2000) study measuring people's environmental concerns described nature as "all living things" (p. 394). In either of these cases, the

definition of nature is too limited in scope given our current knowledge about how ecological systems function. The definitions offered by early natural scientists typically ignore the fact that no corner of the planet remains untouched by the influences of human activity. Definitions like Schultz's are no better because they exclude the abiotic elements (such as sun and water) that support life. In common terms, nature may refer to many things – the stars and galaxies, the earth and atmosphere, and the birds and bees. Nature, in its broadest sense, refers to the phenomena of the physical world and all living organisms. This definition excludes human-made, manufactured or artificial products. In simple terms, nature is "not only living things, such as plants and animals [including humans] but also inanimate things, such as streams and landscapes" (Dutcher et al. 2007, p. 482).

Definitions of urban nature are equally ambiguous and unclear. A basic definition of urban nature "encompasses all living organisms and their habitats within the legal limits of the city" (Cilliers, Muller & Drewes, 2004, p. 50) and includes "areas that consist of sizable vegetation and include urban parks and green areas designed, planted and maintained by people" (Kaplan et al. 1998, in Goh, 2006, p. 6). For this study, urban nature is defined as comprised of all plants, non-domesticated animals, green spaces, nature reserves, parklands, botanical gardens and components like street trees within city limits. Participants in this study were given the opportunity to define for themselves a meaning of urban nature.

The term naturalization is used to describe urban areas that undergo a process of becoming more natural. These include areas that were once asphalt, turf vegetation or otherwise highly-disturbed by the process of urbanization but that have been or are being restored or permitted to independently re-vegetate with native species. Restoration activities may include planting trees, growing a garden, reviving a wetland or removing non-native species. The process of naturalization generally increases the native biodiversity found in an urban area (Feign, 2001).

3.1.2 Ecological consciousness and concepts of the human-nature relationship

To understand better the meaning of ecological consciousness, it is best to understand the component parts and the evolution of the term in the literature. The word ecology comes from the Greek word *oikos* (meaning 'house', 'dwelling place' or 'habitation') and *logia* (meaning 'the study of'). The word ecology means is the scientific study of the relationships or interactions of organisms to one another and their environment. This broad definition can be interpreted as a way to organize knowledge about nature. The term ecology is not only a scientific concept but is used widely metaphorically to describe how humans interact with nature (Thomashow, 1995).

The term consciousness is commonly understood to refer to 'knowing or aware'. Capra (2002) makes an important distinction between aspects or types of primary consciousness (i.e., basic cognition, perception, senses, and emotional processes) and reflective consciousness, "a level of cognitive abstraction that includes the ability to hold mental images, which allows us to formulate values, beliefs, goals and strategies" (p. 39). For this study, the term 'consciousness' will mean both primary and reflective consciousness. For it is through the primary consciousness that people experience their world and through the reflective consciousness that they interpret their experiences, understand themselves, and find meaning.

In terms of humans, Weller (2006) adapted a definition of ecological consciousness from Thomashow (1995) that describes ecological consciousness as "an awareness of the complexity and interconnectedness of all life forms on this planet and an appreciation for what that complexity means for one's own existence" (Weller, 2006, p. 8). In this study however, a definition of ecological consciousness is used that goes beyond the idea of simple awareness and incorporates Capra's (2002) description of reflective consciousness. As such, an ecological consciousness also allows people to interpret their world and informs their values. The natural environment serves to inform people about who they are. Thus, for this study, ecological consciousness is defined as a perception of humans as an integral part of a larger, interconnected network of living things.

Other terms are used in the literature to describe similar concepts: ecological self (O'Sullivan & Taylor, 2004), ecological identity (Thomashow, 1995), consciousness of interdependence (Daloz, 2000), environmental identity (Clayton & Opotow, 2003), and connectedness to nature (Schultz, 2000; Mayer & Frantz, 2004; Dutcher et al., 2007; Mayer et al., 2009). An ecological self is the "wider sense of connection with all powers of the world and is a primary matrix for all our subsequent development" (O'Sullivan & Taylor, 2004, p.13). Ecological identity describes "the ways people construe themselves in relationship to the earth" (Thomashow, 1995, p.3). Consciousness of interdependence is described as a relational awareness and "highly developed way of making meaning" of the world (Daloz, 2000, p. 30). Opotow (1996 in Clayton & Opotow, 2004) conceptualizes environmental identity as the dynamic way in which people "define the environment, the degree of similarity we perceive between ourselves and other components of the natural world," and the value we prescribe to nature and nonhuman natural entities within our social and moral community (p. 8). Dutcher et al. (2007) used the term connectivity to describe a perception of "sameness between the self, the others (including other people) and the natural world" (p. 474).

Much has been written within the discipline of environmental psychology on the link between people's moral stance regarding their behaviour and responsibilities toward nature and their sense of inclusion in the natural environment. Schultz and Zelezny (1999) proposed that held biospheric environmental concerns reflect the degree to which people define self as part of nature. In a later work, Schultz (2000) empirically investigated this assumption. He found that people who see themselves as more connected to nature score higher on measures of biospheric (i.e., non-anthropocentric) concern and lower on measures of egoistic (i.e., utilitarian) concern with respect to environmental problems. Later works in the field of environmental psychology adopt the same or similar interpretations of the human-nature disconnect.

Mayer & Frantz (2004) postulate that feeling a sense of belonging to the broader natural community may be a prerequisite for increasing environmental protection. The concept

extends from the psychological argument that as an individual expands one's idea of self to include the natural world, this leads to more empathetic and altruistic behaviours. One rationale is that if people feel connected to nature "then they will be less incline to harm it, for harming it would in essence be harming their very self" (Mayer & Frantz, 2004, p.512). Their and other subsequent research demonstrates that a strong experiential sense of oneness with the natural world leads to concern for nature and is related to biospheric value orientation and ecologically friendly behaviour (Mayer & Frantz, 2004; Dutcher et al., 2007; and Nisbet, Zelenski & Murphy, 2009). Additionally, Mayer and Frantz (2004) linked sense of connectivity with nature to anticonsumerism, perspective taking, and identity as an environmentalist.

Schultz, Shriver, Tabanico and Khazian (2004) noted that associations between self and nature are relatively stable over time but vary between cultures and individuals, and could in fact be malleable depending upon the context in which it is assessed (e.g., an office building verses a park). Evidence suggests that contact with the natural environment significantly influences the development of environmental empathy (Chawla, 1998; Frederickson & Anderson, 1999). In an attempt to improve understanding of the link between nature experiences and people's sense of inclusion in nature, Hinds & Sparks (2008) discovered that an emotional connection towards nature predicts intentions to engage with the natural environment, while Nisbet et al. (2009) found that people with high nature relatedness scores spend more time outdoors, in nature.

Schultz & Tabanico (2007) approached the problem more directly and tested their participants while in various natural and built environments. They found that participants showed an increase in connectedness with nature after spending time at a zoological park or in a natural environment (i.e., a hiking trail or the beach). Their results indicate that participants had "stronger associations between self and nature than between self and built stimuli" (p. 1240). Similarly, Mayer, Bruehlman-Senecal and Dolliver (2009) examined the effects of exposure to nature on cognitive processes and positive affect (i.e., emotions). Their study revealed that a 15-minute walk in a natural park increased a felt sense of connectedness to nature, attentional capacity, positive emotions, and ability to

reflect on a life problem amongst their participants. Because people's sense of connectedness to nature increased after a nature experience, this suggests that concepts of nature and how humans are related to it ought to be examined in the context of the actual environments and places that people experience in their lives.

3.1.3 The human-nature relationship in the context of place

Ecological psychologists, architects and landscape designers have long recognized the ability of landscapes and places to affect people's emotions, behaviours and psyche (Manzo, 2003; Creswell, 2004; Kellert, 2005; Kellert et al. 2008). Scholars employ numerous broad terms in an effort to describe this relationship: sense of place, place attachment and place identity are some of the key concepts to have emerged in the literature (Manzo 2003). Loosely defined by Fredrickson and Anderson (1999), the term 'sense of place' reflects the idea that people can develop a positive sentiment or affiliation with a specific place, be it cultural, historic, natural or social. Place attachment is the bonding of people to place, and place identity is how one's identity is shaped by or closely tied to a location (Manzo, 2003).

Several studies suggest that there is a positive relationship between place attachment and environmental sensitivity. For example, emotional attachment to a local natural resource has been associated with environmentally responsible behaviour (Vaske & Korbin, 2001), perceptions of environmental impacts as being problematic (Kyle et al., 2004) and pro-environmental attitudes (Budruk, Thomas & Tyrrell et al., 2009). More interestingly, Budruk et al. (2009) explored levels of place attachment among urban green space users in India and found that individuals whose identities were more deeply entwined with place more strongly exhibited values that considered humans as part of nature.

These results support the idea that ecological consciousness, place identity and place attachment are closely related psychological constructs. Humans have the capacity to produce and consume meaning. In the rich and complicated interplay between people and the environment, place can become a way of seeing, knowing and understanding the

world. The way we choose to think about a place (i.e., what we decide to designate as unimportant or to emphasize) can ascribe meaning to place as an idea, a concept and way of being in the world (Creswell, 2004).

3.2 Qualitative data collection

A qualitative research approach is common within the social-science discipline because it allows the researcher to understand and interpret (1) how people experience things, events and situations, and (2) how it is that people ascribe meaning to those direct experiences (Bryman & Teevan, 2005). A nascent method from Owen, Duinker & Beckley (2009) was adapted for this study, whereby participants were taken on a one-day tour to six urban sites within their city of residence. At each site, participants completed a diary entry, thereby providing an authentic account of their experiences in diverse, urban spaces. Each research day concluded with a focus-group session. This descriptive method provided a wealth of information to use for comparative purposes. More importantly, the qualitative approach allowed participants to actively engage all of their senses (i.e., sight, hearing, taste, touch and smell) hence improving their ability to characterize local urban landscapes and formulate a viewpoint based on the real world.

3.2.1 Study sites

The settings for this study were located in two distinctly different cities in Canada: Halifax and Calgary. The smaller, Halifax, is situated on the Atlantic coast of Canada, in the province of Nova Scotia. Halifax Regional Municipality (HRM) (pop. 389,000) covers an area of 5,850 km^2. Despite the size of its landmass, the population is heavily concentrated (1,506.2 people/ km^2) in an urban core settled around the Halifax Harbour with rural communities located along the south and eastern shoreline. In 2006, 40.8% of the total population of NS resided in Halifax Metro (Government of NS, 2006). Halifax's population grew 3.8% between 2001-2006 census periods, while the national average was 5.4% over the same period (Government of NS, 2006). Halifax is characterized by a

moist climate and moderate seasonal temperatures which support a dense combination of mixed Acadian and coniferous forests, and wetlands through much of the municipality.

The larger city, Calgary, is 80 km from the front ranges of the Rocky Mountains in southern Alberta. As recently as 2008, Calgary (pop. 1.1 million) was the fastest growing urban economy in Canada. Calgary's population growth rate of 13% was more than double the national average of 5.4% between the 2001-2006 census periods (Statistics Canada, n.d.). As a result, skyscrapers have replaced a relatively low-rise downtown and surrounding agricultural lands have been overtaken by suburban sprawl. The city proper covers a land area of 726.5 km^2 and the population density is 1,435.5/km^2. Due to Calgary's generally dry climate, dense vegetation naturally occurs only along the river valleys, on some north-facing slopes and within Fish Creek Provincial Park, which is located within city limits.

3.2.2 Selection of field tour sites

Urban nature and urban green spaces take many forms. They may range from a highly altered, human-built landscape (e.g., car park) to a green space predominated by native vegetation (e.g., wilderness area). Tour sites selected for this research project met three basic criteria. Each site was (1) in close proximity to the others, (2) representative of a typical urban landscape (i.e., may be found in almost any Canadian city), and (3) unlike the other sites in its degree of naturalization. The range and type of urban locations chosen for this project include: (1) a commercial streetscape, (2) a residential street lined with mature trees, (3) an athletic field, (4) a botanical garden, (5) a naturalized schoolyard, and (6) a forested natural park (Table 3.1 and Figure 3.1).

Table 3.1: Field tour sites in Calgary, AB and Halifax, NS. The chronological order of visit is indicated by the numbers in brackets.

Site Type	*Calgary location*	*Halifax location*
Mature Tree-lined Street	(1) 7th Avenue & 2nd St, N	(1) Walnut Street
Commercial Streetscape	(2) Centre Street, N	(2) Quinpool Road
Athletic Field	(3) Riley Park	(3) North Commons
Forested Natural Park	(4) Weaselhead Natural Area	(4) Point Pleasant Park
Naturalized Schoolyard	(5) Altadore Elementary School	(6) Dalhousie University
Botanical Garden	(6) Reader's Rock Garden	(5) Public Gardens

Figure 3.1: Field sites in Halifax, NS and Calgary, AB (1) Mature tree-lined streets, (2) Commercial streetscapes, (3) Athletic fields, (5) Forest parks, (6) Botanical gardens

3.2.3 Participant recruitment and data collection

In this study, 89 participants were recruited using multiple strategies including local radio interviews, open invitations to community and business organizations, advertisements in key locations, and recruitment through social networks (i.e., snowball sampling). The aim of the recruitment strategy was a stratified sample containing roughly even numbers of people in each city, sex and age class. Participants came from a variety of age cohorts (Table 3.2), and ethnic and educational backgrounds. However, one can conclude that they all had some interest in urban outdoor spaces given their agreement to participate in a day-long session.

Sixty-seven percent of participants were under 46 years of age and merely 12% of the sample was 46 - 59 years. Men over 45 years of age were under-represented and the sample was predominately university-educated as 63% have one or more degree. Fifty-eight percent of the sample reported living in a city for 20+ years or all of their life. Only 16% have lived in a city for fewer than five years and 5% for less than one year.

Table 3.2: Participant characteristics by age, sex and location

Age	***City***					
	Calgary		***Halifax***		***Total***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
16 – 30 yr	8	7	10	10	18	17
31 – 45 yr	6	7	6	6	12	13
46 – 59 yr	2	4	3	2	5	6
60+ yr	5	2	8	3	13	5
Total	21	20	27	21	48	41

In Halifax, three staff members from HRM's urban planning and urban tree commission participated in the project. Together, they were placed with a group of citizens and their information was treated the same as all other data sets. The 89 participants were taken on

field trips in small groups of three to 15 people. Six field trips were conducted in Calgary in June, July and August 2009, and eight in Halifax in September 2009. Each field trip followed the same procedures: respondents completed a pre-tour survey, visited six urban locations, wrote a diary entry at each site and participated in a focus-group session (Table 3.3).

Table 3.3: Outline of the field day

Time	*Activities*
8:30 am	Meet at pre-determined location for introductions and instructions. Participants complete Part A: Initial Impressions of diary.
9:30 am – 12:30pm	View Sites 1-6 and write in Part B of diary. Each visit is 15 minutes in duration for individual reflection and writing. Mid-morning refreshment break.
12:30 pm	Indoor lunch provided.
1:15 – 2:30 pm	Focus-Group Session: a set of questions are posed to each group. The discussion is digitally recorded and captured on flipcharts.
2:30 – 3:00 pm	Wrap-up: Participants record final thoughts in their diaries, Part C: Final Impressions and demographic information. In Halifax, participants select an art card, while in Calgary, they receive a behind-the-scenes tour at the Calgary Zoo as thank-you tokens.

A diary booklet (Appendix C) comprised of three sections was given to each participant at the beginning of the research day. Participants were asked to avoid identifying themselves by name in the dairy. PART A consisted of closed and open-ended questions to measure participants' levels of ecological consciousness and their attitudes about urban green spaces before the field tour. PART B was divided by field site and primarily contained space for personal reflections, with only a few prompting questions. At each field site, participants spent 15 minutes observing, reflecting and writing in PART B of the diary. Participants were asked to not speak with others in the group during these sessions, thus allowing each participant the opportunity to write down their individual thoughts and feelings in one's own words. PART B also requested participants to draw

and label a circle diagram that best illustrated their connections to nature while visiting the space. Due to the possibility that participation in the research process may lead to a perspective shift among respondents, they were asked to record final reflections on their experiences in PART C of the diary.

A focus group is intended to ignite deeper discussion among participants and offers an opportunity to study how individuals "collectively make sense of phenomenon and construct meaning around it" (Bryman & Teevan, 2005,p. 195). By conducting focus groups after the field trips and personal reflection, participants were given the opportunity to openly express their viewpoints and be exposed to others' perspectives. These group data were collected to develop a clearer understanding of citizens' thoughts and values.

Data from PART A of the diary were processed using Statistical Package for Social Sciences Version 16.0 developed by SPSS, Inc. (2007). All qualitative data including participants' diagrams, transcribed diaries and focus-group discussions were coded thematically with the aid of NVivo 8 (QSR International, 2008), a qualitative research software program. These results were later linked within the software program to respondents' survey responses (i.e., PART A of their diary) for greater insight. Particular attention was paid to people's accounts of the characteristics of the sites and how those characteristics affected their thoughts, feelings, and senses of belonging to a broader natural community. A list of common themes, topics, or concepts was made and later organized into more general headings or categories. Key themes were identified by frequency of mention and are not mutually exclusive but interrelated concepts.

