

**Understanding the Pathways in the Relationship between  
Engagement with Nature and Wellbeing**

by

Rebecca S. Koroll

A Thesis  
presented to the University of Waterloo  
in fulfillment of the  
thesis requirement for the degree of

Master of Arts  
in  
Recreation and Leisure Studies

Waterloo, Ontario, Canada 2019

© Rebecca S. Koroll 2019

### Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

## Abstract

It is now well established that contact with nature, regardless of activity type or experience, can have positive influences on the physical, psychological, social, and spiritual health and wellbeing of individuals. The biophilia hypothesis, which states that humans have an innate need to connect with nature, is noted in the literature as one of the reasons people accrue benefits from nature. However, there is still limited understanding of the underlying mechanisms at play between time spent outdoors and wellbeing. Using biophilia hypotheses and specifically the biophilic values as a guiding framework, motivation, place attachment, place bonding, and nature relatedness were selected as the constructs that may be the mechanisms further explaining the relationship between engagement with nature and wellbeing. A sample of 663 visitors to a variety of natural areas in Ontario (i.e., national and provincial parks, conservation authority lands, and popular trails such as the Bruce Trail) completed an online survey. Correlations and linear regression analyses were used to determine if significant associations existed between constructs (i.e., motivation, place attachment, place bonding, and nature relatedness), and with engagement with nature and wellbeing. Results revealed that, motivation was highly correlated with place-related constructs, as well as nature relatedness, which is consistent with the conceptual development of the core concepts. Regression analyses showed that nature relatedness, and dimensions of place made a significant contribution to wellbeing outcomes. Subsequently, moderation and mediation analyses were used to assess if constructs affected the relationship between engagement with nature and wellbeing, results revealed that nature relatedness was significant, however, place constructs were not. The lack of anticipated outcomes in the analyses might be attributable to lack of diversity in the sample representing different visitor-types and the recreation specialization of users. Place familiarity, an element of place bonding, might also have been a limiting factor because the sample consisted mostly of long-term, frequent users of the Bruce Trail. Future research should seek to include a broader sample to gain a more holistic insight into possible factors at play driving the engagement with nature-wellbeing relationship beyond mere presence in nature.

## Acknowledgements

I would like to begin by thanking my advisor, Dr. Bryan Smale, for his significant mentorship during my master's journey. Without his patience and numerous suggestions to guide me through the process, grow as an academic and get the quantitative wheels turning in my head, none of this would have been possible. I would also like to extend a sincere thank-you for involving me in the CIW, the experience, community and help from the staff and students was invaluable. I would also like to extend a thank-you to my committee member, Kelley McClinchey, for her insightful comments from the start of my proposal defense to her mentorship throughout this process.

I would especially like to thank my husband, Brandon, who has been with me through this journey from the start and has continually acted as a source of motivation, support and put-up so lovingly with my frustrations, excitements, travel and general thesis-related mood swings over the last few years. I also want to thank my parents and family for supporting my academic endeavors and continually showing their pride for my persistence in continuing in academia. I would also be remiss if I didn't thank my 24-hour therapy companions, my loving bernese mountain dogs, Finn, Louie and Linus.

Lastly, I would like to thank my peers and the department for the continual support and numerous opportunities and mentorship that I have been privileged to participate in since joining the Recreation and Leisure Studies community at Waterloo. Thank you to everyone who has made this possible, it has been a pleasure!

## Table of Contents

<b>LIST OF TABLES .....</b>	<b>VII</b>
<b>LIST OF FIGURES .....</b>	<b>VIII</b>
<b>WANDERING INTO THE WILDERNESS SEEMED LIKE A GOOD IDEA .....</b>	<b>1</b>
PROLOGUE .....	1
INTRODUCTION .....	2
<b>NAVIGATING THE FOREST.....</b>	<b>6</b>
WELLBEING .....	6
<i>What is Wellbeing?</i> .....	6
<i>Wellbeing and the Environment</i> .....	8
BIOPHILIA THEORY .....	11
<i>Nature Relatedness</i> .....	16
<i>Place</i> .....	19
<i>Place Attachment</i> .....	21
<i>Place Bonding</i> .....	24
SUMMARY .....	26
<b>HOW I AM GETTING OUT OF HERE .....</b>	<b>28</b>
<b>METHODS .....</b>	<b>28</b>
<i>The Research Process</i> .....	28
<i>Study Sites</i> .....	28
<i>Sample Selection and Procedures</i> .....	31
<i>Data Collection</i> .....	32
<i>Survey Instrument</i> .....	32
<i>Core Concepts</i> .....	33
<i>Ethics</i> .....	38
DATA ANALYSIS .....	38
<b>THINGS I PICKED UP ALONG THE WAY.....</b>	<b>40</b>
TRAIL USERS .....	40
<i>Sample Characteristics</i> .....	40
<i>Trail Behaviours</i> .....	42
<i>Core Constructs</i> .....	44
TRAIL USERS AND CORE CONSTRUCTS .....	46
TRAIL USERS AND WELLBEING.....	50
RELATIONSHIPS AMONG CORE CONCEPTS AND THEIR DIMENSIONS.....	51

THE COMBINED CONTRIBUTION OF ALL CONSTRUCTS TO WELLBEING .....	53
INFLUENCING FACTORS AS MEDIATORS OF THE RELATIONSHIP WITH WELLBEING.....	56
<b>THE OPENING FROM THE WOODS .....</b>	<b>59</b>
<b>DISCUSSION .....</b>	<b>59</b>
CONCLUSION.....	63
<b>REFERENCES.....</b>	<b>67</b>
<b>APPENDICES.....</b>	<b>76</b>
APPENDIX A. SAMPLE NEWSLETTER INSERT INVITING TRAIL USERS TO PARTICIPATE IN THE SURVEY .....	77
APPENDIX B – INFORMATION LETTER ON WEBSITE .....	78
APPENDIX C – CONSENT FORM.....	79
APPENDIX D. SURVEY INSTRUMENT .....	80

## List of Tables

Table 1. The nine values of biophilia.....	13
Table 2. Demographic characteristics for trail users. ....	41
Table 3. Demographic characteristics of trail users by gender. ....	41
Table 4. Descriptive statistics for trail users trail-use behaviours .....	43
Table 5. Cronbach's alpha reliability scores and descriptive statistics for core constructs.....	45
Table 6. Summary of significant differences for dimensions by gender .....	47
Table 7. Differences in place attachment based on time spent outdoors .....	48
Table 8. Differences in place bonding by time spent outdoors.....	48
Table 9. Differences in nature relatedness by time spent outdoors .....	48
Table 10. Differences in motivation by time spent outdoors.....	48
Table 11. Differences in place attachment dimensions by time spent outdoors .....	49
Table 12. Difference in place bonding dimensions by time spent outdoors .....	50
Table 13. Differences in motivation by time spent outdoors.....	51
Table 14. Relationship between core constructs, dimensions and wellbeing .....	52
Table 15. Relationship between core construct dimensions and motivation dimensions.....	53
Table 16. Contribution of time spent outdoors and nature relatedness to overall wellbeing.....	54
Table 17. Contribution of time spent outdoors and place attachment to overall wellbeing .....	55
Table 18. Contribution of time spent outdoors and place bonding to overall wellbeing .....	55
Table 19. Contribution of time spent outdoors and <i>dimensions of place attachment</i> to overall wellbeing .....	56
Table 20. Contribution of time spent outdoors and dimensions of place bonding to overall wellbeing .....	56