3.3 Results

Despite the differences among respondents and between study areas, there were many similarities and common themes that appeared consistently across respondents and sites. While 94% of participants indicated that they spend time in urban green spaces and 98% agreed that spending time in nature and a connection to earth is important to them, only

77% reported feeling a connection daily. In response to the survey question, "If you would prefer more connectedness to nature, what prevents this?" 92% of participants selected one or more obstacles (Figure 3.2) with the most frequently mentioned being 'not enough time'.

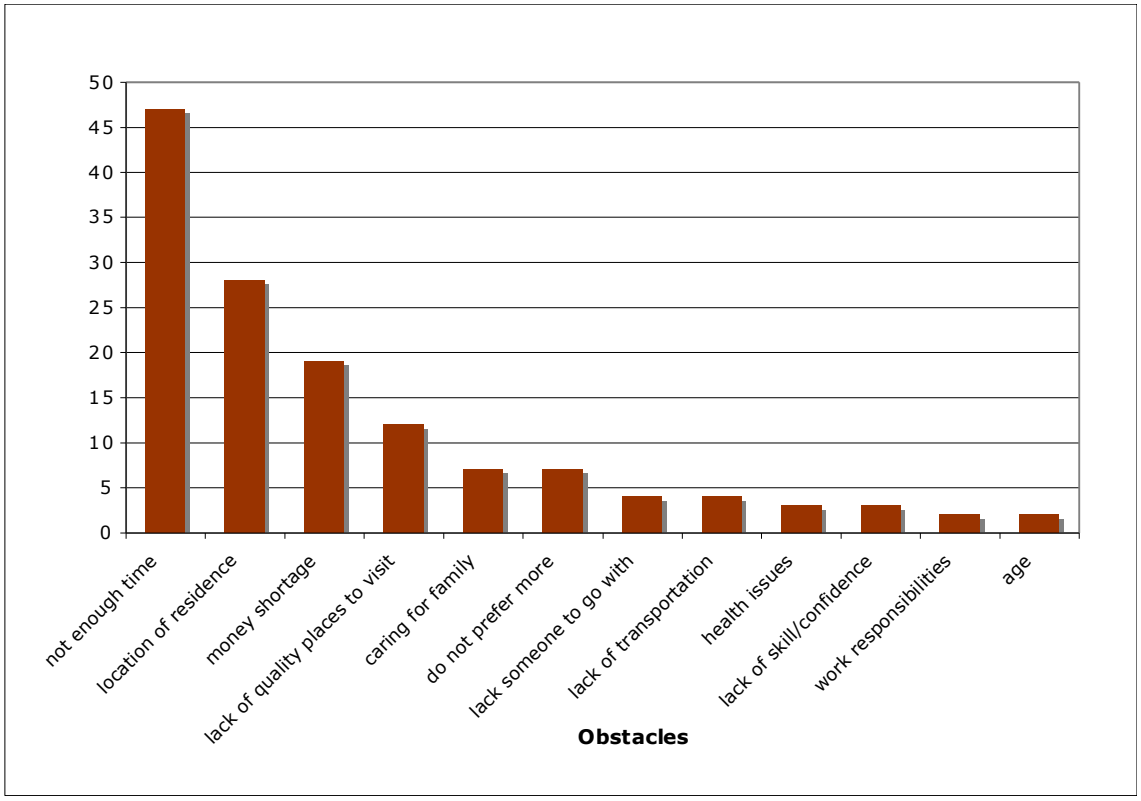

Figure 3.2: Barriers to pursuing more connectedness to earth

The two most prominent themes that arose from the diaries and focus groups were (1) the beauty of nature and (2) urban nature as a recreational escape for improved human health and wellbeing. All participants expressed the view that natural elements such as robust and healthy trees, flowers, and flowing water made their city more aesthetically pleasing. As well, most respondents preferred urban landscapes with vegetation, such as tree-lined streets, forested parks, botanical gardens and athletic fields to commercial streetscapes for outdoor recreational activities and escaping the hustle and bustle of urban life.

Both themes have been thoroughly explored in the literature (see Campbell & Wiesen, 2009; and Konijnendijk, 2008). Accordingly, they are only briefly touched upon in this paper as they specifically relate to the five novel themes that arose from this investigation: there is no urban in nature, positive psychological effects, engagement with nature, the impacts of size and scale, and nature experience as necessary but insufficient for development of ecological consciousness.

3.3.1 There is no urban in nature

Respondents' levels of ecological consciousness (sense of connection with nature) were influenced by the degree to which they perceived the space to be natural or human. In the minds of these citizens, a separation existed between what is nature and what is city. As one man writes: "Nature equals wilderness equals no city" [08/15.1.0/07].

Certainly, none of the tour sites in this project qualifies as untouched nature as all have some degree of human influence. However, this fact did not prevent some participants from using intriguing vocabulary to differentiate and authenticate natural landscapes. For example, a Calgary man writes: "The Weaselhead provided a sense of true nature, untouched and real" [07/09.1.0/03]. In Halifax, another man explains: "I prefer 'nature nature', [although] it is not always available and urban nature is the best substitute" (participant emphasis) [09/20.1.0/02].

For most respondents, if the landscape lacked vegetation or wildlife, they found it difficult to sense connectivity with nature. Even when vegetation was present, if the space was crowded with people or contained numerous signs or advertisements, it was easily overlooked. For example, this Halifax man describes his experience of the commercial streetscape: "I found that nature wasn't really present there either, even the trees and flowerpots, you just wouldn't notice, you just go by them without noticing…" [09/27.1.0/06]. Unquestionably, respondents most frequently mentioned traffic and noise associated with vehicles as restricting their ability to sense a connection to nature, as this woman describes: "I find it very difficult to get past the urban noises to see through to nature" [09/19.0.1/02].

This led me to two conclusions: (1) that respondents usually only notice dominant features in the landscape, and (2) while reflecting on their relationship to the earth, they search for symbols of nature within the space with which to connect. Typically, participants associated vegetation or wildlife as symbols of nature as opposed to other natural elements, such as the sun and air, which are found universally in outdoor landscapes. Moreover, when the predominant landscape features are human artifacts, such as buildings, roads and/or concrete (e.g., commercial streetscape), even the natural elements of sun and air felt unnatural, as this man attempts to convey.

> When we are on Centre Street I noticed two things. The sun was hot. And the other thing I noticed was the wind was blowing from behind. But it was interesting because both of those I experienced in a negative way and I thought once we got out to Weaselhead or other places, the sun was warm and inviting and the wind was gentle but on Centre Street it seemed …the sun wasn't the same sun, the wind wasn't the same wind…[s]o the concrete actually negated sunlight and wind and trees. [06/11.1.0/04]

Initial survey results revealed that participants' definitions of urban nature incorporate more than just the availability of vegetation but also the vegetation's type and quality. For example, participants were asked to select which elements they regard as urban nature. While 17% of the sample selected all the listed elements, the majority of respondents excluded green open fields, lawn, zoo, and pests from their definition of urban nature (Figure 3.3). Interestingly definitions differed between cities. A t-test analysis revealed a significant variance between Calgary and Halifax regarding flowerbeds (.027), green roofs (.003) and pests (.059) (Table 3.4). In general, Halifax citizens have a broader definition of urban nature.

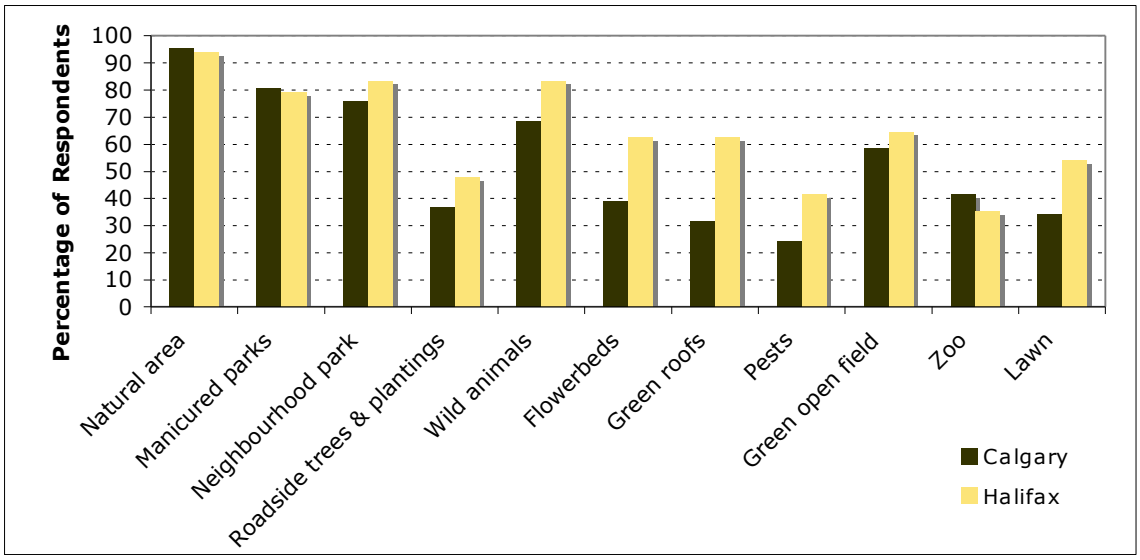

Figure 3.3: Elements of urban nature

Table 3.4: What constitutes as urban nature differs significantly between Calgary, AB and Halifax, NS

Location	*Flowerbeds*	*Green roofs*	*Pests*
Calgary	39.0%	31.7%	34.1%
Halifax	62.5%	62.5%	54.2%

Diary entries provided clearer insight into how respondents' definitions of nature factored strongly in their ability to feel a sense of belonging to the broader natural community. For example, if vegetation was perceived to be exotic to the region, the respondents classified the vegetation as a human artifact thus hampering their sense of connection, as this woman describes: "I think they [Athletic fields] are important for community…but I don't feel connected to nature necessarily, you know the way I would if it were native grasses" [08/15.0.1/09]. In contrast, if the vegetation reminded them of natural settings they experienced in the past, then participants were better able to feel a sense of connection to earth, as this woman describes about the naturalized schoolyard: "I do feel a connection, it reminds me of the ponds by my house back home in Ontario and all the things I used to explore as a child." [09/27.0.1/04].

Participants used descriptive terms such as manicured, artificial, formal, controlled, structured, and organized to convey the concept that a landscape was manipulated by people to such an extent that it no longer fit their definition of nature. Fewer respondents reported feeling a sense a connection to nature while visiting the athletic fields, because they perceived there to be little nature with which to connect, as this Calgary man describes.

> Tough to explain this but I think the degree of 'manicur-ization' is throwing me off. You pretty much never just see a big open field of grass, and only grass, in nature. That said, at least it's alive. This [athletic field] is a good place to get out and get fresh air but I don't think of it as natural or part of an eco-system. Actually now that I think of it, this place is almost a metaphor for the games you play here: structured, rule abiding, fun, at times great to watch, but not something that necessarily has a life of its own. This place needs humans to infuse it with life. [06/11.1.0/03].

The perception of mown fields as unnatural was only one illustration of how the quality and condition of vegetation within an urban outdoor space influenced how the sites were interpreted as natural or artificial. A comparison between the botanical gardens and the naturalized schoolyards provides another interesting example. First, both sites contain lush, verdant and diverse vegetation. Second, both landscapes are obviously planned, planted and cared for by people. However, the key difference between locations is the degree to which respondents perceived them to be manicured, controlled, or influenced by human activity. As this woman explains: "[the naturalized schoolyard] seemed like it was made and it is just being allowed to go organically from there…it was kind of becoming its own thing" [07/11.0.1/02]. On the other hand, this man points out: "I wouldn't have really looked at, like, the botanical gardens as a natural setting even though there are all kinds of plants and even ducks on the pond just because it is so tightly organized and grid locked" [09/20.1.0/03].

The sounds of birds and rustling leaves, fresh air, water, trees and other diverse, abundant and native vegetation defined nature for participants. For them, nature was soft and varied in colour, texture, pattern and topography. As well, natural landscapes were described as exuding a life-force whereby vegetation growth is uneven and unbound, and animals live out their lives unrestrained, as this Halifax woman describes: "[Point

Pleasant] is just more of a natural environment. You have succession going on and birds, and squirrels running around looking for food and doing whatever they do. It just grows as is…" [09/26.0.1/02].

For these participants, how human and natural aspects of outdoor places relate to each other symbolizes society's relationship to nature. They found it challenging to develop a sense of kinship with all life where the life appeared to be suppressed and controlled.

> Centre Street to me was more like the city trying [to] keep nature out and you saw nature trying to come through the cracks in the sidewalks and trees growing up amongst different buildings, foundations, etc. So, it was like nature was fighting against and we were trying to keep it out on Centre Street [08/15.1.0/04]

In places where respondents perceived the human influence to harmonize with the natural order rather than intrude upon it, they were better able to feel a sense of belonging to the broader natural community.

> My most 'awe' feeling and connection to nature was at the mature tree lined street. The mixture of human architecture and nature made for a very cool effect. I really felt that nature and humanity were living beside each other in peace. [07/09.1.0/02].

3.3.2 Emotional experiences at field sites

Alongside descriptions of physical features, respondents provided detailed accounts of their emotional experiences while visiting the field sites. Every participant shared this man's sentiment: "Every location had unique characteristics and so I felt different" [09/25.1.0/01]. Most of the emotions described by participants could easily be categorized as positive or negative feelings and their frequency of mention strongly correlated to specific tour sites (Figure 3.4). The more natural the landscape, the more participants were able to feel liberated from the hectic aspects of city life for contemplation on oneself, as this Calgary woman describes:

> When I arrived at a few of the locations, right away I felt very peaceful, at peace with myself and that I could sit and think, and write and then there where other locations in which I definitely did not feel that way as much. So, I think that, obviously, the amount of nature around me and the birds

> and the fresh smells and stuff like that definitely added to the feeling. So the more nature, the more I felt like that - peaceful. [06/11.0.1/02]

Most importantly, respondents' positive emotional states and sense of detachment from urban life contributed to dissolution of the divide between nature and themselves.

Forested Parks

Free •peaceful •calm
fondness •pleasure •relaxed
able to think •revitalized •comfort •awe
fascinated • appreciative •friendly

Naturalized Schoolyards

Free • fondness • pleasure
surprised •peaceful •calm •inspired
relaxed •comfort •able to think appreciative
• fun •hope

Botanical Gardens

Peaceful • calm • free •relaxed
able to think •fondness • pleasure •
inspired • revitalized • comfort • awe
fascinated •not relaxed

Athletic Fields

Free • exposed • relaxed fondness
• pleasure • peaceful calm •comfort •
safe • revitalized
fun • able to think

Mature tree-lined Streets

Peaceful • calm • fondness
pleasure • comfort • relaxed •free
welcome • safe • home
able to think

Commercial Streetscapes

Dislike • busy • stress •unsafe
uncomfortable
rushed • need to be productive
tired •tense • annoyed

Naturalness

Figure 3.4: Frequently mentioned emotions by site type (Large to small font represents more to less frequently mentioned)

In their accounts, participants shared the above respondent's view that natural elements create a sense of solace, which leads to positive mood change and renewal of directed attention capacity or focus. Related to this concept is the fact that many participants' commented on the ability of trees and other vegetation to visually and psychologically separate them from the busyness, noise and pressures of their usual routines. For example, this Calgary woman explains that naturalized areas provide "a way of escaping from the cacophony and distractions that wear us down" [08/13.0.1/04]. Similarly, this Halifax man describes how the forested park felt like a haven from the city:

> It was almost like a shield from the city. Like you said before, you could go into the Point Pleasant Park and not see the city, not see the buildings…a lot of the traffic noise is muffled out by the wind and the trees and stuff like that. It's like a protective bubble almost. [09/19.1.0/03]

Topography and tall vegetation allowed participants not only to isolate themselves from the artificial world but also from other people. This solitude was necessary for some citizens to feel a sense of connectedness to nature, as one woman describes: "I find for me, a big part of connecting with nature and things like that, is not having a lot of people around." [09/19.0.1/01]. Even busy, urban green spaces could create a feeling of being alone, if the vegetation and trails allowed them to visually seclude themselves.

> I like the idea of the stone pathways just winding and going up…what was nice about it was that you had little areas where you can actually just disappear. After a while, I saw nobody because everybody went off to their little corners and you were actually alone in a spot. And I like that and seemed that the whole ambiance was actually quite different, it seemed peaceful even though I heard cars again and the traffic but I could be invisible. [08/15.0.1/13]

Figuring prominently in respondents' accounts was the sensation of being surrounded by nature. The ability of vegetation, specifically mature trees, to act as a barrier allowed them to feel protected, safe and comfortable while in a space, as this man described: "The big trees make it very quiet and provide a "sheltered"/cozy feeling." (participant emphasis) [08/15.1.0/03]. The perception of being surrounded by nature was a feeling participants related to being outside of the city in landscapes normally defined as natural. For example, many respondents described the sensation of being on the mature tree-lined street as, "being in a forest" or "like a forest".