## List of Figures

Figure 1.	Relationships among constructs of place.....	22
Figure 2.	A conceptual framework of the connections between time spent outdoors and wellbeing.....	27
Figure 3.	Conservation authorities map (Conservation Ontario, 2018) .....	29
Figure 4.	Bruce trail network map (Bruce Trail Conservancy, 2019).....	30
Figure 5.	The mediating effects of nature relatedness on the time spent outdoors wellbeing relationship.....	59
Figure 6.	The mediating effects of place familiarity on the time spent outdoors wellbeing relationship.....	59



## Chapter 1

# Wandering into the Wilderness Seemed Like A Good Idea

### Prologue

“I don’t like either the word or the thing. People ought to saunter in the mountains - not hike!... *Do you know the origin of that word ‘saunter?’ It’s a beautiful word. Away back in the Middle Ages people used to go on pilgrimages to the Holy Land, and when people in the villages through which they passed asked where they were going, they would reply, “A la sainte terre,’ ‘To the Holy Land.’ And so they became known as sainte-terre-ers or saunterers. Now these mountains are our Holy Land, and we ought to saunter through them reverently, not ‘hike’ through them.*”

Personal communication between Albert W. Palmer and John Muir found in an excerpt from *The Mountain Trail and its Message (1911)*

Explaining what led me to this area of research is arguably the easiest part of this whole undertaking. As a child, I was fortunate enough to grow up in a time when “helicopter parents” did not exist to the extent they do now, and all the neighbourhood kids regularly disappeared outside for hours at a time. Congregating on someone’s front lawn to draw out a plan of action before leaving and giving someone’s parent an idea of where we thought we were heading. We spent most hours in creeks, forests, playing in nature, going for bike rides, and anything else you could think to do outdoors. Research has shown the benefits that nature has for children, their attention spans, their creativity and their wellness. Research also shows the consequences of a lack of time spent outdoors, such as nature deficit disorder, often talked about in reference to the modern-day child. Aside from children, adults and seniors and the outdoors have also been studied, and one consensus is clear, nature provides increases to wellbeing.

The simple experiences I was privileged to have led me to love the outdoors through childhood into adulthood, and likely the remainder of my life. My early experiences helped me realize that biology and environmental studies were where my interests laid, which I eventually pursued in undergraduate studies. My keenness for the natural world, sports, and being active were fostered through High School into University. I spent most of my time working at a gym

and heavily involved in recreation, all of which built my understanding of wellbeing. It was not until University through my courses that I was exposed to the world of historic naturalists, protected areas, and outdoor recreation and everything became connected. Linking wilderness and active living, experiencing it through parks in my own life, and understanding what I, and others, might gain from the interaction is what drove my interests for the intersection between wellbeing, environmental studies and, environmental psychology. Understanding how and what drives this relationship, and its implications for the future of wellbeing individuals and environmental conservation is an area of building interest through my career as a graduate student. It was not until this point that I have been able to understand it through an academic lens and engage in it from a research perspective. Throughout this thesis, you will find quotes from the writings of John Muir, the “Father of National Parks” that set the stage for each aspect of nature and wellbeing in this research. Unknowingly, his quotes have inspired and reinforced the areas of interest I have through his own writings and self-reflection in his lifetime.

## **Introduction**

The discussion of understanding what creates “the good life” has taken place for millennia and is posed across academic institutions from all levels of high school education to post-secondary institutions. Diener (2000) notes that this discussion generally focusses on criteria such as loving others, pleasure, self-reflection, whether people think they are living the good life, and what makes an individual’s life worthwhile. Wellbeing has numerous conceptualizations in the literature, however, with some of the frequently used terms including: hedonic and eudaimonic wellbeing, happiness, subjective wellbeing, and quality of life. Used interchangeably, these terms are recognized in the literature as overlapping constructs, even synonymous with one another when used broadly (Anand, 2016; Gill & Bedini, 2010; Kim, Lee, Uysal, Kim, & Ahn, 2015). Diener and Ryan (2009) state that wellbeing and life satisfaction

have been found to improve life in four areas: (1) health and longevity; (2) work and income; (3) social relations, and (4) societal benefits, which are often reciprocal. The Canadian Index of Wellbeing (CIW) echoes this notion in its use of the following working definition for wellbeing: “the presence of the highest possible quality of life in its full breadth of expression focused on but not necessarily exclusive to: good living standards, robust health, a sustainable environment, vital communities, an educated populace, balance time use, high levels of democratic participation and access to and participation in leisure and culture” (Canadian Index of Wellbeing, 2016)

The field of recreation and leisure focuses on the promotion of positive health and wellbeing (Gill & Bedini, 2010). The natural environment is an integral part of the leisure experience and contributes to individual, social, and community health outcomes (Mowen & Rung, 2010). It is well established that time spent outdoors influences wellbeing outcomes accrued, such as physical, psychological, social, and spiritual wellbeing (Capaldi et al., 2015; Lawton, Brymer, Clugh, & Denovan, 2017). Additionally, the time spent outside is not the only benefit, but also the interaction with nature itself (Keniger et al., 2013). The interaction one has with the outdoors can be indirect, incidental, or intentional; however, whatever the leisure choice that brings people into nature, the leisure experience itself has an impact on wellbeing as the choice is often made to elicit a positive experience (Kleiber, Walker, & Mannell, 2011). There has been significant consensus amongst researchers that exposure to nature, length of time spent in nature, and connection to nature are associated with benefits to health, wellbeing, and life satisfaction (Cleary, Fielding, Bell, Murray, & Roiko, 2017; Coon, Boddy, Stein, Whear, Barton, & Depledge, 2011; Cox et al., 2017; Keniger, Gaston, Irvine, & Fuller, 2013; Lee, Manthiou, Chiang, & Tang, 2018; Romagosa, Eagles, & Lemieux, 2015). These benefits have been recorded in activities including nature viewing in and out of lab settings, and activities taking place outdoors such as hiking, parks visitation, wildlife viewing, exercise, and horticulture (Chen

& Tu, 2013; Coon et al., 2011; Cox et al., 2017; Doherty, Lemieux & Canally, 2014; McIntosh & Wright, 2017; Wolf & Wohlfart, 2014). These activities have shown increased benefits related to physiological, psychological, social, and spiritual wellbeing outcomes.

However, the underlying mechanisms explaining *how* the of the environment contributes to wellbeing have not been thoroughly explored or precisely determined. A starting point to explain the underlying, existing relationships is the Biophilia Hypothesis, which states “the innate tendency to focus on life and life-like processes” (Wilson, 1984, p. i). This perspective leads us to the understanding that humans are innately connected to and appreciate nature because of the wellbeing benefits and biological evolutionary adaptations that draw humans to need to be around other living things (Beery, Jönsson & Elmberg, 2015; Cleary et al., 2017; Lumber, Richardson, & Sheffield, 2017; Wilson, 1984). The values of biophilia as outlined by Kellert (1993) describe the ways that humans affiliate with nature and can be used as a framework to help identify potential factors that help to understand existing pathways that contribute to wellbeing (Lumber et al., 2017). These values are reflected in the constructs in related literature concerning nature relatedness and place attachment and may be particularly important to further understanding the relationship between engagement with nature and wellbeing. The biophilic humanistic, naturalistic, and aesthetic values provide the core foundation for these constructs that result in wellbeing outcomes which are still not well understood in the literature (Cleary et al., 2017; Lumber et al., 2017).

Various attributes have been recognized as influencing factors in how and to what extent wellbeing is gained from time spent in the natural environment (Kyle, Bricker, Graefe & Wickham, 2004; Nisbet, Zelenski & Murphy, 2011). Mechanisms of interest include time in nature, motivation, nature relatedness, and notions of place such as place attachment and place bonding, yet to date, the role these factors might play in understanding place and nature relatedness in connection to wellbeing in an outdoor recreation setting has not been well-

established. These mechanisms have the potential to influence or impact the relationship that nature has with promoting wellbeing outcomes and therefore need to be explored to understand if a relationship exists, how it is formed and operates, and if and how it bears an impact on wellbeing outcomes. Therefore, drawing on biophilia hypothesis for its theoretical underpinning, the purpose of this research is to further the understanding of the relationship between the engagement with nature and wellbeing outcomes.

A number of research questions must be answered in the process of this exploration. Specifically, understanding to what extent time spent outdoors influences wellbeing through the core constructs, how the core constructs relate to wellbeing as well as how they inter-relate. For example, an initial starting point involves questioning to what extent the constructs of nature relatedness, place attachment, bonding, and motivation are each related to wellbeing, and further, how time in spent outdoors relates to wellbeing. The next point of interest would be to understand how engagement in nature is related to motivation, place attachment, bonding, and nature relatedness. Finally, exploring to what extent the core concepts are inter-related, such as nature relatedness to place attachment and place bonding, nature relatedness to motivation, place attachment to motivation and place bonding to motivation will help clarify if pathways have individual or collaborative relationships.

## Chapter 2

# Navigating the Forest

### Wellbeing

But in every walk with nature one receives far more than he seeks.

From John Muir's journals  
cited in *Steep Trails* (1877, ch. 9, p. 1).

### *What is Wellbeing?*

This section will differentiate the terms of health, wellbeing, and quality of life before describing the specific benefits that time spent outdoors can contribute to wellbeing. Beginning with the notion of health, in the preamble to the World Health Organization's (WHO) constitution (1948), health has been defined as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (p.1). The principles of the original constitution go on to add, as stated on the WHO's website today, "the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being" (WHO, 2018). Another influencing organization, The United Nations (UN), echoes and builds on the World Health Organization's statement of health as a human right in the creation of their Sustainable Development Goal (SDG) 3 – "good health and wellbeing" from the Envision2030 (2018) campaign that states countries should be "ensuring healthy lives and promote wellbeing for all at all ages". The definition for wellbeing, on the other hand, also stresses the importance of positive health, but a universally accepted definition does not exist at present. Authors Gill and Bedini (2010) note that wellbeing can be understood as positive or optimal health and, in a more holistic sense, includes spirituality alongside psychological and physical health. Cervinka and colleagues (2011) classify wellbeing as an umbrella term that, again, includes positive affect and general life satisfaction. The Canadian Index of Wellbeing (CIW) uses the following working definition for wellbeing: "the presence of the highest possible quality of life in its full

breadth of expression focused on but not necessarily exclusive to: good living standards, robust health, a sustainable environment, vital communities, an educated populace, balance time use, high levels of democratic participation and access to and participation in leisure and culture” (Michalos et al., 2011). This definition reflects and expands on the work on the social determinants of health, which identifies several external factors that have a bearing on individual wellbeing. Lastly, two additional and commonly used perspectives on wellbeing are reflected in the psychology literature – hedonic and eudaimonic wellbeing.

Hedonic wellbeing, frequently referred to and measured as subjective wellbeing and often used interchangeably with happiness in the literature, relates to the pleasantness of one’s experiences and is based in emotional valence (Capaldi, Dopko, & Zelenksi, 2014; Kim et al., 2015; Nisbet et al., 2011). Hedonic wellbeing, when used as subjective wellbeing/happiness, includes affect and cognition as components for research (Capaldi et al., 2014). Affect describes the presence of positive, and absence of negative, experiences one faces. Cognition includes the evaluation of one’s life satisfaction (Capaldi et al., 2014). Further, descriptions of subjective wellbeing occur in multiple forms because of the different definitions of affect and cognition, and frequently include descriptions such as happiness and life satisfaction. Authors Kim and colleagues (2015) define happiness as one’s feelings toward life, and life satisfaction as one’s perception of achievement. Zelenski and Nibset (2014) define happiness as the average of emotional experience and life satisfaction. Overall, while definitions and terminology vary, subjective wellbeing has been the predominant way in which wellbeing has been conceptualized and measured in the literature.

Eudaimonic wellbeing explores adaptive characteristics of a person more than their happiness or good feelings, and can include deeply held values and the realization of potential (Capaldi et al., 2014; Zelenski & Nisbet, 2014). Examples of concepts of typically associated with eudaimonic wellbeing include purpose in life, growth, autonomy, and vitality, all of which

aim to capture aspects of optimal living (Nisbet et al., 2011). Eudaimonic wellbeing is often represented in the literature as psychological wellbeing.

With respect to measurement, several scales have been developed to capture hedonic wellbeing, such as the positive and negative affect scale (PANAS), the subjective happiness scale, and the satisfaction with life scale (Capaldi et al., 2014, Lyubomirsky & Lepper, 1999). Eudaimonic wellbeing has often been measured using Ryff's psychological wellbeing questionnaire (Nisbet et al., 2011; Ryff, 1989). These two perspectives on wellbeing, while different in conceptualisation and definition, are recognised in the literature as highly positively correlated (Capaldi et al., 2014; Nisbet et al., 2011). In measuring wellbeing, a single item measure of life satisfaction is often used because of the high correlation of the two perspectives. This measure captures and is generally regarded as a global measure of subjective wellbeing even though as discussed above, wellbeing is comprised of a variety of dimensions such as physical, psychological, social, and spiritual.

### ***Wellbeing and the Environment***

It is well established that time spent outdoors influences the wellbeing outcomes accrued. However, not only is time spent outdoors important for wellbeing, but also the exposure and interaction with nature and its physical elements (e.g., soil and forest litter, ground cover, rocks, grass) (Capaldi et al., 2015; Keniger et al., 2013; Lawton, Brymer, Clugh, & Denovan, 2017). The benefits accrued from nature can be examined in the same four dimensions of wellbeing: physical, psychological, social, and spiritual (Keniger et al., 2013; Mowen & Rung, 2010). Physical benefits from leisure experiences in the outdoors have been shown to enhance wellbeing through the opportunities they provide for physical activity, and these activities in turn influence biological processes such as blood pressure, heart rate, moods, and body weight (Mowen & Rung, 2010). Experiences outdoors also have been shown to provide restorative



benefits, where stress reduction occurs from everyday stressors such as traffic, crowds, over stimulation and sedentary work places (Keniger et al., 2013). Korpela, Borodoulin, Neuvonen, Paronen, and Tyräinen (2014) also note that the length of time has impacts on emotional wellbeing, alongside the properties of the places being experienced.