The archways formed by the branches of the trees on the mature tree-lined streets received several mentions because of their particularly powerful impact on respondents' emotional experience. For example: "There are lots of trees on lots of streets but what strikes me about that one is there is lots of canopy cover … you get that sense again of being like in nature and even in Riley Park I didn't feel like/have that. So there is something about being contained within it" [06/13.0.1/01]. This Calgary woman describes the importance of the trees' form on her emotions: "For me on that street, it is all about that archway, the arch it makes. When you talk about feeling encompassed or enclosed or whatever, close feeling" [08/15.0.1/09]. The sense of being surrounded by nature was not only a physical sensation but also a psychological sensation that influenced respondents' feeling of inclusion in nature. For example, another Calgary woman explained how the trees affected her feeling of security in the space and therefore her relationship to nature: "I placed myself in the middle of "nature" because I feel cocooned by all the trees that meet over the street" (participant emphasis) [07/09.0.1/06].

In their accounts, participants noted that places with more vegetation felt friendlier, as this Calgary man describes: "[green space] softens the image of the city, seems more friendly" [08/15.1.0/12]. Also, respondents felt that people they encountered in vegetated places were more social and friendly towards them, as this Halifax woman comments: "The sounds, the sights, it makes me feel quite happy. The people here are more friendly - less distant" [09/26.0.1/01]. In general, this friendly atmosphere allowed them to feel more comfortable, welcome and at home in the space.

Beauty was one of the most commonly mentioned qualities in respondents' descriptions of tour sites. Even on the commercial streetscape they spoke of the need for beautification to improve the location. More importantly, they marveled at the beauty of non-human nature, which evoked a sense of awe, wonder, and fascination. One Calgary woman remarks upon how nature's creations are without parallel: "[Y]ou go out there [in the forested park] and you see something far more magnificent than any person can build…so what mankind can do is so miniscule as compared to what nature can do" [07/09.0.1/05]. Another Calgary woman describes how the forested park impressed her:

"Like in comparing the different spaces today it was the natural one, the Weaselhead, that makes you just go WOW! The others don't have a wow factor." [07/09.0.1/06]. In Halifax, another woman explains why the forested park intrigues her: "Things that you see in that space are a surprise. You never know what you are going to find" [09/18.0.1/03].

3.3.3 Engaging with urban nature

At its core, *engaging with urban nature* focuses on the activities and behaviours that respondents felt were appropriate for the types of spaces they visited on the field tour. As well, it highlights how the uses of a space affect one's ability to connect to the broader natural community. It includes respondents' accounts of how more-naturalized spaces allowed for a greater variety of active and passive recreational activities, increased their desire to explore and discover the wonders of biodiverse landscapes, and allowed the freedom of simply being and acting without constraint.

At the beginning of the research day, respondents selected which outdoor activities they partake in and rated their level of connection to nature while engaging in that activity (Figures 3.5 and 3.6). Results indicate that the most popular pursuit is walking in an urban park and only one Halifax participant feels no connection to nature while doing so. Combining results from both cities reveals that hiking, camping and shopping at the Farmer's Market are the next most popular activities. While few participants felt a strong connection to nature while shopping at the Farmer's Market, most felt a strong connection while hiking and camping. Both hiking and camping generally require a person to visit natural landscapes outside of the city.

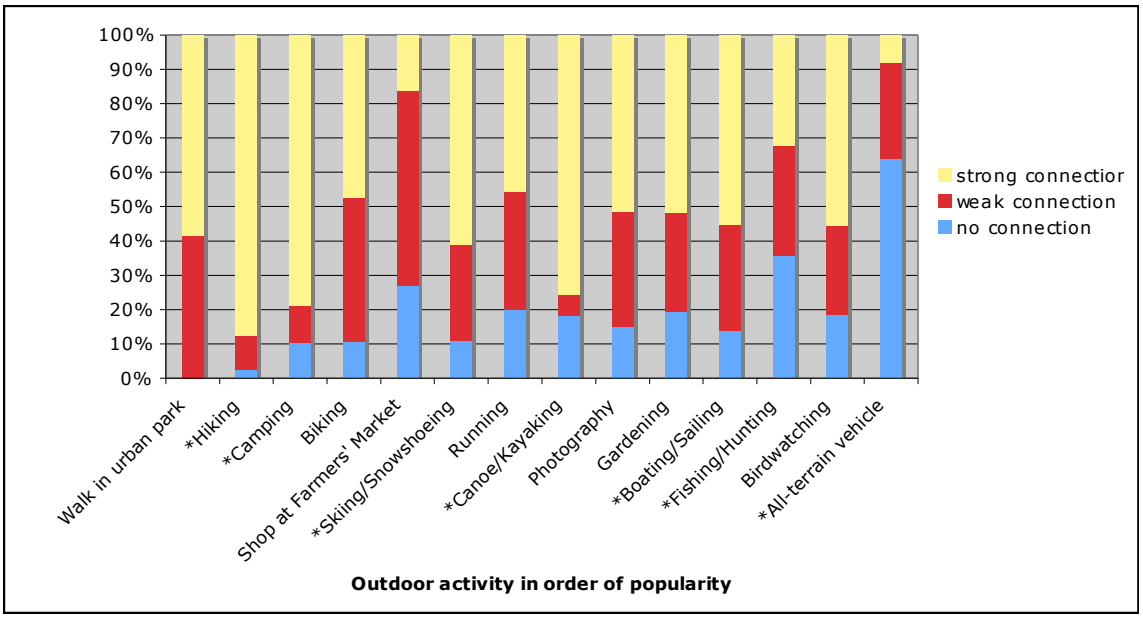

Figure 3.5: Calgary respondents who engage in outdoor activities and their level of connectedness to nature (* signifies activities that generally occur outside of the city)

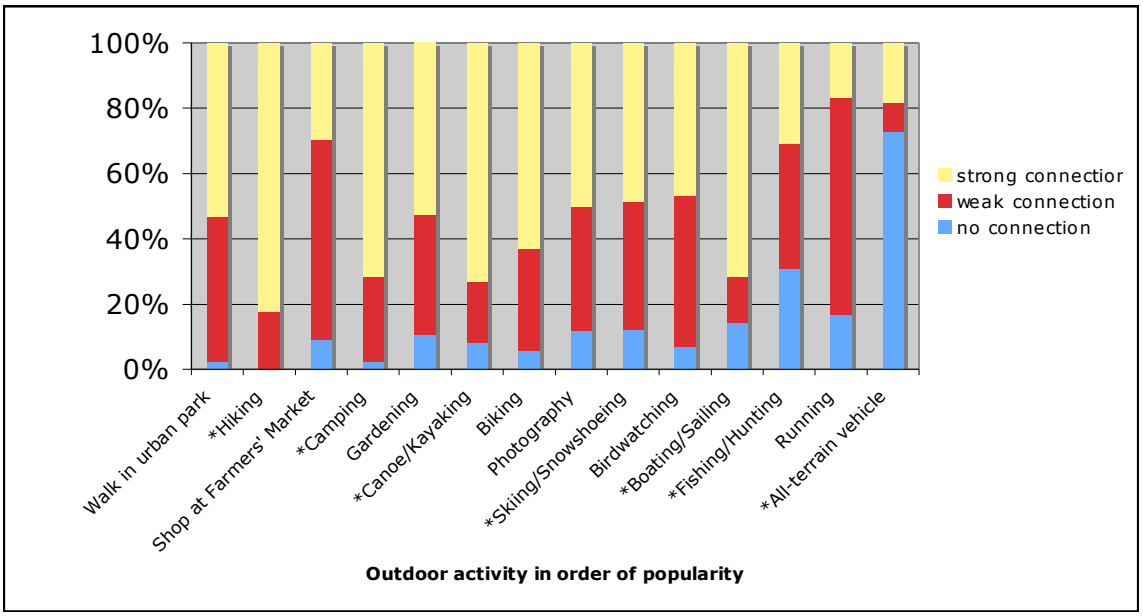

Figure 3.6: Halifax respondents who engage in outdoor activities and their level of connectedness to nature (*signifies activities that generally occur outside of the city)

Private property and the presence of roads and traffic greatly influenced how respondents felt they could use a space. For example, respondents described the mature tree-lined street and commercial streetscape as places that provide necessary services, homes for

people to live and ways to commute from point A to B. However, they were not places participants wanted to stop and linger. Either traffic made the space feel unsafe and busy or it seemed inappropriate to use a space belonging to someone else for any reason other than to pass through, as this Halifax woman describes: "I felt like it was private space so I could walk through. So, there are certain things you are allowed to do in that space, but it is not a place to stop at" [09/25.0.1/04]. Another Halifax woman points out: "You can walk up and down the street but you weren't really interacting with the nature" [09/19.0.1/01].

Public outdoor spaces like the athletic fields provide more freedom to engage with natural elements. However, while respondents appreciated athletic fields as gathering places, opportunities to use the open spaces for activities other than team sport or public events was limited. The lack of biodiversity characterizing the athletic fields did not inspire participants' curiosity or desire to explore, nor could respondents find privacy or places for contemplation.

> [The athletic field] made me feel exposed, completely barren and even the way the paths are, it is made almost in a way to cross the space. You cross it or you play football. To me it didn't feel like the kind of park that you would sit up against a tree because they are all beside the sidewalk, it was just really barren. I mean there was a lot of activity but not my kind of park. [09/27.0.1/08]

This sentiment was particularly true for older participants (i.e., age 46 +). As a result, participants reported that they found it easier to connect to other people in the space than they could to a larger natural community.

In contrast, natural landscapes possess a variety and complexity of vegetation that changes from season to season and year to year, so there is always something new to see and discover. Even the lush botanical gardens appeared as static environments compared to the naturalized schoolyards and forested parks. The unpredictability and variability of the nature experience in these more-naturalized sites sparked participants' sense of adventure and mystery, as one Calgary man explains: "This [naturalized schoolyard] is the kind of place you can just go and wander and discover new things, a broken log, a

cool inlet etc." [06/11.1.0/03]. Another Calgary man comments: "[Y]ou wonder what is around the corner." [06/13.1.0/03].

For many older (i.e., 46 + years) female participants, sitting and observing nature was enough to generate a sense of kinship with all life. Others expressed a desire for direct interaction rather than vicarious experiences of nature. Sites that were too controlled severely limited their ability to connect to nature, as this Halifax man writes about the botanical garden.

> "Do this, don't do that, can't you read the signs." All the beauty of nature to be admired...from afar. You can't even sit on the grass. It's too regimented. It's like taking a kid to the science centre and telling them they can't touch anything. In fact, I can't even "stop to smell the roses", unless in a designated area. (participant emphasis) [09/25.1.0/04]

Many respondents felt that a simulation or a display of nature lacked reality and relevancy. They needed a physical connection to nature in order to feel a sense of inclusion in nature. They wanted to be able to pick berries, challenge themselves physically, climb trees, dig in the dirt, swim in lakes, and explore under rocks and logs. For many respondents, urban nature did not provide enough opportunity to engage with nature and visiting the field sites inspired a desire for nature experiences beyond urban boundaries where they felt greater freedom to act. For example, this Halifax man explains his views of the field sites:

> There was or is limited interaction in all places with nature, it tended to be, limited to just, like, being in it and looking at it and hearing it, smell it kind of things. The Commons was like more of a stage for activities…and the Point Pleasant Park was maybe closest but you still could not do much, you still just walk through nature and you can pick berries which is good. But they are still almost different styles of cathedrals, these sanctuaries, contemplative places. Certainly the Public Gardens are definitely that, they are an art gallery version of nature, where you go and look at things and you pass through and maybe it is more pleasantly decorated and has a nicer smell in the air but you are not interacting with nature in a substantial way. [09/27.1.0/06]

In their accounts, respondents explained that how quickly they moved through a space either assisted or hindered their ability to notice natural elements and gain the psychological benefits (as described in the previous section) of naturalization. For

example, this Halifax man explains: “You have more opportunities to do these observations [of natural elements] and to see these differences [changes in nature] provided that you are moving slow enough to see it rather than on a bicycle or in a car.” [09/26.1.0/03]. Meandering paths force people to stop or slowdown. Landscapes that require a person to take a leisurely or unhurried pace fosters contemplation that leads to an experiential sense of oneness with the natural world, as this woman’s comment suggests:

> I do feel more connected when I am in a place that reminds me that I live on the planet, because sometimes you are just not even reminded, you are like, I live in a city and I do this. You are really caught up in your day-to-day life, so sometimes the thing that makes you feel connected in wild spaces is that it is like slow pace, you have time to think. [09/25.0.1/02]

Finally, accessibility was a major concern for participants (see Figure 3.2). In their opinion, urban nature needs to be accessible to all urban citizens equally. For them, accessibility means that they can easily access information regarding availability and locations of urban green spaces, that urban nature is easy to get to from any person’s home by public or active transport, and that urban naturalized spaces provide both active and passive recreational opportunities (i.e., quality trail networks and benches) so that every age group, including children and seniors, could use the space.

3.3.4 Impacts of size and scale

This theme of ‘impacts of size and scale’ focuses on how participants notice and are sensitive to prominent landscape features. A natural landscape’s area or the size of natural elements affected how the space could be used as a recreational escape, worked as a visual and psychological buffer, and influenced how participants classified the site as natural or human. On the tree-lined street, one woman wrote: “The size of the trees gives me the impression of being in a forest” [08/15.0.1/14]. As well, when natural elements were very large relative to the observer, it gave the impression of magnificence or grandeur. This ‘bigger than me’ perspective symbolized their relationship to the natural world, as described by this Calgary woman: “I think that because it [the forested park] is such a big space, that I just felt like I was just a small part of it” [07/09.0.1/06].

In contrast, both naturalized schoolyards were small in area, with neither being bigger than 800 m^2. While some respondents questioned the purpose of such small, naturalized spaces, most shared this woman's sentiment: "I'm surprised at how such a small space can give such a 'big nature' impression" [06/13.0.1/01]. When participants sat down within the vegetation, they suddenly felt as though they were small and surrounded by nature. And while the small size of the naturalized schoolyards prevented some respondents from feeling a connection with nature, many emphasized the importance of these spaces for children given that children use space differently and, as one Calgary man points out, "when you are a kid, small spaces seem big" [07/09.1.0/03].

Many respondents demonstrated that large green spaces are not always an essential criterion for connecting to nature because they were better able to feel a sense of connection while visiting a small naturalized schoolyard: "Riley park was expansive too, so I don't think size matters as much. I mean big and open and awesome is nice, but it is not necessary" [06/13.1.0/02]. In response to his comment, however, a woman contributes her viewpoint, adding: "Although when you go to the mountains or you are like by the ocean, there is a sense that you get nowhere else, there is something about the magnitude of those things that makes a difference" [06/13.0.1/01].

3.3.5 Nature experience is necessary but insufficient

The vast majority of respondents believe that nature experiences have educational value. When specifically asked whether a walk in the park is an educational experience, most agreed, although a significant difference (t test = .002 & .000) exists between age groups (Figure 3.7). Older generations are more inclined to hold the view that a walk in the park is a learning opportunity.

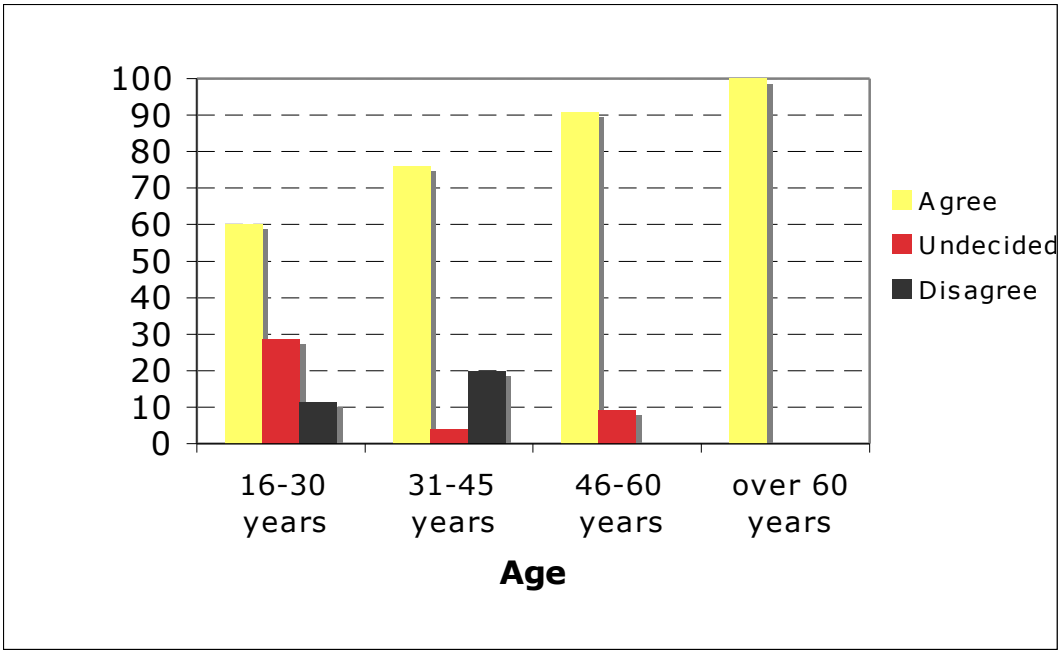

Figure 3.7: A walk in the park is an educational experience

According to respondents, urban nature experiences are necessary for developing an ecological consciousness because: "If you don't see it, you don't know it" [09/20.1.0/05]. Contrary to survey results on the educational value of a walk in the park, many respondents suggest that most urban citizens overlook or disregard urban nature. Participants believe that while people value urban nature for its aesthetic qualities and contributions to health and well-being, most do not spend time contemplating their connection to earth while visiting outdoor spaces. As this Halifax woman explains: "I think that for the majority of people, if you are used to living in an urban space, you walk in and out of many green spaces, maybe a little calmer but possibly just the same as before" [09/27.0.1/08].