Connected to physical wellbeing outcomes are psychological outcomes, which Keniger and colleagues (2013) note are often related to and studied in relation to physical activity in nature. However, one of the more dominant psychological outcomes noted is related to the restorative benefits from being in the natural environment. Those benefits are seen in reductions in stress, anxiety, and illness, in mood improvement, and increased levels of creativity using nature as an artistry outlet (Nisbet, Zelenski, & Murphy, 2011).

Psychological outcomes gained from engagement with nature are closely connected to social wellbeing. For example, growing urbanization has been linked to increased feelings of isolation and loneliness, which detract from our wellbeing through decreasing positive affect and increasing negative affect (Keniger et al., 2013). Outdoor recreation activities such as going to parks, gardening, and other nature-based activities have been shown to provide opportunities for social contact, social participation, and feelings of social-cohesion (Keniger et al., 2013). Further, feelings of belongingness, safety, and empowerment through participation, connections between adults and children, families and communities and the positive elements associated with social support in communities have been linked to time spent outdoors (Keniger et al., 2013; Mowen & Rung, 2010; Puhakka, Pitkänen, & Siikamäki, 2017).

Being outdoors has been identified as conducive to one's spiritual wellbeing because of the ability of this leisure experience to allow for an escape from everyday life and time to focus on the basics of one's life (Heintzman & Coleman, 2010). Increased spirituality has been found to be correlated to transcendent experiences in nature. These experiences are associated with high levels of happiness, positive feelings, freedom, and unity with the natural world (Keniger et

al., 2013). Visiting natural settings generates feelings of awe, which lead us to existential contemplation (Mock, Havitz, Lemieux, Flannery, Eagles, & Doherty, 2016). Motivation, an influencer of wellbeing outcomes, is present in spiritual wellbeing because the such contemplation leads to further questioning of motives surrounding natural areas (Mock et al., 2016). Lastly, increased inspiration and valuation of the natural environment have also been identified as outcomes of spiritual wellbeing. (Keniger et al., 2013; Puhakka, Pitkänen, & Siikamäki, 2017). The acknowledgement and practice of forms of spirituality have been positively connected to increased psychological and physical wellbeing because psychological wellbeing benefits from lower stress and respiration rates, and physical wellbeing benefits have occurred in those with ill health through building resilience and deriving strength from nature (Kamitsis & Francis, 2013).

Other factors related to the experience outdoors that positively influence physical wellbeing include time spent outdoors, frequency of visitation, duration of use (different from time spent outdoors as this concept is more usually a quantifiable measurement of time), and leisure motivation. Cox and colleagues (2017) identified that time spent outdoors was a predictor of physical activity, as nearby nature becomes a strong motivator for people to engage in physical activity, which provides physical and mental wellbeing benefits and may further motivate people to exercise more. Mowen and Rung (2010) also identified time spent in nature as a predictor of physical activity levels, alongside proximity to nature and the properties found in parks, such as paved versus unpaved trails. Understanding the motivation to spend time in nature would help to clarify the relationship between time in nature and wellbeing outcomes and the degree to which factors such as place attachment and bonding values or the overall level of nature relatedness also play a role.

Time spent engaging with nature has a wide range of benefits to one's physical, psychological, spiritual, and social health. The literature demonstrates that not only being

physically present and active in nature produces wellbeing outcomes, but also the ability and opportunity for engagement with others, creation of time for deeper understanding of self, and the restorative elements of nature like the quiet, natural sounds, and peaceful and calming scenes elicit wellbeing outcomes. However, while these outcomes have been reported, it remains unclear what pathways lead to these wellbeing outcomes from spending time in nature and a suitable framework to help identify them.

### **Biophilia Theory**

There is a love of wild nature in everybody, an ancient mother-love ever showing itself whether recognized or no, and however covered by cares and duties.

From John Muir's journals  
cited in *Wilderness World of John Muir* (Teale, 1954).

The wellbeing outcomes humans accrue from nature are well-documented in the literature and include benefits to one's physical, psychological, social, and spiritual wellbeing. One foundation for understanding how and why these benefits exist lay in theories of human evolution. Human's evolutionary heritage began in tropical savannahs of Africa where they have since sprawled and survived in multitudes of climates and geographic regions (Sampson, 2012). This starting point of the human species has been cited as the first interaction connecting to, interacting with, and depending on nature, that has persisted through to today's 21<sup>st</sup> century (Beery, Jönsson, & Elmberg, 2015; Sampson, 2012).

The interaction and connection with nature has become described and popularized through Wilson's (1984) biophilia hypothesis. The biophilia hypothesis provides an understanding of humans' association to, and affiliation with, the natural world. Wilson's (1984) biophilia hypothesis is rooted in evolutionary and biological notions, which strive to explain the necessity humans have for connecting to nature. As Wilson puts it, biophilia is "the innate tendency to focus on life and life-like processes" (p. i), which humans require (Nisbet & Zelenski, 2013; Nisbet, Zelenski & Murphy, 2009). The main argument of the hypothesis,

resulting from human's evolution in nature and biology's explanations of genetic dispositions, is that humans have an innate need to connect with all life as these relationships, evolutionarily speaking, contributed to our health, wellbeing, and survival (Kellert & Wilson, 1993; Nisbet & Zelenski, 2013). Further, the hypothesis does not just emphasize the survival needs humans had in the material goods of the physical environment, but also the influence that nature has had on cognitive, emotional, aesthetic, and spiritual aspects of human evolution (Beery et al., 2015; Lumbar, Richardson & Sheffield, 2017). These additional influences together would ultimately help in survival and reproductive successes (Kellert & Wilson, 1993). Therefore, one of the main assertions of this hypothesis today is that humans search for a fulfilling life is highly dependent on one's connection with nature, and the absence of such connection can create negative outcomes in one's life (Kellert & Wilson, 1993).

In subsequent writings, Kellert and Wilson (1993) contribute descriptions of the nine values of biophilia that describe how humanity affiliates with nature, and the functions these values serve to human needs (see Table 1). The values demonstrate aspects of basic human relationships with or dependence on nature. The values can be related to adaptational values in human survival, thriving, and individual fulfillment, however, they should not be taken as the sole contributors individually as their cumulative, interactive, and synergistic relationships may more wholly contribute to fulfillment (Kellert & Wilson, 1993). These values serve to support the selection of the core constructs considered in this study and help to inform their relevance in being tested – nature relatedness, place attachment and place bonding. Specifically, the naturalistic, aesthetic, and humanistic values provide a foundational perspective for the concepts of nature relatedness and place. Further, the ecologicistic-scientific, symbolic and moralistic values provide important context for the basis of the relationship between the core concepts and human fulfillment or wellbeing. The connection of these selected values to the core concepts is explored in greater detail below.