Respondents felt that urban citizens can develop an ecological consciousness over time but it would to take more than a walk in the park. They believe that urban naturalized spaces are good places to build a familiarity with nature and to start learning about natural processes, and the human impacts on nature. However, additional educational support is required in the formation of an ecological consciousness. Participants suggested that family or friends, interactive educational programming (whether formal or

informal), and/or educational signage could provide the necessary support to effectively connect people to nature and assist in the development of an ecological consciousness.

> [P]robably changing the spaces we live in would be the best kind of education, obviously right. If people are living in more integrated environments where you are interacting with the world in a more participatory way, so you see the effects of your actions, you then become aware of that interconnectedness much more…[09/29.1.0/03]

Exactly how would an increase in the number of naturalized areas affect urban citizens' ecological consciousness? It is the opinion of most respondents that more naturalized areas would result in more opportunities for urban citizens to connect to nature. In essence, this is bringing the nature experience "to their doorsteps" [09/25.1.0/04]. Daily exposure is thought to bring nature to the forefront of urban citizens' minds so that they cannot ignore their environment, as this Halifax woman describes: "Well, it would be in their face all the time too,…it is like advertising – natural advertising." [09/20.0.1/04].

Finally, many echoed that the research process itself was an effective way to positively influence ecological consciousness. Most had never taken the time to consider how a space affects their thoughts and feelings relative to the earth. The time provided for reflection was appreciated and making comparisons between sites assisted respondents to realize the importance of green spaces to them. Many commented that participating in the project gave them a new-found appreciation for both the quality and variety of green spaces in their city. Some even gained inspiration and new ideas about how nature could be reintroduced in an otherwise hard urban environment: "And it makes me feel more like I have a hand in the future because we can imagine it differently" [09/17.1.0/07]. Furthermore, the research process challenged their conceptions of nature. At the end of the day, most respondents described that their definitions of urban nature were broadened.

3.4 Discussion and Conclusion

Today, most of the world's population lives within a metropolitan area. Urbanites now spend more time in front of screens, engaging with the technological and manufactured world than they do with the natural world. There are growing concerns about the consequences of this occurrence given that nature views today are largely created by a growing urban population and thus dominated by urban values. As this research has shown, the experience of visiting natural sites and reflecting upon them increased participants' reported feeling of connection to nature and their ecological consciousness. This is consistent with Orr (2004), who theorizes that providing direct nature experiences shapes our ideas and philosophies relative to the earth, and cements our citizenship in the natural world, eventually culminating with the realization that what we do to the earth we do to ourselves. In essence, people's judgements about the acceptability of different human activities in natural environments ultimately "derive from people's sense of how they are (or ought to be) related to non-human nature" (Schroeder, 2007, p.293).

No simple or universal answer exists to the question of whether people feel they are a part of or separate from nature, as it is a very abstract, psychological conceptualization. However, the methods used in this project demonstrate that qualities of urban landscapes affect people's feelings and their ability to sense themselves as belonging to a great network of living things.

The theme of naturalized urban landscapes as refuges was a continuous thread throughout most diaries and group discussions. Respondents felt over-stimulated in an urban environment, and found that time spent in green spaces provided calm, peace, pleasure and relaxation, as Konijnendijk (2008) suggests, the necessary "antidote" (p.81). Urban residents seeking respite and quiet gravitate to these less-built, more vegetated areas. Certainly, in this study, increased naturalness of a site related to an increase in respondents' sense of freedom and their ability to think and reflect. In Konijnendijk's

(2008) work on urban forests, he proposes that the 'non-controlled' experience of a forest is the crucial factor for achieving 'escape" from the city.

Participants in this project conveyed corresponding restorative benefits from a landscape's aesthetic qualities and naturalness whereby naturalness is defined by respondents as biodiverse and un-manicured. Similar psychological benefits of nearby nature have been well documented (Kaplan & Kaplan, 1989; Hartig et al., 1996; Korpela, 2001). Hartig et al. (1996) found park-land settings in urban areas yield restorative experiences including improved attention capacity or focus and positive mood change. Benefits also include contemplation on oneself (Korpela, 2001) and ability to reflect on a life problem (Mayer et al., 2009). Fuller et al. (2007) found that the psychological benefits derived from contact with nature in urban green spaces increase with species richness.

As respondents' feelings of restoration and calm improved during visits to natural landscapes, so too did their sense of connectedness with nature. This suggests that perhaps people's experiential sense of oneness with the natural world is not only a conceptualization but also a feeling akin to calm, peaceful and reflective. This is not to say that feeling a peaceful calm will always lead to a connection to nature, but repeated positive emotional experiences in nature have been shown to lead to place attachment, a similar psychological construct (Kellert et al. 2008; Campbell & Wiesen, 2009). Furthermore, Mayer et al. (2009) demonstrated that the positive psychological effects of exposure to nature are partially mediated by increases in connectedness to nature.

For many people in this study, an experiential sense of oneness with the natural world was less about a sedate experience of nature than an opportunity to be stimulated or challenged. An athletic field or botanical garden could not provide the same strong sensation of freedom or desire to explore as a naturalized space, so some respondents had difficulty sensing themselves as part of nature. This finding relates to the work of Kaplan and Kaplan (1989) who discovered that while natural landscapes have the ability to reduce stress and foster peacefulness, they simultaneously compel and fascinate us.

Kaplan and Kaplan's (1989; 2005) research on landscape preferences suggests that natural landscapes offer endless possibility for new insight and opportunities for exploration. People effortlessly direct their attention when fascinated, leading them to feel in tune with their immediate surroundings.

The participants in this study tended to focus on dominant landscape features, particularly trees, water, sounds of birds, buildings or cars. Relating to the theme *there is no urban in nature*, if participants associated the dominant feature of any landscape as being natural, they were more inclined to feel a sense of connectedness with nature. Indeed, the environment conveys information and humans examine it to learn what is going on (Kaplan & Kaplan, 2005). In Kellert's (2005) research in three Connecticut communities he also discovered that most people only notice and appreciate prominent landscape features and land-use practices, such as the presence of large attractive trees, fast-flowing water, or abundant parks. He suggested that people use these indicators to discern environmental quality since most do not fully grasp what is a healthy ecosystem (e.g., nutrient flows, water chemistry) (Kellert, 2005). Results from this study support Kellert's conclusions.

When a place contains both human and non-human features, the way in which these features relate symbolizes, for the urban participants in this study, the relationship between humanity and the natural world. If human influences or actions modified nature to the extent of removing it (e.g., commercial streetscape), the site was no longer defined as nature. Similarly, Burgin, Williamson and Maheshwari (2010) found that most Australian university students' classified urban bushland as urban natural spaces. However, when adjectives such as 'degraded' or 'weed infested' were added, urban bushland was no longer considered 'natural'.

In this study, people made a distinction between what is human and what is non-human. This is not to say that the participants believed that nature must be totally detached from and unrelated to human beings. On the contrary, if human elements and artifacts (including sounds) do not appear to dominate the landscape but rather appear as a

harmonious piece (in balance with natural elements), participants found that this assists dissolution of the divide between nature and themselves. The fact that many participants were surprised to feel part of the natural environment while visiting human-built landscapes (e.g., naturalized schoolyards, mature tree-lined streets) demonstrates that people's distinction between natural and human environments is a matter of first-hand experience of real places and their reflections upon them. This illustrates Schroeder's (2007) point that definitions of nature are apprehended not only conceptually, but also through perception, feeling and imagination.

Schroeder (2007) also suggested that an individual's relationship to the environment can change or develop through contact with an unfamiliar or previously unappreciated place. Therefore, definitions of nature not only vary among people, but also within the same person over time. Certainly, the respondents in this study gained a new appreciation for nature in their city through participation in the research project and also discovered why some landscapes were better than others at allowing them to reflect on their direct relationship to earth. Yet it is important to note that the meaning people derive from nature experiences is essentially mediated by the society one belongs to and is, therefore, culturally determined (Sauve & Orellana, 2004).

Citizens' recognized that through deliberate design, we may restore or foster the growth of an ecological consciousness within the urban context. A combination of the following key attributes promotes associations between self and nature.

- People need to feel within a landscape that they define as nature, in order to experience some connection to earth. This study's respondents define nature as quiet, non-manicured, with abundant, natural and diverse vegetation and wildlife. Naturalized spaces can fit this description.
- The landscape needs to provide places for people to find refuge and escape, solace, and solitude to allow for contemplation of their relationships with others and with non-human nature.

- People require nearby access to naturalized spaces, as well as freedom to explore, act and directly engage with natural elements to feel a sense of inclusion with the natural world.
- Size and scale do matter. Large natural elements or landscapes, which render human elements (including people themselves) as small and less-significant, reminds people of the broader natural community.
- Experiences of naturalized landscapes require additional social support to assist people to move beyond the positive psychological experience of nature toward development of an awareness of interconnectedness.

Interestingly, the above qualities closely resemble biophilic design principles used to construct buildings intended to connect people to nature. Adapted by Kellert (2005), elements of biophilic design include: prospect (ability to see into the distance), refuge (sense of enclosure, shelter or canopy), water, biodiversity, sensory variability, biomimicry (design derived from nature), sense of playfulness (elements of surprise) and enticement (discovered complexity). Biophilic design overlooks one of the more important qualities mentioned by this project's participants, that being, how sound can hinder or promote a sense of connection to nature. However, it is reassuring to note that research conducted within another setting derives similar results, thus suggesting that there is both relevance and potential for a wider geographical application of this study's findings.

It is important to comment on some of the limitations of this study. The sample for this project was limited to people who were both available and interested in donating their time to participate. Clearly, it would have been beneficial to have a larger and more diverse representation of citizens. Participants in this study were self-selected and do not represent all urban inhabitants. The images of nature described in this study cannot simply be applied to other cities, countries and/or cultures, or for that matter, to all citizens of Halifax and Calgary. Different landscapes as well as different cultural contexts may lead to different conclusions.

Nearby nature plays a vital role in people's lives, for as much as urban nature is produced by humans, nature in turn produces us (Creswell, 2004). This interaction between people and nature occurs everywhere at every moment of the day. Providing a variety of green spaces, including naturalized urban landscapes, presents more opportunity for a greater diversity of people to reap the benefits that nature experiences bestow. Given the extent and severity of environmental problems, naturalized spaces are a relatively simple and effective method to improve mental, physical and environmental health while also fostering an attachment to place, if urban citizens experience them.

Urban naturalized spaces can affect our overall relationships with, and views of nature. In a largely artificial environment, naturalized spaces provide first-hand experiential knowledge of natural processes, the rhythms of seasons, and the interconnectedness of all life. Urban naturalized spaces connect culture and ecology within a geographical context and reflect how we see ourselves fitting into the world. They are symbols of our society's environmental stewardship ethic whereby green spaces are not just refuges from the city but active agents within it. They are symbols that the world is not a place of divisions, but rather a place of relations.

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Chapter 4 - Urban Forest Values in Canada

Views of Citizens in Calgary and Halifax

Abstract

A significant component of the urban ecosystem is the urban forest. They are also the quintessential meeting point of culture and nature, so it is critical to incorporate values-based approaches to managing them. The values that really count are those of urban citizens. A novel qualitative method was used to determine what qualities of the urban forest are valued by citizens of Calgary, AB, and Halifax, NS. These values were compared with those reported in the literature to reveal that citizens value the urban forests mostly for their non-material benefits. Specifically, urban forests contribute to human emotional, intellectual, and moral fulfillment.

4.1 Introduction

The world is becoming more urbanized as more of the world's population moves from the countryside into cities (United Nations, 2008). Canada is no exception to this trend. According to Statistic Canada (2006), Canada's population is 80% urbanized and Canadian cities are expected to continue to grow, given a combination of high immigration rates and the preference of new migrants toward settling in urban centres. Associated with high levels of urbanization are unprecedented levels of land consumption and the loss of native land cover (Bryant, 2006). While one could argue that expanding cities mean the end of nature, others suggest that it is merely its transformation (Braun, 2005).

Recently, the definition of the city has expanded to include non-human entities and organisms that help shape the city. Recognition of cities as "produced nature and space" has extended to an understanding that urban ecologies share a metabolic relationship with

the rest of the world and are very much a link between society and nature (Braun, 2005, P. 497). As such, cities are not spatially bound but are, alternately, spaces in which dense flows of nutrients and matter, energy, capital, commodities, people, and ideas link urban landscapes with distant sites and distant ecological systems (Braun, 2005). Within these dynamic urban eco-systems, trees and forests are being recognized as key contributors.

For this reason, newly formed urban forest commissions are developing urban forest management plans aimed at sustaining the abundant and diverse values associated with the urban forest. Amongst the dozens of municipalities in the US and the few Canadian cities which have developed long-term urban forest management plans, most tend to focus solely on trees and their caretaking (Ordonez & Duinker, 2010). While these plans primarily concern themselves with criteria such as canopy cover, tree-size, and species diversity, concentrating on biophysical functions and/or structural characteristics of the urban forest blatantly overlooks the full range of contributions trees and forests make to the urban environment.

Ordonez (C. Ordonez, personal communication, August 20, 2010) provides a comprehensive literature review revealing an enormously broad set of values associated with urban forests (Table 4.1). His broader values-based approach to urban forestry considers environmental as well as psycho-social and economic values. Such studies and approaches bring us closer to understanding the full range of benefits provided by the urban forest. A particular focus is required, however, on the values held by urban residents. Urban inhabitants not only produce and use the urban forest, but in turn, urban society is also greatly affected by their close interaction with city trees. Urban forests can become part of local culture and identity (Konijnendijk, 2008). Additionally, Canada is a democracy and one of the fundamental principles of a democratic nation is public participation. Further, local commitment is a vital element in any resource management initiative.

Until recently, diverse social values and attitudes were largely excluded from the decision-making process of hinterland forests because managers and foresters have

favoured scientific and economic values (Bengston, 1994). While urban foresters have different management goals than hinterland foresters who are harvesting trees for profit, they risk repeating the same mistakes their counterparts made in the past. Two decades of controversy surrounding hinterland forest management prompted forestry professionals to take into account values and preferences of the general public (Beckley et al., 1999).

By understanding the urban forest values that people hold, managers and planners are better equipped to refine management goals and to establish policies geared towards meeting those objectives. More importantly, potential conflicts can be mitigated. Urban reforestation projects implemented at the turn of the century in Greece, Netherlands and Ireland may have resulted in modest successes. However, the benefits of these afforestation projects did not match locals' expectations because public participation was not part of the planning process (Papageorgiou et al., 2000).

The human dimension of urban forest management should be qualitatively and quantitatively measured in order to understand better the full and complex meaning people ascribe to urban landscapes. Therefore, the purpose of this paper is to use a nascent qualitative method to collect and catalogue a comprehensive list of citizens' values of the urban forests in Halifax, NS, and Calgary, AB, and compare these to findings in the literature.

Before moving forward, it is useful to offer some definitions of the terms used in this research project. In the sections that follow, I review my interpretation of the terms "urban forest" and "forest values".

4.1.1 Urban forests

Taken from Rowntree's (1984) earlier use of the term, the urban forest encompasses all natural and planted trees found in urban areas. Konijnendijk (2008) added that the urban forest may also refer to forests situated adjacent to a city, such as a municipally managed, forested watershed.

Established on both private and public lands, each urban forest is unique and is, in essence, the city's living landscape. Urban forests differ from hinterland forests in a number of ways. Urban forests exhibit a patchy forest structure with high spatial heterogeneity and often consist of both human-made landscapes and remnant natural areas. Species compositions of urban forests are also generally - highly variable. Urban forests may be composed of only a few species of trees or may contain a tremendous diversity of native and non-native tree species. Urban forests are comprised of trees of various ages and health levels. (Ordonez & Duinker, 2010)

It is perhaps the intensity and intricacy of human-forest interactions that truly distinguishes the urban forest. Trees within the urban environment are not only influenced by their biophysical environment but are strongly interconnected with human activities and artificial infrastructure (Ordonez & Duinker, 2010). While urban forests make important contributions to livable and attractive cities, as Jorgensen et al. (2007) noted, they may also affect people's lives negatively (e.g., as places of fear).

Undoubtedly, urban forests have been produced, reproduced and shaped many times through history according to the preferences and demands of urban society. It is because of this close dialogue between urban societies and their natural surroundings that Konijnendijk (2008) described urban forests as cultural landscapes. The social and political processes shaping urban forests assign meaning to urban places and spaces and are based on social and cultural values (Cheng et al., 2003). Therefore, it is important to understand nature-society relations and the role city forests play in the development of good cities and the physical and socio-psychological health of citizens.

Table 4.1: A comprehensive listing of urban forest values from the literature (C. Ordonez, personal communication, 20 August 2010)

Category	*Value*		*Example*
Environmental	Atmospheric pollution capture through dry deposition and increase in air quality.		(Nowak et al., 2006),
	Moderation of microclimatic urban environment	Regulation of solar radiation into urban infrastructure	(Akbari & Taha, 1992)
		Windbreaking	(Heisler et al., 1994)
		Lowering air temperature through evapotranspiration	(Rosenfeld et al., 1998),
		Reduction of energy costs for heating and cooling grey infrastructure	(Akbari et al., 2001)
	Carbon Emissions	Direct carbon sequestration	(Nowak & Crane, 2002)
		Controlling carbon dioxide emissions by cooling effect	(Akbari, 2002)
	Regulation of Hydrological cycle	Reduction of the rate and volume of storm water runoff (increase in rainwater detention)	(Xiao et al., 1998)
		Reduction of damage caused by flooding	(Grimmond et al., 1994)
		Regulation of water quality problems	(Sanders, 1986)
		Reduction of costs for the maintenance of a city's draining infrastructure	(Girling & Kellett, 2002)
	Biodiversity	Harbouring wildlife	(Dunster, 1998)
		Promoting conservation	(Adams, 1994)
	Lowering noise levels		(Farnham & Beimborn, 2003)
Psycho-Social	Positive psychological effects	Provision of a tranquil and healthy environment	(Ulrich, 1984)
		Influencing the behaviour and performance of learners	(Taylor et al., 2001)
	Aesthetic quality	Enhancing the attractiveness of cities	(Manning, 2008)
		Blocking of undesirable views	(Schroeder, 1991)
		Softening of the urban hardscape (e.g. colours, shapes, textures, sounds and feelings)	(Smardon, 1988)
		Space for wildlife to thrive; aesthetic pleasure	

	Recreational spaces for community	(Nowak et al., 2001)
	Provision of research sites for researchers	(McDonnell et al., 1997)
	Increase in civic values and stronger sense of community	(Kuo, 2003)
	Reduction of crimes and fear of crime	(Kuo & Sullivan, 2001)
	Work and labour from tree-caretaking	(Kenney, 2008)
	Emotional and spiritual benefits: strong feeling of attachment to particular places and trees	(Chiesura, 2004)
Economic	Increase of real estate values: residential aesthetics	(Tyrväinen & Miettinen, 2000)
	Higher economic activity in tree-covered areas	(Hastie, 2003)
	Asset for tourism	(Baines, 2000)
	Direct provision of timber	
	Recreational opportunities	(Nowak et al., 2001),
	Savings due to carbon dioxide sequestration	(McPherson et al., 1999)
	Savings due to air pollutant removal	
	Savings due to infrastructure runoff	

4.1.2 Forest Values

Within the social science realm, values are generally defined based on the influential work of Rokeach (1973). He described values as cultural ideas and judgements about what is desirable, right and appropriate. Dutcher et al. (2007) derived their interpretation of values from Rokeach, whereby "values are fundamental orientations, life goals or guiding principles which serve as the basis for organizing an individual's beliefs and attitudes, and guiding their behaviour" (p.475). Values are fairly resistant to change, though they can be refined (Rokeach, 1973). Attitudes, preferences, beliefs and opinions that derive from values however, do change in response to significant life experiences (Chawla, 1998).

In the broadest sense, values emerge from social dialogue and are whatever is important to us (Moyer et al. 2008, Owen et al. 2009). In this research project, the term *values* will be used to describe both assigned values (ethical principles or end states) and existence values (relative worth or preference of an object) (Rokeach, 1973; Owen et al., 2009). In a values-based approach to natural resource management, they are the characteristics or qualities we wish to sustain (Ordonez & Duinker, 2010).

Focusing on forest values, Xu and Bengston (1997) distinguished four distinct ways in which people value national forests and forest ecosystems in the United States: economic/utilitarian, life support, aesthetic, and moral/spiritual. These categories were grouped as either instrumental or non-instrumental values whereby an instrumental value is an attribute that meets a human need or "realization of other values" (Xu & Bengston, 1997, p.45). For example, instrumental values define a forest system as a utility (such as timber) in achieving a human end (such as housing). In the case of life-support values, the value is not assigned to the ecosystem itself, but rather life-support values are associated with environmental functions and services that meet a human need or good.

In contrast, non-instrumental values describe qualities that have a good of their own which cannot be easily replaced. In the words of Xu and Bengston (1997), "the concept

of the non-instrumental value focuses on the worth of something as an end in itself, rather than a means to an end" (p. 46). With this understanding in place, Xu and Bengston (1997) sub-categorize economic/utilitarian and life support under the category of instrumental values, while aesthetic and moral/spiritual are grouped as non-instrumental values.

If a value is described as that which is desirable, then no human value can be truly "non-instrumental" (Moyer et al., 2008). For example, if the forest is valued for its spiritual enlightenment for humans, than spiritual enlightenment is also an instrumental value. I agree with the precedence set by Moyer et al. (2008). For their Old-growth Forest Values Framework, they adopted the terms *material* and *non-material* in place of instrumental and non-instrumental, as these are more neutral terms (Moyer et al., 2008). Specifically, I use the term *material* benefits to refer to the physical objects people value for themselves or for other living beings and the term *non-material* benefits to refer to the abstract or intangible things such as ideas, knowledge and beliefs that people discern as important.

4.2 Methods

This project used a mixed-method approach to data collection, where both qualitative and quantitative data were gathered. However, qualitative methods are more suitable for exploring values and attitudes about the urban forest than quantitative methods because qualitative approaches are grounded in the context of people's lived experiences (Burgess et al., 1988). Therefore, priority was given to qualitative (descriptive) data. Social science disciplines often use qualitative methods because the researcher can collect multiple sets of sensory data for comparison purposes (Rossman & Rallis, 2003). For this study, the desire was to enable participants to engage all of their senses (i.e., sight, hearing, smell, touch and taste) actively during visits to several urban landscapes, thus providing an opportunity to create a rich data set.

Inspiration for the method was taken from Owen et al.'s (2009) work on citizen's values of old-growth forests. This approach was thought to derive a wealth of information that

could be useful not only for comparative purposes but could also be used to answer a multitude of research questions. The rich data set was purposed to assist me to address two research objectives. The first objective was to gain a clearer understanding of the contributions urban nature experiences make toward development of an ecological consciousness (see Chapter 3), and the second was to create a preliminary list of values that citizens hold for the urban forest.

Fourteen one-day field tours were organized in Calgary, AB and Halifax, NS (six in Calgary and eight in Halifax). Participants were organized into small tour groups based on their availability. All the tours followed the same procedures and occurred during the summer months of June through September 2009. The research day consisted of an initial survey of participants, a tour to six urban open spaces, diary writing and an afternoon focus-group discussion (Table 4.2).

Table 4.2: Outline of the field day

Time	*Activities*
8:30 am	Meet at pre-determined location for introductions and instructions. Participants complete Part A: Initial Impressions of diary.
9:30 am – 12:30pm	View Sites 1-6 and write in Part B of diary. Each visit is 15 minutes in duration for individual reflection and writing. Mid-morning refreshment break.
12:30 pm	Indoor lunch provided.
1:15 – 2:30 pm	Focus-Group Session: a set of questions are posed to each group. The discussion is digitally recorded and captured on flipcharts.
2:30 – 3:00 pm	Wrap-up: Participants record final thoughts in their diaries, Part C: Final Impressions and demographic information. In Halifax, participants select an art card, while in Calgary, they receive a behind-the-scenes tour at the Calgary Zoo as thank-you tokens.

4.2.1 Participants

Urban residents in each city were recruited to participate in the project using various techniques. These included online ads, notices posted in high-traffic locations (e.g., university campuses, grocery stores and markets, coffee shops, libraries, and ferry terminals), radio interviews (CBC Radio*ONE*) and snowball recruitment through social networks (i.e., email and Facebook). In total, 89 citizens from a diverse range of backgrounds agreed to participate in a day-long session (Table 4.3). In Halifax, three staff from the municipal planning and urban forest department agreed to participate. Their data received the same treatment as all other participants. Most respondents (68%) heard about the project through a friend and are university educated. Sixty-three percent hold one or more degree.

Table 4.3: Participant characteristics by age, sex and location

Age	***City***					
	Calgary		***Halifax***		***Total***	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*
16 – 30 yr	8	7	10	10	18	17
31 – 45 yr	6	7	6	6	12	13
46 – 59 yr	2	4	3	2	5	6
60+ yr	5	2	8	3	13	5
Total	21	20	27	21	48	41

4.2.2 Field Sites

Calgary is situated in the prairie province of Alberta, close to the front ranges of the Rocky Mountains. With a population of 1.1 million, Calgary is the largest city in the province and owes its recent expansion to a booming petroleum industry. The population growth rate for Calgary during the 2001-2006 census period was 13%, more than double the national average for the same period (Statistics Canada, 2007). As recently as 2008, Calgary had the fastest growing urban economy. The city covers a land area of 726.5 km^2

and has a population density of 1,435.5/km^2. In general, Calgary's climate is semi-arid, so groves of trees occur naturally only along the river valleys and on the western outskirts of the city. Precipitation decreases somewhat from west to east. Consequently, forest patches give way to treeless grassland around the eastern city limit.

In contrast, Halifax Regional Municipality (HRM, or Halifax for short), NS, is a small city of some 400,000 people. Situated on the shores of the Atlantic Ocean, HRM covers an area of 5,850 km^2. However, the population of the municipality is heavily concentrated in an urban core settled around the Halifax Harbour. The population density of Halifax Metro is 1,077/km^2 verses 65.4/km^2 for the municipality (Statistics Canada, 2007). Halifax Metro is the largest city in Atlantic Canada and the population growth rate for 2001-2006 census period was 3.8% (Government of NS, 2006). Surrounding ocean currents create a moist climate which supports a dense combination of mixed Acadian and coniferous forests and wetlands.

The urban sites chosen for the study represent the range and diversity of landscapes one typically finds in Canadian cities. All locations contain trees of various ages, species, densities and health conditions. This project's field sites include: (1) residential street lined with mature trees, (2) commercial streetscape with very few trees, (3) athletic field with tree perimeter, (4) forested park, (5) naturalized schoolyard, and (6) botanical garden (Table 4.4).

Table 4.4: Field tour sites in Calgary, AB and Halifax, NS. The chronological order of visit is indicated by the numbers in brackets.

Site Type	*Calgary location*	*Halifax location*
Mature Tree-lined Street	(1) 7th Avenue & 2nd St, N	(1) Walnut Street
Commercial Streetscape	(2) Centre Street, N	(2) Quinpool Road
Athletic Field	(3) Riley Park	(3) North Commons
Forested Natural Park	(4) Weaselhead Natural Area	(4) Point Pleasant Park
Naturalized Schoolyard	(5) Altadore Elementary School	(6) Dalhousie University
Botanical Garden	(6) Reader's Rock Garden	(5) Public Gardens

In this report a variety of terms, including *urban trees*, *forested landscapes, forested sites* and *treed landscapes,* are used synonymously in reference to the urban forest. I have also used the term *forested parks* in reference to two specific study sites used in this project, Weaselhead and Point Pleasant Park. These two research sites are classified as public, urban, park spaces and both are characterized by remnant tree stands.

4.2.3 Data Collection

Diaries were used to explore the ways in which respondents read urban landscapes and interpret their meaning (Appendix C). Each participant received a diary booklet at the beginning of the research day. The diary remained in the participant's possession until collected following the focus-group discussion. Respondents were asked to provide demographic information but otherwise to avoid identifying themselves in the diary booklets.

PART A of the diary consisted of both closed and open-ended questions to assess participant's environmental attitudes as well as to gather information on their opinions and usage of urban open spaces. PART B was divided by field site and contained only a

few prompting questions related to the research topic. Each site visit lasted 15 minutes during which each participant observed the landscape and recorded her or his individual reflections in her or his own words. Respondents were asked to refrain from speaking to each other during this personal time. Given the possibility that the participant's views of urban open spaces might shift during the research process, participants were asked to make concluding remarks in PART C of the diary.

Focus-group discussions provided further understanding of individuals' thoughts and feelings while also allowing collective thought processes to occur. Sharing personal views within the discussion group creates an opportunity for individuals to begin to get in touch with their deeper feelings and concerns, while simultaneously being exposed to others' viewpoints. With the permission of the group members, each focus group was audio-recorded and later transcribed.

All diary and focus-group transcripts were coded into theme areas using NVivo8, a qualitative software package (QSR International, 2008). Particular attention was paid to people's accounts of why they felt the particular types of treed landscape were important to them or their community. A list of common topics, themes and concepts was compiled and later organized into more general value classifications. Results from closed questions in PART A (including demographic information) were processed using Statistical Package for Social Sciences Version 16.0 (SPSS Inc., 2007). These results were later cross-referenced with other diary data and focus-group material within NVivo8 to establish relationships and to make comparisons. Key values were identified by frequency of mention and used to create major and minor sub-themes and categories.

4.3 Results

Many positive forest attributes were identified such as naturalness, sedate atmosphere, colour, large trees, sounds of birds, fresh smells, presence of wildlife and biodiversity. Additionally, many uses of the urban forest were pointed out such as recreation, nature experiences, and urban escape. These and other attributes and uses were positively

associated with urban forest values and appeared evenly across age, gender and urban area.

The list of urban forest values were organized in a table format under the value categories of aesthetic, psychological, ecological life-support, social, educational, moral and economic (Table 4.5). Aesthetic, psychological, social, educational and moral values are defined here as non-material values, while economic and ecological life-support are classified as material values (Figure 4.1). Additionally, each value has a corresponding frequency of mention classification. Values with a high frequency of mention were interpreted to be values more commonly shared among a wide range of people relative to values mentioned less frequently.

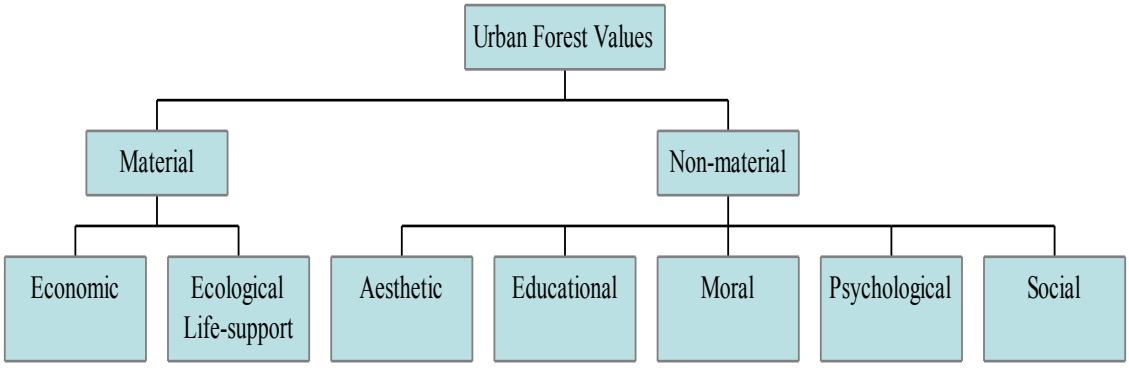

Figure 4.1: Urban Forest Values Framework

There may appear to be some redundancy among values provided in both the participant sample quotes and the list of values organized in the table. This is because participants may communicate more than one value in a single statement and, depending on the context of the respondent's discourse, the same word may have different interpretations or meanings. Take for example this woman's quote regarding urban trees: "And it is a shelter, it is a cooling effect too being under foliage" [09/27.0.1/03]. I would interpret this statement to mean that trees are valued because they provide shelter and protection, as well as for temperature amelioration. Obviously, the values are interrelated in that because trees offer protection from the sun, they improve the temperature.

Citizens' values of the urban forest have also been organized into thematic categories of *simple pleasures gained from contact with the urban forest, social and cultural values of the urban forest*, and *deeper meanings of the urban forest*. These thematic sub-headings are directly related to the list of respondents' values reported in Table 4.5 and are intended to provide a more detailed description of citizens' values of the urban forest, and highlight the interconnections between value categories.

4.3.1 Simple pleasures gained from contact with the urban forest

The two most striking themes to emerge from this investigation are the diverse range of aesthetic values associated with urban nature and the urban forest as an escape for improved health and well-being (see Table 4.5). These concepts were the most frequently mentioned and are interrelated since the beauty of the urban forest generates feelings of pleasure and enjoyment. The multitude of aesthetic qualities participants associated with the urban forest appears to assist people to achieve positive psychological states. For example, trees and other urban vegetation add a sense of naturalness to urban landscapes and are the antithesis to and complement or balance the hard, angular, built environment characterizing most cities. The quality of naturalness creates a softness that people relate to a friendlier, more relaxed and inviting atmosphere.

Naturalness was a frequently mentioned and important characteristic of urban trees. Besides providing a sense of softness to the urban landscape, naturalness was also associated with the ability of plant life to grow with little human interference, control or obvious grooming. The quality of naturalness was related to elements of nature or naturally occurring elements, as opposed to human created objects such as buildings or asphalt. Respondents defined urban landscapes as more "natural" when they displayed a greater diversity of native flora and fauna than typically found throughout the urban environment, were less manicured, had few roads, buildings or other human infrastructure, and resembled uncultivated, hinterland landscapes outside of the city.