Table 1. The nine values of biophilia

Value	Definition	Function
Utilitarian	Use of nature for material goods.	Human sustenance, protection and security.
Naturalistic	Satisfaction from direct contact with nature.	Creation of curiosity, development of outdoor skills, development of physical and mental capabilities.
Ecologistic-Scientific	Systematic inquiry of the natural world, its interconnectedness and other natural systems.	Observation of nature and development of increased knowledge and understanding.
Aesthetic	Attraction of nature's physical beauty.	Elicits feelings of inspiration, harmony, peace, connectedness and security.
Symbolic	Expressing ideas and thoughts through nature-based metaphors and language.	Opportunities to communicate with nature, others, and develop mental capabilities.
Humanistic	Emotional attachment, bond with, or love for nature and its individual elements.	Creation of companionship, group bonding, sharing and cooperation.
Moralistic	Feelings of ethical concern, responsibility and reverence for nature.	Creation of order and meaning in life, affiliation ties.
Dominionistic	Mastery, control, dominance of the natural world.	Feelings of control, development of physical and technological skills
Negativistic	Feelings of fear, aversion and avoidance towards nature.	Feelings of security, protection and safety are formed.

*Source:* Adapted from Kellert & Wilson (1993) and Lumbar et al. (2017)

To begin, the naturalistic value has its roots in evolution; specifically, that humans evolved after, and in, nature. Therefore, this wonder and increased knowledge of the world that began before humans likely created an increased evolutionary advantage through one's curiosity (Kellert & Wilson, 1993). This value holds that humans gain satisfaction from direct contact with nature, derived through sense of fascination and wonder with the diversity of the natural world. Today, the naturalistic value is often used as a basis for explaining the physical fitness benefits that comes with participation in outdoor recreation activities such as hiking, and the mental benefits that arise from time spent in nature such as relaxation, restoration, and creativity (Kellert & Wilson, 1993). The naturalistic value helps explain the mental benefits from outdoor

recreation that come from the diversity of the environment around a person – the colours, sounds, and other sensual experiences that contribute to creativity and wellbeing.

Building on the creativity and curiosity that comes from engagement with a diversity of natural environments is the aesthetic value, which explains the appeal of the physical beauty of nature to humans. The aesthetic value focuses on the associated reactions to broader landscapes, or larger, living organisms, like megafauna species. The reactions can be seen as an assessment of the environment for its compatibility and need fulfillment abilities with humans (Kellert & Wilson, 1993). This assessment can have benefits to the psychological wellbeing both from a human evolutionary standpoint or a genetic response. It represents an intuitive recognition of the patterns, symmetry, harmony, and resulting feelings of tranquility and peace for which humans could model behaviour and life after (Kellert & Wilson, 1993).

Thirdly, the humanistic value revolves around feelings and emotional attachment to elements of the natural environment. Similar to the aesthetic value, attachments are often made with the larger elements of the environment like sentient animals or non-reciprocating elements such as trees (Kellert & Wilson, 1993). Evolutionarily speaking, this value would have benefitted humans in their development of bonding, altruism, and sharing later in history as their primitive lives would have depended heavily on caring for the natural world. Today, this value can most easily be seen in the humanizing of nature, specifically companion animals, for mental and physical benefits (Kellert & Wilson, 1993).

Three other values provide additional support for the use of this hypothesis by helping to explain concepts related to the modern-day experience to learn, communicate, and take care of the natural world. The ecologicistic-scientific value is rooted in the motivation to study and understand the ecological underpinnings of the environment, which contribute to psychological wellbeing by eliciting feelings of mastery of physical and mental skills (Kellert & Wilson, 1993). The symbolic value has evolutionary roots in communication and language, as the natural

environment was and is a facilitator of human language and thought because nature was, at one point, the only setting to which humans were exposed (Kellert & Wilson, 1993). The psychological benefits that accrued from the ability to self-express, identify, and have abstract thought are seen to be larger in the past than in the modern world, where this is put at risk from the synthetic versions of the environment that exist today (turf fields & boulevards, plastic trees, gardens, stuffed wildlife) and are likely to decrease the capacity for symbolic expression, metaphors, and communication (Kellert & Wilson, 1993). Finally, the moralistic value lies in the responsibility or ethical obligations for the environment, where strong feelings of spiritual meaning, order, and harmony take place. Evolutionarily, this value would have had biological repercussions in the feelings of belongingness, kin, affiliation, and affinities for conservation of the natural environment as the natural world is a living world and we are inextricably connected to it (Kellert & Wilson, 1993).

The Biophilia Hypothesis and six of the values of particular interest that informed the selection of the core constructs in this study, provide an appropriate starting point for the investigation into the relationships and effects that may exist between nature relatedness, place attachment, and health and wellbeing. The biophilia hypothesis informs an understanding of how the two constructs of nature relatedness and place evolved and are central to human life.

However, this theory is not without its critics. Critiques have emerged when considering the modern-day relationship humans hold with nature. One of the bases for this theory is that it is rooted in evolutionary biology, specifically links with genetic adaptations in humans, which is a notion authors have described as weak and hard to directly and empirically test (Beery et al., 2015; Chen & Tu, 2013; Lumbar et al., 2017). Additionally, the theory has been described as too narrow because the physical non-living components of the natural world are not considered by the definition, but are often identified by humans (Beery et al., 2015). Further, socio-cultural considerations are not present in this theory and because of the weak empirical evidence for the

biophilia hypothesis, there is considerable room for considerations of cultural factors and individuality (Beery et al., 2015; Cleary, Fielding, Bell, Murray, & Roiko, 2017; Grinde & Patil, 2009). Alternatively, the hypothesis has been labelled too broad in the sense that the evolutionary origins of humans' relations with life-like elements and their processes have likely been overestimated (Beery et al., 2015). These reasons have been noted by Sampson (2012) as contributors to why the hypothesis has been ignored in scientific circles, as well as within the emerging field of evolutionary psychology. Even though these limitations persist, the theory has created a strong base for understanding conservation ethics and biophobic responses, and it remains a catalyst in understanding human-nature relationships (biophilia) (Beery et al., 2015; Kellert, 1993; Lumbar et al., 2017).

As with certain values of biophilia theory, the constructs nature relatedness and place attachment have shown to contribute to the physical, psychological, social, and spiritual wellbeing of individuals (Beery et al., 2015; Capaldi et al., 2015). However, the two constructs have not been explored as key mechanisms for explaining how these wellbeing outcomes derived from nature are actually realized.

### ***Nature Relatedness***

If one pine were place in town square, what admiration it would excite! Yet who is conscious of the pine tree multitudes in the free woods, though open to everybody?

*John of the Mountains: The Unpublished Journals of John Muir* (1938, p. 313).

Technological advances in society have created the ability to have experiences without ever leaving your home, to learn new information with a simple click, and to have connections with others without ever seeing them. Alongside these seemingly positive technological advances, negative consequences have also surfaced such as more exacerbated environmental problems and degradation to the natural world (Nisbet et al., 2009). However, the abilities gained from technology come with consequences, including increasing disconnect from the outside



world, and accordingly, a disconnect from nature. The implication of disconnecting from nature has negative outcomes for human health and wellbeing, as evident from our innate need for nature (Kellert & Wilson, 1993; Nisbet & Zelenski, 2013). The behaviours of the human species are contributing not only to environmental degradation, but also to negative outcomes in human health and wellbeing (Nisbet et al., 2009). In order to understand the human-nature relationship, whether it contributes to environmental degradation, or concurrently, to conservation, health, and wellbeing, a meaningful starting point is understanding a person's nature relatedness. Understanding this human-nature connection is important in maintaining and improving human wellbeing in today's increasingly technologized and urbanized society and into the future (Keniger et al., 2013).

Nature relatedness, coined by Nisbet and colleagues (2009), aims to describe an "individual's level of connectedness with the human world" (p. 718). This construct draws on the biophilia hypothesis for its theoretical underpinnings and encompasses one's understanding and appreciation of our interconnectedness with the natural environment and all that it contains, both pleasing, and unpleasing to humans (Nisbet et al., 2009; Nisbet & Zelenski, 2013). Further to this, naturalistic, humanistic, symbolic, moralistic, and aesthetic biophilia values have been proposed by Lumbar and colleagues (2017) as indicators of nature relatedness. Each individual will have differences in how they connect to nature, and in turn this reflects how aware they are of biophilia or how much their innate biophilic needs are supported or suppressed (Nisbet & Zelenski, 2013; Nisbet et al., 2011). Lastly, connectedness can be referred to as trait-like because researchers have identified and demonstrated its as stability across time and situations (Capaldi, Dopko, & Zelenski, 2014).

The field of ecopsychology examines the human-nature relationship and its connection with psychological health. Through this approach, the strength of one's connection to nature is responsible for promoting environmental and human health, and that the disconnect from nature

contributes to an unhealthy environment, as well as unhealthy and unhappy humans (Nisbet et al., 2011). Nature exposure has benefits to psychological and physical health, and that repeated contact with nature leads to more positive emotional functioning and increases with life satisfaction (Capaldi et al., 2014; Capaldi, Passmore, Nisbet, Zelenski, & Dopko, 2015; Cleary et al., 2017; Lumbar et al., 2017). Individuals with a connection to nature, not just access to it, are less anxious overall and their connection to nature is essential to mental wellbeing (Martyn & Brymer, 2016). Expanding on this, access to nature serves as a facilitator to nature relatedness and provides partial benefits to wellbeing. A connection to nature is the basis for nature relatedness because real engagement with the natural world provides different wellbeing outcomes than simply being physically present in the natural world, but not engaging with it. Wellbeing outcomes are augmented when higher levels of nature relatedness are experienced, as this is the mechanism in which the engagement with nature-wellbeing relationship takes place. Further, time spent in nature also has additional indirect benefits such as opportunities for physical activity, facilitation of social interaction, the feeling of community cohesion, positive emotional and spiritual experiences, stress reduction, recovery from cognitive fatigue, and increased sense of purpose or meaning in life (Cervinka, Röderer, & Hefler, 2011; Cleary et al., 2017). Individuals with higher levels of nature connectedness may intentionally seek opportunities where they can reap psychological benefits or satisfy their need to affiliate with other living things (i.e., biophilic tendencies), and these individuals who accrue more contact with nature have been found to have higher levels of happiness (Capaldi et al., 2014). Research supports the existence of the nature connectedness–wellbeing relationship and nature connectedness-meaning (in life) relationships (Howell, Passmore, & Buro, 2013).

In order to measure nature connectedness, many scales have been developed such as: the connection to nature scale (CNS), the environmental identity scale (EIS), the inclusion of nature in self scale (INS), and the love and care for nature scale (Nisbet et al., 2009; Perkins, 2010). The

one scale, however, that is most widely-used in the literature today is the nature relatedness scale developed by Nisbet and colleagues (2009). Their nature relatedness scale uses a 21-item, self-report questionnaire to assess the affective, cognitive, and physical relationships one has with the natural world. Later, Nisbet and colleagues (2013) developed a shortened 6-item scale that focuses on two distinct themes: sense of identification and contact with nature.

While this scale builds and develops a measure of nature relatedness, areas for improvement exist and important considerations have been made by researchers. For example, Keniger and colleagues (2013) note that in understanding the benefits of and connection to nature, the majority of research done has taken place in western societies and is geographically biased towards the higher latitudes. This creates a bias towards specific cultures and socio-economic classes and, further, means that the benefits accrued and strength of connections researched so far cannot be said to be universal or culturally specific (Keniger et al., 2013). Furthermore, the concepts of nature relatedness could benefit from adopting a place-centred perspective (Perrin, 2018). Including a perspective on place would help understand the human-nature relationship because it would include a consideration of subjective perceptions (Perrin, 2018). One's perceptions of a particular place at a moment in time (such as in different natural environments with different characteristics) influences the relationship between place and nature connection, and subsequently the resulting wellbeing outcomes; yet, this perspective on place has largely not been recognized in current research (Cleary et al., 2017; Perrin, 2018).

### *Place*

Going to the mountains is going home.

John Muir  
*Our National Parks* (1901, p. 1).

Notions of space and place have existed since the first century AD when described by Greek geographers in the notions of chorology. Since that time, such notions have changed

contextually from the focus on particular geographic locations to an understanding gained through perceptions and experiences as part of the human condition (Cresswell, 2004). Space and place were popularized by Tuan (1977) who expanded our understanding of space and place through an example of being in motion. Movement was conceptualized as the space and places were conceptualized as pauses in the movement where values and belonging are constructed and attachment can exist (Cresswell, 2004; Tuan, 1974). Tuan (1974) introduced the notion of *topophilia*, a term that links sentiment and place and is defined as the “affective bond between people and place or setting” (p. 4). Tuan (1974) characterized topophilia as the “strongest human emotion” (p. 94) because when induced in a person, it indicates that a place or environment is now connected to an emotional event or is perceived as a symbol. Today, the notion of place is examined through constructs like place attachment, place bonding, and sense of place in disciplines such as geography, environmental psychology, sociology, and landscape architecture (Manning, 2011).

In the context of leisure research, place has been considered as a means to help understand leisure behaviours, and it has been commonly understood as the extent to which some individuals value or identify with a particular natural setting (Kyle, Bricker, Graefe, & Wickham, 2004). In the environmental behaviour literature, understanding these connections has most frequently been done using *place attachment* as a defining construct and it is largely considered the traditional way of conceptualizing place (Hammit, Backlund, & Bixler, 2006). Another related but separate concept is *place bonding*, which has also been used in the literature to conceptualize relationships in a deeper, more expanded way. Place bonding extends beyond dimensions of place attachment to embrace broader dimensions found in the multidimensional meanings shared between humans and place (Cheng & Chou, 2015; Hammit, Kyle & Oh, 2009). The constructs have been compared and researchers have generally concluded that theoretically, they both focus on the emotional and cognitive associations that develop in human/place

interactions. However, place attachment originated in the environmental psychology/geography field whereas place bonding is rooted in social psychology field (Cheng & Chou, 2015).