Respondents derive pleasure from seeing many shades of green and often spoke of their appreciation of vistas overlooking forested parks or views of green from office or home windows. Commuting through the city, they much prefer using areas with trees or other green vegetation over transportation corridors dominated by concrete (e.g., commercial streetscapes). Large trees in particular caused participants to feel less distracted and in the present moment. Many respondents commented that cars appeared to travel at slower speeds on the mature-tree lined streets, leading them to feel safer.

Perhaps most surprising was the high frequency with which participants mentioned sounds specifically related to trees. They described their delight in hearing tree leaves rustling in the wind and the sounds of birds calling above their heads. These sounds produce a sensory experience that is calming and peaceful, leading to a reflective state and a feeling of ease and of connectivity to nature. Additionally, large or dense stands of trees create a physical and psychological buffer from the hustle and bustle, resulting in a sense of freedom from the usual busyness of the city. Participants valued urban landscapes where trees enclosed or surrounded them because these were perceived to be "welcoming", quieter, and provided them with much needed solitude and separation from a hectic urban environment. Overarching branches of the tree canopy were often associated with respondents' feelings of being sheltered and protected.

Many other positive aesthetic qualities of the urban trees were identified such as multiple dimensions, textures, qualities of light and protection from wind. Moreover, citizens value urban forests because they offer diversity and variety in form and function within the urban environment (e.g., mature tree-lined streets are different in form than the naturalized schoolyards) as well as offer a variety of experiences over time. They attribute this to the fact that the urban forest is part of a dynamic system. Trees grow, change with the seasons, die and are replaced by new growth. This partly explains why respondents appreciate densely forested parks as stimulating places that fascinate, energize and motivate. These more natural landscapes also inspire respondents' creativity, imagination, and curiosity.

4.3.2 Health and well-being: Social and cultural values of the urban forest

There were over 400 references to the importance of the urban forest for recreation (a non-material value). The most valued urban landscapes were those that offered the greatest diversity of activities and were close to home. For example, athletic fields were regarded as less attractive sites for recreation than more densely forested landscapes because, while they were excellent for formal sport, they prevented so many other social activities from taking place around the area. Participants recognized that people in general prefer different types of recreational activities at different stages of their lives. As such, these citizens remarked on the importance of providing various forms of urban forest conditions for different members of society.

Overall, respondents described the large forested parks (Weaselhead and Point Pleasant Park) as providing more opportunities to engage in a diverse range of both passive and active recreation. Most city forests are primarily used for walking, running or biking, but many respondents also enjoy opportunities to geo-cache, picnic, read, or pause for reflection. These citizens felt that children should have access to a variety of safe outdoor environments for play and exploration. The varied topography and diversity of plants within densely treed urban landscapes were pointed out as allowing for more imaginative play and adventure.

Overall, respondents credit trees throughout the city and other forms of urban nature with improving the quality of life in the city. Particularly, these citizens value the positive contributions trees make towards human health, including mental, physical and spiritual well-being. Human health is therefore repeated in many value categories. All participants relate the restorative benefits derived from treed landscapes with improved psychological health. Most also associate a healthy and robust urban forest with ecological health and, in turn, sound ecological health with good human health.

Forested landscapes, particularly athletic parks, forested parks and botanical gardens, play an important role in the lives of these urbanites as places to gather, meet and

socialize. Some participants even enjoy visiting forested sites to sit and observe other people. Respondents also highlighted the value of the forested landscapes listed above for isolated members of their community, such as seniors and mothers of young children, because these landscapes provide places to get out of the home and be with others. Forested parks in particular were viewed as quality sites for families to spend time together.

For participants, spending time in nature is tremendously important and 94% of them rely on local greenspaces (undeveloped, vegetated open land within the built up area of towns and cities) for nearby access to nature experiences. As mentioned above, respondents perceive naturalized forested areas within the city as providing a more stimulating, non-controlled environment where people feel free to interact and engage with natural elements. Within these places, many respondents felt better able to gain an experiential sense of oneness with the natural world, which some believe can lead to both an awareness and appreciation of ecological systems or, in other words, develop an ecological consciousness. Equally important, a number of participants believe that this intimate contact with nature allows them to observe directly how their behaviours affect the local environment. Some indicated that this information encouraged better personal decision-making regarding the environment.

The forested parks and naturalized schoolyards were regarded by most respondents, as being particularly important for children as a way of gaining an appreciation of and learning about the natural world. As such, some believe that direct contact with nature in forested parks has the potential to be a compelling educational experience that could shape future attitudes and stewardship. This finding may be of particular significance, given many participants' concerns about current deterioration of the global environment.

Respondents mentioned few economic benefits of the urban forest, but some participants indicated that attractive forested landscapes such as botanical gardens were important tourist attractions. Additionally, a few respondents commented that residential properties with attractive trees have higher real estate values than those without. Savings in

provision of health care because of improvements to societal physical and mental health through recreational time spent in forested landscapes was the most frequently mentioned economic benefit of the urban forest.

4.3.3 Ecological life-support

Respondents acknowledged that the urban forest is important for ecological life-support, most frequently mentioning the contributions of urban trees towards wildlife, biodiversity and air quality. However, overall this value category was mentioned with less frequency than other urban-forest benefits. Additionally, not all forms of the urban forest were recognized equally as contributing to ecological life-support. For example, citizens recognized the contribution urban trees make to improving air quality, providing shade and creating habitat for birds. However, only naturalized forest stands (as opposed to street plantings) were valued for preserving nature, cycling nutrients, providing biodiversity, maintaining ecological processes and services, and creating habitat for other wildlife. The one exception is that the botanical gardens were also appreciated for their biodiversity, particularly their plant diversity. Interestingly, only one Halifax respondent among all the participants in either city spoke about the value of urban trees as carbon sinks.

The majority of citizens participating in this study are concerned about declining environmental conditions. Initial survey results revealed that 90% of respondents disagreed with the statement that "environmental problems are not as bad as people think". In addition, many voiced their concerns about present and future environmental states during focus-group discussions.

4.3.4 Deeper meanings of the urban forest

Respondents often described landscapes with many large, healthy trees as good places to live. Large, healthy trees make a place feel established and stable, cared for, safe and imbued with character. Big, old trees also connected many respondents to the past as they

considered what changes may have occurred within the community during the trees' lifetime, and as they reminisced about playing around them in their childhood. Because of this connection to the past, many citizens felt nostalgic during visits to the mature tree-lined streets and forested parks. They were reminded of pleasant childhood experiences and/or time spent in similar landscapes in other cities. In contrast, respondents remarked that a lack of trees or the presence of unhealthy trees, such as on the commercial streetscapes, made the places feel sterile, unsafe and neglected by urban society.

Participants recognized many forested sites as important local historical landmarks, memorials and cultural experiences, adding that important cultural events still take place there. Some participants identified specific forested landscapes as extraordinarily important because so much of their personal history, from early childhood to old age, had unfolded in these locations.

Some participants' comments demonstrated that they value any natural elements within the urban environment for the simple fact of its existence. Others noted that the well-cared for and popular forested parks were unique, special places or natural "treasures" within their city. Many urban citizens believe that sparsely planted, unhealthy trees, litter, and a lack of well-maintained walking trails or benches represent a lack of responsibility, respect and communal care of the natural environment. On the contrary, if the landscape contains robust, old trees and a diversity of vegetation, then many participants think that the site symbolizes acceptance, respect and appreciation for the natural world, translating as a balanced human-nature relationship.

Table 4.5: Urban forest values in Calgary, AB & Halifax, NS (Frequency of mention: low ☐ moderate ▒ high ■)

Sample Participant Quote	Freq.	Value		Value Category
"There was a blend of art, like using nature to make art." [06/11.1.0/01]			artistic expression	Aesthetics
"In my neighbourhood... I have all these older trees, these 20 - 30 year old trees but you go to a new place... you look around and all you see are houses, the tree can hide the houses…" [08/15.1.0/10]	■		barrier, buffer	
"[A]s I sit here I find the trees quite beautiful, stately…" [06/11.1.0/03]	■		beauty, beautiful	
"The colours of the green mixing with so many different shades of green, the contrast of the green with the blue sky is wonderful." [06/13.0.1/04]	■		colour	
"Trees give you a different dimension, if you don't have trees you just have something flat, I don't know, trees add a dimension for your eye." [08/15.0.1/13]	▒		dimension	
"Grace for trees." [08/15.0.1/02]	▒		grace	
"This location is important to me in that it has a majesty that is hard to find in other places in the city." [09/27.1.0/05]	▒		majesty	
"I appreciate the naturalness of them. Feel they are necessary to city dwellers' experience in particular." [09/29.0.1/02]	■		naturalness	
"There is a good balance of nature and housing on this street. Small houses are nicely settled into a bed of trees." [08/15.1.0/03]	▒		nature-infrastructure balance	
"I do also like that there is open space and I can see all around, as opposed to feeling constricted between tall buildings." [09/25.0.1/02]	■		openness	

"I love the trees and the play of shadows and light and dark." [09/18.0.1/04]		pattern	quality of light	
"I feel the sun and seek shade amongst the trees." [07/11.01/02]		shade		
"I think that is what struck me on that first street was the size of those trees, you just don't see them like that in Calgary." [09/23.1.0/01]		big, large	size & scale	
"[T]here is such a grandness to the trees and it's nice to see that..." [09/24.1.0/01]		grand		
"I also have come to appreciate how just a little bit of green space can give you such a strong sense of nature." [06/13.0.1/01]		small		
"Smelling the air here is nice, that fresh-tree smell." [09/26.0.1/03]		fresh	smell	
"There are lots of trees which makes it smell good and fresh." [08/15.0.1/14]				
"I personally feel that Centre Street could be as beautiful and as nice to spend time in as the first street that we went to, it would be softer, it would help society and the city. It has this cold, kind of sterile feel." [08/15.1.0/04]			softness	
"…it is so wonderfully quiet." [09/19.1.0/04]		quiet	sound	
"[O]ne of the things that I wrote was the trees you know, the sound...the shimmering of the leaves ..." [08/15.0.1/13]		leaves in the wind		
"I love that I can hear the chickadees and other birds." [09/26.0.1/01]		birds		
"Less urban sounds more nature sounds. Even the sounds of squirrels and bugs are awesome!" [09/20.0.1/07]		animals		
"I can touch the plants [and] appreciate their form, colour, softness, textures, [and] curves." [08/13.1.0/05]			texture	
"I love this place [forested park]. It is variety, it is calmness." [07/09.0.1/01]			variety	
"Good scenes – sky, mountains or hilly land, green vegetation, trees." [07/11.0.1/03]			views, vistas	
"Yes. Trees provide shade, break the wind and add to the aesthetics of a place." [06/13.0.1/05]			wind break	

"I love their natural shape and foliage..." [08/13.0.1/04]			affection	Psychological
"It's my preference to go down a street where the trees form a canopy. I love it; it feels established and comfortable." [06/13.0.1/05]			comfort	
"The wind, the waving branches in the bushes and the fact that I am sitting within the bushes makes me feel connected to the natural world." [07/09.0.1/01]			connection to nature	
"But I love the ever-changing conditions that make this place unique - yet it is predictable and the features here are the same - yet never the same." [07/09.0.1/01]			dynamics	
"I really enjoyed the presence of the trees. They seem to add a lot of life to the neighbourhood." [07/09.1.0/03]			enjoyment	
"Softens the image of the city, more friendly." [08/15.1.0/12]			friendliness	
"My reason for coming to a place like this is, in a way, something I do to escape the hectic mayhem of the city." [09/27.0.1/11]		escape	freedom	
"I have a feeling of freedom from the city even in the heart of it." [09/18.0.1/06]		refuge		
"'FREEDOM!" So much to do in a place like this. Fly kite, bike, hike, picnic, birding, meditate, canoe. Did I mention freedom?" [08/15.10/10]		choice		
"I guess those places also provide a place to meet up with people and it is kind of a place to have fun and kind of a social place…" [06/11.0.1/04]			fun	
"I very much enjoy the park. The sounds, the sights, it makes me feel quite happy." [09/26.0.1/01]			happiness	
"In the winter places like this [botanical gardens] are very important, for the hope of things to come." [09/18.0.1/04]			hope	
"I can see trees that are much bigger than I am – a reminder to be humble (I'm so small)." [09/20.0.1/08]			humility	
"Urban nature is a vital component of city living! Essential for mental well-being." [08/15.0.1/11]			mental health	

"[Y]ou can definitely go there to get away from work, or school and family obligations and you know, you can find some mental restoration…" [09/26.0.1/04]			mental restoration	
"I guess what it comes down to is: the more variety of green space an urban center can provide, the higher and more appreciated is the quality of living in it." [08/15.1.0/03]		variety	quality of life	
"It [forested park] makes one want to sit and ponder." [09/18.0.1/02]			reflection	
"[T]his [botanical garden] is great spot to read, meet a friend, see pretty flowers, have a romantic walk." [09/20.0.1/07]			romance	
"It is amazing how my stress level has been reduced; it just seems to dissipate as I'm sitting here." [06/13.0.1/05]			stress reduction	
"[T]he tree-line street kind of closed over you and kind of hugged you." [09/27.1.0/05]		refuge	safety	
"[T]he trees, there are a lot of them and they are like embrace you and close you in…" [09/27.0.1/11]		enclosed		
"And talking about the streets like the one we were on today, making street more like nicer including some green like trees so that we get natural boundaries to divide us from traffic, to make our environment look nicer, more safe, more people friendly..." [09/20.1.0/03]		safety		
"[T]he large trees feel greater than me and are sheltering and comforting." [07/11.0.1/03]		shelter/ protection		
"It [tree-lined street] makes the whole place feel very established." [09/27.1.0/07]		stability		
"I felt like I could get completely "enveloped" or "encompassed" in the park. When I was in the middle I felt completely surrounded by nature. It was the only site where I was swallowed up by nature." [08/15.1.0/03]		surrounding		
"And [the big trees] they do really give a personality to the place…" [09/27.1.0/07]		character	sense of place	
"I was raised on a tree-lined street where everyone had a large yard with lots of lawn, so it is very		familiarity		

familiar to me to be surrounded by lots of green." [07/09.0.1/06]				
"I most identify with the elm tree street because it was like my grandparents' old street. We spent days at a time at, which I haven't in 6 years. It made me feel at home once again." [08/15.1.0/01]		home		
"Definitely important. This [forested park] is a Halifax landmark." [09/20.0.1/07]		landmark/icon		
"It is living history. Set out for the use of the public…it is part of who you become in HRM [Halifax Regional Municipality]." [09.29.1.0/01]		place identity		
"Really enjoy being able to hear wind in the trees, see leaves on the ground. LOVE the atmosphere. I enjoy walking through this place [tree lined street] for the ambiance." [08/15.0.1/06]		positive ambience		
"[Naturalized schoolyard] gave me the most sense of history of any of the other places...because this made me feel like this is what this land would actually be if this university wasn't here. So then imagining the whole campus with things like this made it feel like if there was more of this around, Dalhousie would actually feel like it was in Nova Scotia, not like just buildings in any city." [09/27.1.0/05]		bioregional identity		
"This [forested park] to me is a real urban-park, the kind of wildland that makes Calgary unique. It is variety, it is calmness…this is what makes Calgary special!" [07/09.0.1/01]		special place		
"Being here [forested park] is bringing me much joy and calmness. I could close my eyes and relax. Any feeling of being rushed has subsided. Time has little importance when I'm in such a place." [06/13.0.1/05]		calmness	tranquility	
"I'm struck by how peaceful this location seems. The trees lend it a tranquil quality." [06/11.1.0/03]		peacefulness		
"I feel relaxed and comfortable here – as if I could stay all day and not be bored." [09/25.0.1/02]		relaxedness		
"Even so, when you stand and observe it's quite restful…" [09/19.0.1/05]		restfulness		
"And the pace is so different. Like the cars going down the street was generally slow." [09/29.1.0/04]			slower pace	

"[T]his place [forested park] has importance to me. Its quiet and serene, all the city feels filtered out. I feel like I am the only one here…it is a great feeling." [09/27.0.1/01]			solitude	
"I felt because of the grandness of the trees, because the trees were big, and old, and there were birds flitting about…it all felt…I was thinking soulful." [09/24.0.1/02]		grandeur	spiritual	
"So, the birds are singing and the squirrels are running and the bugs are bugging and … I think the opportunity to kind of observe that is a very rewarding experience and I think when people understand how that whole that whole thing is interconnected, I think first of all there is a real sense of awe when you realize it is there…" [07/09.0.1/02]		awe, fascination	stimulating	
"I am not an incredible artist, a hobby person or a painter or anything like that, but it [botanical gardens] spoke to me, to my creativity. Because that all comes out when I garden." [08/15.0.1/13]		creativity		
"Yes. It provides the potential for natural adventure and stirs the curiosity." [09/27.1.0/10]		curiosity		
"This is the kind of place you can just go and wander and discover new things, a broken log, a cool inlet etc. I like the sense of discovery." [06/11.1.0/03]		discovery		
"Being able to bike through a park to get to work always energizes me for the day and keeps me sane. Without green spaces all the concrete and people can be quite depressing." [07/09.1.0/04]		energizing/ uplifting		
"I like to come and see what I can see and hear/collect (berries). Good to just stop and wait to see what appears. Also good to explore with kids." [09/25.0.1/02]		exploration		
"This place makes me feel like I am in a storybook!" [07/09.0.1/06]		imagination		
"*It inspires me to try to recreate this sort of atmosphere in my own yard at home."* [08/15.0.1/13]		inspiration		
"Makes me want to get out and do some sort of exercise." [08/15.1.0/04]		motivation		
"[Forested park is] always a new experience, depending on the season. Nature has a way of dressing up a space like this in a new "dress" every day – we observe or notice a new flower or hear a different bird call or pick a berry or snow shoe on a new path." [09/25.0.1/03]		variability		

"It reminds of an older area - the big trees - it feels welcoming." [08/13.0.1/02]			welcome	
"It is important to have trees and other fauna in a city, not just because they look nice, but also because they contribute to air quality through respiration." [09/20.1.0/01]	■	air purification/ fresh	air quality	Ecological Life-support
"It's also environmental friendly since it facilitates oxygen circulation hence improving the quality of air." [09/19.1.0/03]		oxygen production		
"It is important in that...it makes the environment of the campus more attractive and interesting; increases the local biodiversity." [09/25.0.1/02]	■	diversity	biodiversity	
"There are also animals who live in the city, such as birds, squirrels, insects, etc., and its nature that keeps them alive, as a home and food." [08/15.0.1/14]		habitat		
"It is wonderful to have nature preserved in the urban setting." [07/09.0.1/05]	■	nature preservation		
"Definitely has importance to me. It ...attracts wildlife. Birds have a place to nest." [06/11.0.1/06]	■	wildlife		
"It's important in that it's a large intra-city green space with trees and grass that act as CO_2 sinks and breaks up the concrete." [08/15.0.1/13]			carbon storage	
"[W]hen I think about Weaselhead and Nose Hill, those are the spaces where I think we need to protect those because not only are they providing native and natural experiences but they are keeping ecosystem processes going and all that sort of stuff." [08/15.0.1/09]			ecological processes	
"These spaces [Dalhousie wetland] are critical to watersheds." [09/29.1.0/03]		clean water		
"And you also see the trees when they fall they stay there and they become part of it all over again." [09/26.0.1/03]		nutrient cycles		
"[Forested park] is a total refuge in the city. Large enough to have a good long walk in and full of so much life and activities." [09/18.0.1/02]		life/activity	aliveness	

"I adore Point Pleasant Park, you feel more of a vibrant kind of thing because there is so much actual growth, uninhibited growth." [09/20/0.1/04]		growth		
"I find them calming and important to my mental, physical, emotional, spiritual health." [08/13.0.1/04]			human health	
"This has made me appreciate the value of urban spaces and the positive role that they can play in enhancing the quality of life in terms of recreation and also in pollution control." [09/19.1.0/03]			pollution reduction	
"And it is a shelter, it is a cooling effect too being under foliage." [09/27.0.1/03]			temperature amelioration	
"Yes, they are meeting places I feel. Places for communities to come together." [09/18.0.1/02]			community	Social
"I felt it was an ideal place for family with kids to spend time. And even with friends, a good place to spend the day, social feelings." [07/11.1.0/01]			family	
"Around the one memorial or maybe it's one of the emplacements or whatever, there is heather and that heather was from the mattresses that the Scottish soldiers… was filled and they shook them out. And you don't see heather all over the place and it is real heather." [09/18.0.1/05]		cultural experience	cultural	
"I do think they're important to a city as they give it a sense of history...because these trees give me a sense of how long this community has been developing." [06/13.0.1/01]		history		
"That is interesting because my dad's ashes are scattered just off Point Pleasant Park [PPP] and you wouldn't believe the number of people who go to PPP to scatter ashes in the water. It is huge thing." [09/18.0.1/03]		memorial		
"*We loved, you know where the pond is…our kids, John had bought them these tiny boats...and we used to go week after week and take a picnic lunch, we could not afford to eat out, we never even thought about eating out, and just spend practically all of Sunday there."* [09/18.0.1/04]		nostalgia	memory	
"This place reminds me of Fishcreek. Fishcreek is important to me because it's somewhere that I've gone all my life." [06/13.1.0/03]		reminiscent		

"I think it is important to have plants and trees in urban areas. It would be nice to live in areas like this with nice trees." [08/15.0.1/15]			good place to live	
"Important for a city to have for recreational purposes. Would be good for a picnic...for a run or walk or bike ride." [08/15.1.0/03]			recreation	
"Point Pleasant Park is really an educational experience...for, you know, just appreciating the variety of plant life and wildlife and trees and for kids growing up in a city to be able to able to experience some nature and…to pick some berries and see the leaves change and things like that and to see how the weather and the seasons affect things and being able to see some wildlife and their activities and all that kind of thing increases consciousness and increases the feeling of connectivity." [09/24.1.0/01]		experiential education/ connectedness to nature	ecological consciousness	Educational
"[T]hat is why I think [naturalized schoolyards] are so important because they give kids the idea of what the real world is like, that there are animals and seeing how thing grow and things change and how you can effect that process." [06/13.0.1/01]		environmental impact		
"That [naturalized schoolyard] was my favorite because you could go explore... the kids were obviously planting things and putting the bird feeders in and decorating and learning and then they would gain back some more appreciation for the environment and how things grow and the natural world..." [07/11.0.1/02]			nature appreciation	
"It [forested park] is the only opportunity for a lot of people who live in the city to actually get close to nature, a lot of people never get the chance to leave the city." [08/15.1.0/04]		accessible	nature experience	
"I liked the school in that it, that was almost the most interactive, like at the rock garden you could learn a lot but you weren't, you could like really actually get down in the dirt at the school…" [07/11.0.1/02]		interactive		
"I think the different green spaces teach different things. Riley Park probably teach a little bit more about family togetherness and possibly sport whereas Weaselhead can teach you about wildlife and		native flora & fauna		

plant life that is native to the area." [08/15.1.0/07]				
"[Forested parks] are more representative of people trying to work with nature rather than against it." [09/19.0.1/02]			harmony	Moral
"I think that naturalized spaces that kind of prioritize natural species and a variety of species, if you are surrounded by that kind of diversity then that translates also into appreciation of other kinds of diversity, maybe that would be more helpful with in terms of interpersonal relationship in our globalized world..." [09/20.0.1/08]			diversity appreciation	
"I think also more urban green spaces and natural areas like, right now Point Pleasant Park is in the south end right by all the rich houses ...the people who live in the poor areas that live on the busy streets that are like disgusting and polluted and all that and right to the curb. And the people with money get to have nature." [09/25.0.1/01]		distribution/ access	equity	
"[T]hey still use [the naturalized schoolyard] for teaching so it is nice. I felt hopeful for the future, for those coming after us." [08/15.1.0/04]			future generations	
"I think there is merit for those places [forested parks] existing simply for the fact that they exist whether or not we use them. Yeah, I mean its great and its wonderful and I fully support using nature like that but at the same time I think that there's an importance that there is that place there and that there are things living there, we let that happen and we don't feel the need to overwhelm the whole world, you know?" [06/11.1.0/04]		self-limit/ restraint/ humility	intrinsic/ existence	
"It's like a hidden gem, so beautiful and historic." [06/13.0.1/05]			natural treasure	
"I feel thankful to the people who put in so much effort to create the forest. It shows they must have respected and wanted to maintain nature." [07/11.0.1/03]			respect	
"Yes, because they are examples of intent, care and responsible maintenance…[and] it is good to be around spaces which are cared for." [08/13.1.0/05]		cared for, clean	stewardship	

"Yes, I think that [urban nature] keeps people connected to environment and reminds them of responsibility towards it." [07/09.1.0/03]		responsibility		
"Not all kids have this opportunity to learn about nature under their nose so to speak. Kids in the city need this more than ever. They need large green spaces, they have to learn to appreciate them and be able to be good stewards of the environment." [08/13.0.1/04]		stewardship		
"This location is important to me because it is a forest next to a shipping yard, a defiant splotch of green surrounded by the methods and modes of industry, but which is also in harmony with it. I think that it is important as an example of modern technology and commerce communicating positively with nature." [09/27.1.0/05]			symbolism	
"We all need green spaces. If I couldn't see green looking out the windows of my abode I would be depressed." [08/13.0.1/02]			mental health	Economic
"Extremely important. Gives the people a place to play, exercise, relax, enjoy each other's company away from the hustle and bustle. Probably saves some tax dollars by encouraging healthy lifestyle." [09/19.1.0/01]			physical health	
"I think that is also very telling having been in other cities of where nice manicured green spaces are it always coincides with what pockets of socioeconomic demographics and you get the nicer parks with the grass in the nicer parks of town and then in other places you just get a drag field." [09/29.0.1/02]			real estate values	
"Attractions to the people, mostly tourists – at least counted 7 bus loads of tourist flocking to the public gardens." [09/25.1.0/01]			tourism	

4.4 Discussion

An interesting outcome of this study is the richness and breadth of value expressions provided by participants concerning the urban forest. Clearly, for these citizens the urban forest provides many material benefits including those categorized under economic and ecological life-support. Specifically, respondents most frequently identified wildlife, biodiversity and air quality as important forest attributes. The relative frequency of expression for economic benefits was significantly less than other material or non-material value category. Many of the material benefits highlighted in Ordonez's (C. Ordonez, personal communication, 20 August 2010) literature review such as use of urban forests for timber provision or the economic savings incurred through removal of air pollution, CO_2 sequestration and reduced heating and cooling costs were never mentioned by this study's participants. In comparison to the other economic activities taking place in cities, activities associated with urban forestry are possibly perceived to occur at a scale too fine to be worth mentioning or perhaps, participants do not perceive these values as economic values, because our Canadian economic system does not account for them. It could also be that urban citizens are simply not well informed about the diversity of economic benefits derived from city trees. This may also be the case for two social values not mentioned by participants in this project but which were identified in Ordonez's (C. Ordonez, personal communication, 20 August 2010) literature review. The first of these is urban forests as research sites for scientific study and the other is work and labour derived from tree-caretaking.

Nor was there any mention of the ecological life-support values related to regulation of the hydrological cycle or other techno-ecological benefits such as moderation of the urban microclimate through evapotranspiration. This may be due in some part to the fact that many people are unaware of the role urban forests play in ecosystem functioning (Xu & Bengston, 1997; Kellert, 2005).

What people really appreciate about urban forests are the non-material benefits provided by nearby access to nature. This contact with natural systems greatly affects urban

citizens' physical and mental well-being. Results from this study provide a highly refined and detailed catalogue of qualities that people value about treed landscapes in the city. Certainly, urban citizens continue to recognize aesthetic and recreational values and therefore these should remain on forest management agendas. It is essential to note the diverse range of attributes people find aesthetically pleasing about trees and how these attributes affect their state of mind.

The interweaving of values among value categories is important because forests are always valued in a multitude of ways simultaneously (Xu & Bengston, 1997). For instance, many citizens use forested urban landscapes for recreational purposes. They prefer these spaces to other urban landscapes because they are visually and aurally beautiful and, as such, provide a more tranquil urban atmosphere. In turn, serene urban environments allow citizens to feel relaxed and rested, furthering their ability to think and gain perspective. Hence, recreational and aesthetic forest values can simultaneously provide numerous restorative benefits (Kaplan & Kaplan, 1989). The research method used in this project (i.e., a diary format) reveals a relationship exists between the multi-sensory qualities of the urban forest and positive psychological states.

The psychological benefits of nature experiences within cities are well studied (Ulrich, 1984; Cheisura, 2004; Herzog, 2008; Konijnendijk, 2008). Fuller et al. (2007) recently reported that urban greenspaces in Sheffield, UK comprised of scrub or woodland are more biologically complex than impervious surfaces, amenity plantings, mown grassland and unmowed grassland, and higher levels of species richness strongly enhances human well-being. Furthermore, urban forests offer a contrast to dense urbanization and visually block or soften urban hardscape. Thus, urban forests provide a welcome reprieve from controlled city environments. The naturalness bestowed by urban trees also contributes to people's ability to sense a connectedness to nature, which can lead to development of an ecological consciousness (see Chapter 3). Bunce & Desfor (2007) suggested that natural elements like urban trees are valued because of what they are in themselves, societal imageries of the non-human environment. This project's findings also demonstrate that urban residents endow the urban forest with rich social, educational and moral meaning.

Respondents value their experiences in treed landscapes and appear to develop profound psychological and emotional links to particular forested sites, such as tree-lined streets, botanical gardens and forested parks. These profound personal links to places are what many authors describe as a sense of place (Cheng et al. 2003, Manzo, 2005; Tuan, 2007). Sense of place relates not only to the biophysical features of urban environments, including urban forests, but also to knowledge, values and attitudes towards and about them (Konijnendijk, 2008). The meanings assigned to urban forests in general are somewhat unique. For participants in this study, treed landscapes such as forested parks, naturalized parks and tree-lined streets can represent nature conservation, human coexistence with nature, environmental stewardship and an opportunity to gain awareness of natural processes, cycles and seasonal change.

Many respondents associate uneven tree distribution throughout their city of residence, a lack of species diversity and unhealthy or uncared-for trees on streetscapes as characteristics of the urban forest that underlined social pathologies and disparities. This finding is similar to urban forest research conducted by Heynen et al. (2006). They described a situation of uneven distribution of the urban forest within the city of Milwaukee leading to unequal access for certain ethnic groups to the benefits of urban greenspaces and trees. Urban forestry programs need to respond to contemporary social issues such as disparate access to a healthy urban forest among community groups. In order to adequately address these social disparities, the demands and ideas held by increasingly multicultural urban populations, as well as other marginalized groups such as women, the disabled, the elderly, and the unemployed need to be better understood and considered during the planning process (Johnston & Shimada, 2004).

While effective urban forest management depends on a good knowledge of the trees and woodlands, Johnston & Shimada (2004) made the point that "urban foresters should also be familiar with the social complexities of the communities they serve" (p. 186). Parkins (in press) envisioned urban forests as important links to the natural world for the some 300,000 new immigrants (from other countries as well as Canada's rural areas) that arrive

in Canadian cities each year. He proposed that direct experiences of forests within the city cultivate ecologically aware citizens whose values will guide future sustainable forest management both within urban boundaries and beyond (Parkins, in press). Results reported in Chapter 3 suggest that in fact direct nature experiences are necessary to develop an ecological awareness, but nature experiences in themselves may be insufficient.

4.5 Conclusion

Urban trees were most valued by respondents because they provided comfort, tranquility, escape, beauty, naturalness, a connection to nature, biodiversity, a sense of history and a preferred environment for family and community. Ordonez and Duinker (2010) suggested that most urban forest management plans employ sustainability definitions whereby the primary objectives relate to economics, human health and pollution abatement. However, sustainable development fundamentally constitutes a domain of values, striking at the heart of want we want and what we believe is right and good (Kellert, 2005). Focusing on a narrow range of physical and material benefits of the urban forest lacks an appreciation of other values of urban trees that are independent of human material interests, such as love of nature or reverence of its beauty or being inspired by its spiritual qualities.

Urban forests can be carefully developed and shaped to promote harmonious multiple uses, thus accommodating a diversity of desirable ecological, social and cultural benefits. This must occur, however, in close collaboration with those who are the main users of urban forests - urban citizens. Qualitative methods such as those employed in this research provide in-depth information regarding people's non-material values associated with urban forests, such as aesthetic, moral and psychological. Certainly, societal values may be more difficult to define and measure than techno-ecological elements, but they appear to be increasingly important in our society (Xu & Bengston, 1997; Johnston & Shimada, 2004). In addition, values and attitudes may change as the community shifts

and changes so it is imperative that regular consultation be incorporated into any urban forest strategy.

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Chapter 5 - Conclusion

Many respondents remarked that they felt differently in each of the urban field sites and that they and others in their community require access to a variety of urban landscapes similar to those on the field tour in order to satisfy their various moods, as well as, to meet the needs and preferences of a diverse urban population. “Cities shape people, whilst people shape cities” (Konijnendijk, 2008, p. 4). This statement accurately summarizes the dynamic exchange between urban inhabitants and the urban environment. Many studies of place usually emphasize human interaction with the built environment with perhaps the natural landscape as a backdrop. Alternatively, this research project’s prime foci are the natural landscapes we create or chose to preserve within a city and how our interaction with them, in turn, affects us.

In many cities, urban forests play very important roles within the overall urban landscape. Aside from making cities more attractive, they make major contributions to human mental and physical well-being, air quality, and biodiversity conservation, and provide a sense of place. Trees teach us about seasons and life-cycles while providing us with direct, nearby access to elements of nature. Urban forests also hold deeper meanings for people, both morally and emotionally. In fact, these urban forest contributions are what really matter to respondents in this study. Few respondents mentioned economic or techno-ecological benefits of urban trees.

Trees are also an important element in many naturalized urban spaces including forested parks. Many of the attributes that citizens valued about the urban forest also assisted them to feel a sense a connectedness to nature while visiting naturalized urban spaces. For example, naturalness, sounds of birds, quiet refuge, large trees and biodiversity all contributed to respondents’ sense of kinship with all life. Evidence from this project suggests that the positive psychological effects engendered by experiences of naturalized

spaces (such as enjoyment, freedom and tranquility) contribute and perhaps even encourage many people to reflect on their direct relationship with the natural world.