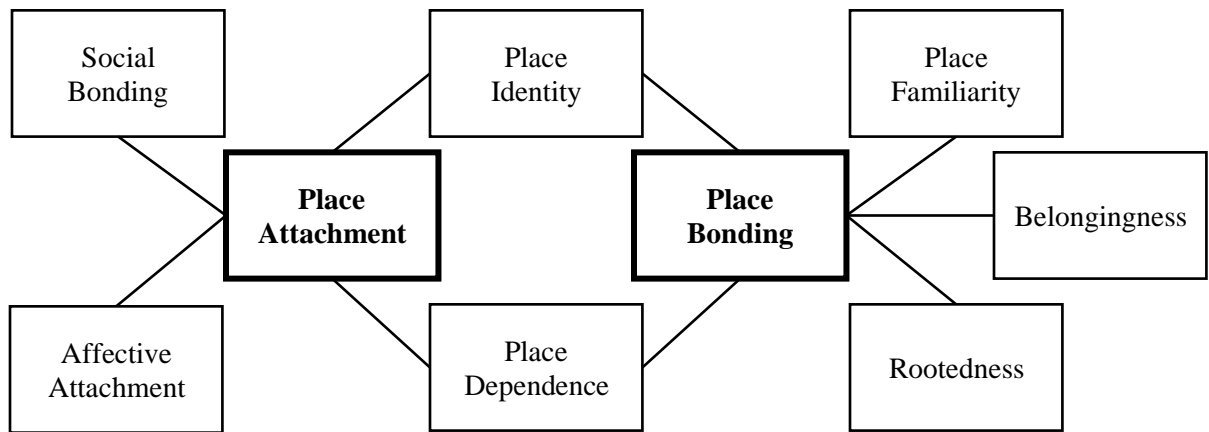
### ***Place Attachment***

Three important elements of place attachment have emerged in the literature, which were originally noted by Low and Altman (1992) and further described by Kyle, Graefe, and Manning (2005). These three elements are: (1) affect, emotion and feeling are central, (2) environments and settings can be experienced tangibly or symbolically, and (3) place attachment varies temporally. The first element states that human-place connections all involve affect, emotions, and feelings, which have become central to the place attachment concept. Secondly, place attachment is subject to spatial variation. The places or geographic locations can vary in scope and size, and have been as specific as an individual's home or as broad as entire communities, and include recreation areas, trails, and rivers (Kyle, Graefe & Manning, 2003/2004; Raymond, Brown, & Weber, 2010). These locations can be either tangible or symbolic in nature. Further, these places can be influenced by one's previous interactions. This influence can take the form of having experienced or not experienced a place, as well as if one has prior knowledge of a place or it is completely unknown to a person (Low & Altman, 1992; Manning, 2012). Lastly, these first two elements can be influenced by temporal changes in place attachment, showing it does not only vary spatially but temporally, and that place attachment can emerge as a person gets to know or experiences a place (Kyle et al., 2003/2004; Kyle et al., 2005). These three elements come together in the widely-used definition of place attachment, which is the development of emotional and affective bonds with a particular place or geographical location (Kyle et al., 2004a; Kyle, Graefe & Manning, 2003/2004; Williams & Vaske, 2003).

In the leisure literature, place attachment is considered to be made up of two dimensions – place identity and place dependence (Kyle et al., 2003/2004). Additionally, two other

dimensions have been proposed and tested to understand place meaning – social bonding, and affective attachment (Kyle et al., 2005; Kyle, Mowen, & Tarrant, 2004c; Manning, 2012). Lastly, an expanded model of attachment called place bonding has also been proposed for place research as an additional way to understanding attachment to a particular place (Hammitt et al., 2006). Place attachment and place bonding are considered separate, but related constructs, and taken together, the relationships among all of these concepts are depicted in Figure 1.

Figure 1. Relationships among constructs of place



Source: Adapted from Manning (2012).

Place identity is considered to be the cognitive component of place attachment and originates in the work of Proshansky (1978). In his research on the city and self-identity, place identity is conceptualized and explained as a complexity of cognitive processes relevant to one’s environment. The technical definition of place identity, as widely used in the literature, is as follows:

the individual’s personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, beliefs, preferences, feelings, values, goals and behavioural tendencies and skills relevant to this environment. (Proshansky, 1978, p. 155).

Put simply, place identity is the connection between self-identity in relation to the environment where an individual can both express and confirm their identity (Kyle et al., 2005; Ramkissoon, Smith & Kneebone, 2014). For recreationists, symbolic and emotional attachments can form here; for example, experiences in the natural environment are said to provide opportunities for place identity to emerge as experiences and memories can form through physical and social opportunities (Kyle et al., 2003/2004; Ramkissoon et al., 2014).

Place dependence, in contrast, can be described as the functional or instrumental role of a setting in providing amenities necessary to facilitate goals; in other words, it is a means to an end (Kyle et al., 2003/2004). For instance, for recreationists creating or gaining leisure experiences, or in their achievement of visitation goals, their attachment forms because of the ability to succeed in finding a specific place that satisfies their needs (Ramkissoon et al., 2014). The environment is a collection of resources, which they can use to pursue activity (Kyle et al., 2004), and these functional leisure experiences can be observed in bird watchers, wildlife viewers, or trail hikers (Ramkissoon et al., 2014).

Aside from these two commonly associated dimensions of the place attachment construct, social bonding and affective attachment also have been integrated into research on place attachment. Kyle, Graefe, Manning, and Bacon (2004) discuss the absence of social characteristics in Low and Altman's (1992) research on place attachment. They argue that because leisure experiences can be social in nature, the social relationships that form and are maintained in leisure settings should share some of the meaning associated with place. Such relationships provide part of the context for the meaning (Kyle et al., 2004b; Kyle et al., 2005). In Kyle and colleagues' (2005) research on place attachment in recreational settings, they include a social bonding component in their survey with questions relating to memories, associations with people, and generational values. In natural settings, the social bonding component can assist in developing bonds with others, the feeling of belongingness, and ultimately, the opportunity for

interaction. All of these aspects, if maintained, have been shown to lead to higher levels of attachment to place in an individual (Ramkissoon et al., 2014).

Lastly, the affective attachment dimension associated with place attachment refers to the building of sentiment with a particular place (Kyle et al., 2004c). Building on the notion in Tuan's (1974) description of topophilia and his belief that it is the strongest human emotion, the environments some humans encounter can be considered deeply emotional experiences (Kyle et al., 2004c). The emotional bonds with a place are influenced by the interactions with the setting and interactions with those in the setting and the setting steadily acquires meaning through each sentiment experienced (Tuan, 1977). One's positive outcomes in a specific setting, or over time, create attachments to these settings (Kyle et al., 2004c). In Kyle and colleagues' (2004c) review of place motivation and place attachment, they conclude that "humans' motivation to engage with natural environments is the product of lifelong socialization processes" (p. 443). This sentiment is shared in the separate notion of place bonding, specifically in belongingness.

### ***Place Bonding***

The place bonding construct aims to more fully identify the meanings and degree to which a person is attached to a place (Manning, 2012). Place bonding shares the dimensions of place identity and dependence with place attachment (see Figure 1). It furthers the way in which place attachment is conceptualized by adding three other dimensions that illuminate strong emotional ties that are temporary or long-lasting between a person and a particular place (Hammitt et al., 2006). The first dimension, belongingness, is a social component that involves feelings of acceptance, membership, and spiritual connectedness to other recreationists and an environment, and it is here that feelings of connectivity and affiliation may develop (Hammitt et al., 2006; Manning, 2012).