Respondents proposed that active engagement with urban nature allows them and other urban inhabitants to learn about natural elements and processes, attain first hand knowledge of behaviour impacts, as well as gain an appreciation of nature. For participants in this research, urban naturalized spaces (including forested parks) represented a naturalness or wilder representation of nature compared to the largely artificial and controlled environment of the city. For many urban dwellers, naturalized spaces provided a tactile and interactive experience of 'real' nature. The direct interaction helped them feel a part of the natural environment and many believed that would lead to the development of an ecological consciousness. For this reason, naturalized landscapes within an urban context are very important for shaping our overall relationships and views about nature.

While many respondents in this project were conflicted as to what constitutes 'real' nature, the vast majority of respondents believed that spending time in nature and a connection to nature was important to them. Naturalized spaces including forested parks were most often described as urban nature or the closest approximation of nature to be found within an urban context. Participants' definitions of nature and naturalness related to higher levels of native species richness, uncultivated growth, and a landscape dominated by vegetation rather than human-built structures.

Abstract concepts, feelings and values are complex and difficult to research. A qualitative approach was of great assistance to access and derive understanding about personal viewpoints. This study provided participants with the opportunity to use all their senses as the research process took place in various urban landscapes. Many respondents appreciated the period of reflection at each location because it allowed them to better understand and then report their own personal views and feelings. Over the course of the research day, respondents had numerous opportunities to express their perspectives both orally and through written format, as well as in both individual and group settings. The

richness and breadth of data collected are a direct benefit of the research process and provided answers to a range of research questions with ample detail.

The research could be continued and extended in many ways. To gain a broader and more comprehensive perspective, it would be useful to repeat this project with an expanded scope including a larger sample, a greater representation of urban citizens from different sectors of society, and other cities in Canada or abroad. It might be necessary to compress the time commitment required of participants and to reduce the number of questions asked to a more refined set, but such a project would allow researchers to make more comparisons among the different perspectives and across regions.

A further extension of the research would more thoroughly explore how urban citizens define nature. At the onset of this project, the significance that various meanings and interpretations of urban nature, and nature in general, would have on how people were able to sense a connection to the natural world while in the city was not anticipated. In retrospect, it would have been beneficial to include a few more questions directly related to nature definitions in the PART A: Initial Impressions. People's definitions of nature are complex and any additional information gleaned from respondents on this subject could have provided deeper insight on the theme. It is also recommended that that research be undertaken to test the validity of my findings. Specifically, it is suggested that effects of urban naturalized spaces and urban forest values be studied as separate research topics so that each research topic can be more fully explored.

Environmental management, in broad terms, is increasingly dominated by urban societies and their values, norms and demands. This means that urban planners and managers not only need to engage with other fields of study, such as political ecology and social sciences, but also that hinterland forestry professionals and environmental managers need to exchange information with their urban counterparts. Within a democracy, public involvement is a key element towards successful implementation of any resource management plan. People's perceptions, values, and personal stakes in local

environmental conditions are significant influences on future management successes or failures.

In the pursuit of more-sustainable cities, urban environments can be designed and maintained to satisfy urban citizens' demands for aesthetic, recreational and other enjoyment of "near nature", developing relationships with the natural world, and environmental education opportunities for children, while still meeting other social, cultural, economic and ecological values. What is required, however, is for managers and planners to have a clear understanding of what those values are.

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Appendix A - Recruitment Letter

Initial Introductory Contact re: participant recruitment

Date

Dear [group chair or president];

My name is Shawna Peckham and I am a graduate student at the School for Resource and Environmental Studies at Dalhousie University. I am currently conducting thesis research towards the completion of a Masters of Environmental Studies degree. My research entails conducting six, one-day field trips in Halifax Regional Municipality, Nova Scotia. I am writing to ask for your help in recruiting participants for this study.

My hope is to recruit a diverse range of participants that vary in age, sex, background and interests.

Each field trip will include the exact same procedures. Participants will be asked to attend one of the six sessions. On the day of the fieldtrip, we will visit 6-7 urban spaces and each participant will be given a diary to record personal thoughts regarding the space. In the afternoon, a focus-group session will be held indoors to elicit participants' reflections on the different styles of urban space. There will be no more than ten participants for each field trip.

Field Trip Dates:	Alternate Rain Dates:
Tuesday, June 16	**Wednesday, June 17**
Thursday, June 18	**Sunday, June 21**
Friday, June 19	**Monday, June 22**
Saturday, June 20	**Wednesday, June 24**
Tuesday, June 23	**Thursday, June 25**
Friday, June 26	**Saturday, June 27**

Trips will be booked on a first-come, first-served basis. During the research day, participants will be transported between sites in a passenger van. Refreshments and lunch will be provided.

I hope that by gaining an understanding of the effects of green spaces on urban citizens, I will be able to make recommendations on what features green spaces should exhibit.

Please circulate this letter amongst your membership and/or if you know of any suitable individuals who would be willing to participate in this study, please reply with their contact information. I will follow-up directly with more details.

If you have any questions regarding this study please email or call me. Thank you in advance.
Sincerely yours,

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Appendix B - Participant Ad Example

Appendix C - Diary

Evaluating Urban Nature

Participant Diary

School for Resource and Environmental Studies

DALHOUSIE UNIVERSITY
Inspiring Minds

This diary is provided to each participant to use throughout the research day to capture personal feelings, observations, and reflections about six locations in HRM. The diary will be collected at the conclusion of the research day.

This diary has three distinct writing sections:

Part A: Morning, before visiting six HRM sites – initial impressions diary entry and survey.
Part B: Morning, while visiting each of the six HRM sites – reflections and thoughts.
Part C: Afternoon, after the group discussion – final impressions and demographic details.

TODAY'S DATE: _____

Background terms:

Ecology: is the scientific study of the distribution, abundance of life and the interactions between organisms and their natural environment (Begon, Townsend &Harper, 2006).

Nature: means not only living things, such as plants and animals but also inanimate things, such as streams and landscapes.

Urban green space: specifically refers to open space reserves within an urban setting; such may include natural landscapes or manicured urban parkland.

Urban nature: refers to all the plants and animals within an urban green space that include nature reserves, parkland, green open space and street trees in this survey.

PART A: Initial Survey and Impressions

1. Where did you hear about this research project?
   - ☐ From a friend
   - ☐ Through work
   - ☐ Flyer or poster, where? _____

2. How long have you lived in a city?
   - ☐ Less than 1 year
   - ☐ 1-5 years
   - ☐ 5-10
   - ☐ 10-20
   - ☐ 20+
   - ☐ All my life

3. In your opinion, which of these elements constitute as urban nature? Select one or more.
   - ☐ Natural area (e.g. forested area in Point Pleasant Park)
   - ☐ Manicured Parks and Botanical Gardens (e.g. Public Gardens)
   - ☐ Neighbourhood Parks
   - ☐ Green Open spaces (e.g. football field)
   - ☐ Roadside Trees and Plantings
   - ☐ Flowerbeds
   - ☐ Green Roofs
   - ☐ Lawn
   - ☐ Wild animals
   - ☐ Zoo
   - ☐ Pests
   - ☐ Others: Please specify: _____

4. How would you rate your knowledge level of environmental issues?

1 No knowledge	2	3	4	5 High

5. How would you rate your knowledge level of ecology?

1 No knowledge	2	3	4	5 High

6. Indicate to what degree you studied environmental issues in school.

	Not at all 1	2	3	4	Extensive 5
Primary					
Secondary					
College					
University					

7. You identify yourself as an environmentalist.
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Undecided
   - ☐ Disagree
   - ☐ Strongly Disagree

8. How many environmental organizations do you belong to?
   - ☐ None
   - ☐ 1
   - ☐ 2-3
   - ☐ 3+

9. Environmental issues are more important than economic issues.
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Undecided
   - ☐ Disagree
   - ☐ Strongly Disagree

10. The problems of the environment are not as bad as people think.
    - ☐ Strongly Agree
    - ☐ Agree
    - ☐ Undecided
    - ☐ Disagree
    - ☐ Strongly Disagree

11. Changed your behaviour in any way because of your concern for the environment.
    - ☐ Strongly Agree
    - ☐ Agree
    - ☐ Undecided
    - ☐ Disagree
    - ☐ Strongly Disagree

12. If your work involves environmental issues, please explain.

13. When you spend time outdoors, where do you like to go? Why?

14. Do you spend time in urban green spaces?
- ☐ Yes
- ☐ No

Why/ Why not?

15. Spending time in nature is important to you.
- ☐ Strongly Agree
- ☐ Agree
- ☐ Undecided
- ☐ Disagree
- ☐ Strongly Disagree

16. You consider a walk in the park to be an educational experience.
- ☐ Strongly Agree
- ☐ Agree
- ☐ Undecided
- ☐ Disagree
- ☐ Strongly Disagree

17. People are a part of nature.
    - ☐ Strongly Agree
    - ☐ Agree
    - ☐ Undecided
    - ☐ Disagree
    - ☐ Strongly Disagree

18. A connection to the earth important to you.
    - ☐ Strongly Agree
    - ☐ Agree
    - ☐ Undecided
    - ☐ Disagree
    - ☐ Strongly Disagree

19. You feel connected to the earth in your daily life.
    - ☐ Strongly Agree
    - ☐ Agree
    - ☐ Undecided
    - ☐ Disagree
    - ☐ Strongly Disagree

20. I never feel a personal bond with things in my natural surroundings, like trees, a stream, wildlife, or a view on the horizon.
    - ☐ Strongly Agree
    - ☐ Agree
    - ☐ Undecided
    - ☐ Disagree
    - ☐ Strongly Disagree

21. Check all activities that you do that connect you to nature, and indicate the strength of the connection.

	No Connection 1	2	3	4	Strong Connection 5
Gardening					
Camping					
Hiking					
Running					
Walk in an urban park					
Canoe/Kayaking					
Boating/Sailing					
Biking					
Skiing/ Snowshoeing					
Shopping at the Farmers' Market					
All-terrain vehicle					
Fishing/Hunting					
Photography					
Bird Watching					
Others:					

22. If you would prefer more connectedness to nature, what prevents this?

- ☐ Do not prefer more connectedness to nature
- ☐ Not enough time
- ☐ Money shortage
- ☐ Caring for family
- ☐ Location of residence
- ☐ Lack of quality places to visit
- ☐ Other? Please explain:

PART A con't: Initial Impressions Diary Entry

Before we begin today's session, do you have any comments on:

a. Do you think having nature in the city is important? Why or why not?

b. Do you think there is enough, too little or too much nature in this city?

c. How do you feel about the quality of urban green spaces in this city?

PART B: HRM Tour & Diary Entries

Location 1: Mature tree-lined street

a.) Before today, approximately how often do you visit this place?

- ☐ 7 days a week
- ☐ 4-6 days a week
- ☐ 1-3 days a week
- ☐ 1-2 per a month
- ☐ Never
- ☐ Other: Please specify: _____

b.) If you visit this place or ones similar to it, explain why?

c.) Does this location, or ones similar to it, have any importance to you? Why or why not?

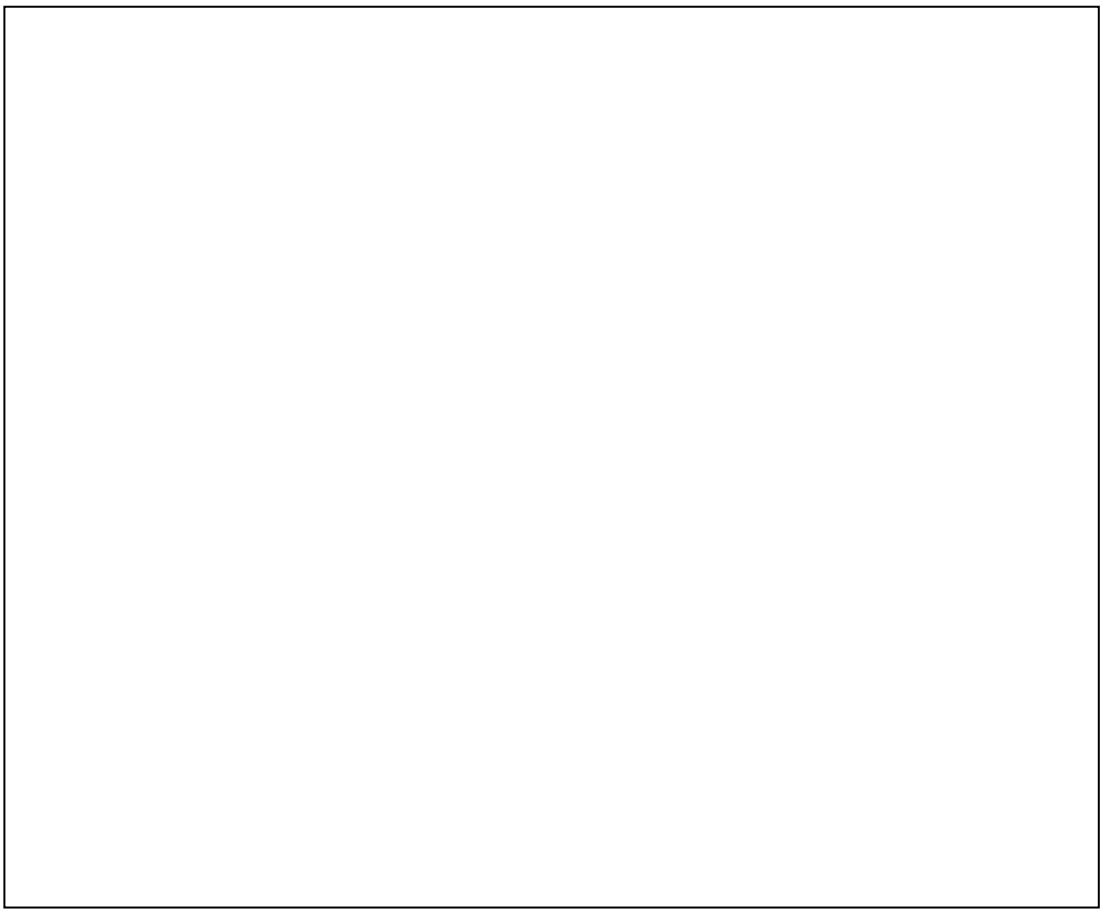
Diary Entry 1

Take a moment and take in your surroundings. Notice what you see, hear, smell and taste. Consider what captures your attention in this place.

- What reflections, observations, and feelings do you have about this place?
- Do you feel any connection to the earth in this place? Why or why not?

d.) Do you think you will visit this place, or one similar to it again? Why or why not?

e.) DRAW a circle diagram that represents your relationship to nature in this place. Label one circle as "Nature" and the other as "ME". Please provide a brief explanation of your drawing.



Location 2: *Quinpool Road*

a.)Before today, approximately how often do you visit this place?

- ☐ 7 days a week
- ☐ 4-6 days a week
- ☐ 1-3 days a week
- ☐ 1-2 per a month
- ☐ Never
- ☐ Other: Please specify: _____

b.) If you visit this place or ones similar to it, explain why?

c.) Does this location, or ones similar to it, have any importance to you? Why or why not?

Diary Entry 2

Take a moment and take in your surroundings. Notice what you see, hear, smell and taste. Consider what captures your attention in this place.

- What reflections, observations, and feelings do you have about this place?
- Do you feel any connection to the earth in this place? Why or why not?

d). Do you think you will visit this place, or one similar to it again? Why or why not?

e.) DRAW a circle diagram that represents your relationship to nature in this place. Label one circle as "Nature" and the other as "ME". Please provide a brief explanation of your drawing.

***Please note: Although not printed here, the exact same format and questions were repeated for each of the six field sites including Athletic field, Forested park, Botanical garden and Naturalized schoolyard in PART B: Tour & Diary Entries.**

Part C: Final Impressions

a.) Which area did you most identify with during today's tour? Why?

b.) Did this field trip experience include feelings of being close to the earth/nature? Where and why?

c.) At the beginning of today's session we asked about your views of what constituted urban nature and if urban nature was important to you. Since this morning have your views changed and/or do you have any additional thoughts to share?

d.) In what ways do you think your upbringing (i.e. cultural heritage, family members, where you were raised, recreational activities) influences your impressions or feelings regarding nature? Please explain.

Please indicate your age category:

- ☐ 16-30
- ☐ 31-45
- ☐ 46-60
- ☐ Above 60

Please indicate your gender:

- ☐ Male
- ☐ Female

Please indicate the highest level of education you have completed:

_____

A most sincere Thank you for taking the time to participate in this study.

Appendix D - Focus Group Concluding Discussion

Discussion Questions:

1. Before our tour today, what were your opinions of urban outdoor spaces? After participating in this project, have your opinions changed?

2. Did you feel differently while in the different locations? Review each location.

3. Were you able to feel a stronger or closer connection to the earth or to nature while in some locations than in others? Where and why?

Explain the definition of an ecological consciousness to the group.

4. Is an ecological consciousness important to you? Why?

5. Do you think that naturalized urban areas affect your ecological consciousness? How and why?

6. How would more urban naturalized areas affect eco-consciousness?

7. Do you think that this city has enough high-quality naturalized urban areas? If not, what specifically needs to be done?

8. Is there anything that you wanted to say today that you did not get a chance to mention?