Second, place familiarity involves pleasant or achievement memories, cognitions, and environmental images from recollections and associations with recreational places (Hammitt et al., 2006). As Marcus (1992) notes, many powerful memories revolve around places, and these memories are a universal human experience, which make us all alike; however, in terms of individuals, memories are unique, meaningful only to that person, and memories rooted in place, cannot be fully experienced by anyone else. In recreation, participation involves self-selection, and therefore results in memories, achievements, and lasting images that produce positive experiences and promote bonding (Hammitt et al., 2006).

Lastly, place rootedness builds on positivity and belongingness because people can become so strongly bonded to a place that they feel at home (Hammitt et al., 2006). Place rootedness has also been described as feeling secure, comfortable, settled, possessive, or habituated in a place so much so that people may not have a desire to be in any other place. Hummon (1992) labels this feeling “everyday rootedness” (p. 267). In recreation, rootedness can be displayed in generational values and ancestral stories, such as an ice fishing location or a camp, and hence, the sense of rootedness originates its meaning from the past (Hammitt et al., 2006).

In summary, place and the principal constructs that describe it – place attachment and place bonding – are linked to human’s emotions and behaviours. However, place attachment is not without its gaps. For example, Scannell and Gifford (2017) note that intact place attachment bonds are related to greater wellbeing, but there is little research on the psychological mechanisms of this effect, or what needs the person-place bonds fill to induce these wellbeing outcomes. Cleary and colleagues (2017) echo this and say that limited efforts have been made to connect, specifically, eudaimonic wellbeing and place attachment dimensions. Further, Moulay, Ujang, Maulan and Ismail (in press) note that place attachment is expressed behaviourally and is related to an individual’s personality and behaviours, which in turn helps us understand the

emotional attachment related to outdoor recreation, environmental intentions, beliefs, and the related wellbeing outcomes. Lastly, both place attachment and place bonding have seen critiques for the lack of conceptual and empirical advances in its study, furthering the rationale for the inclusion of both constructs in this research to more holistically understand how they interact and influence wellbeing (Hammitt et al., 2006).

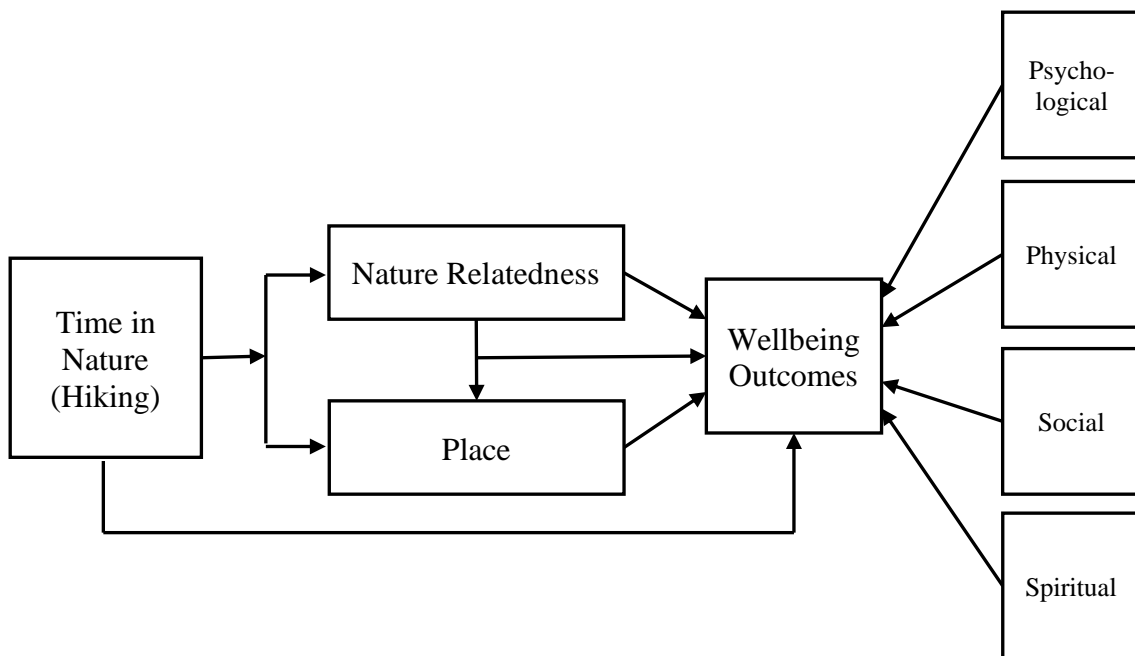
## **Summary**

The evidence for wellbeing benefits accrued from engaging with nature is ample. The biophilia hypothesis provides a guiding, theoretical framework for understanding how and why the benefits exist and serves to inform the selection of place constructs and nature relatedness, and through what potential pathways these benefits are gained. The hypothesis situates the research within human evolution and helps reason that the evolutionary advantages identified within the biophilic values are still underlying reasons for wellbeing outcomes in modern society. The testing of place constructs and nature relatedness, which were selected because of the connections made with biophilia's biophilic values, advances our understanding of their role in contributing to wellbeing.

Within this study, engaging with nature is conceptualized as time spent outdoors. Time spent outdoors has been linked to increased physical activity and psychological benefits from merely being in nature, which all impact overall wellbeing (Beyer, Szabo, Hoormann, & Stolley, 2018; Mitten, Overholt, Haynes, D'Amore & Ady, 2016). Time spent outdoors has typically been conceptualized by researchers in two ways: (1) as the frequency of visits outdoors and length of time spent outdoors, with the intent to establish wellbeing benefits being linked to visitation; and (2) length of time spent outdoors, as a marker of positive outcomes such as decreased depressive symptoms and increased concentration levels (Beyer, Szabo & Nattinger, 2016).

Therefore, the conceptual framework guiding this research is depicted in Figure 2, where time spent in nature influences wellbeing through constructs related to the biophilia hypotheses- biophilic values, to result in wellbeing outcomes. The constructs emerged as most salient in the literature and are considered in terms of their constituent dimensions as well when exploring the time spent in nature-wellbeing relationship. Wellbeing is comprised of four dimensions (i.e., psychological, physical, social and spiritual) and all shown to be influenced by the core constructs. One's nature relatedness is capable of eliciting different wellbeing dimensions and mere presence outside in nature is not sufficient to explain how these wellbeing dimensions occur, but the connections to and engagement with nature that elicit wellbeing has been well established. Place attachment, comprised of place dependence, identity, social bonding, affective attachment and related place bonding, influence individual's wellbeing through both past and present experiences.

Figure 2. A conceptual framework of the connections between time spent outdoors and wellbeing



## Chapter 3

# How I Am Getting Out of Here

## Methods

### *The Research Process*

For this research, a survey of Ontario trail users was conducted. Trail users consist of day-use conservation area and organized backcountry trail users. Participants took a self-administered, online questionnaire, which probed their trail use, behaviours, motivation for visiting, place associations, and levels of nature relatedness. Adopting this approach to the research process is guided by a post-positivist orientation. Henderson (2011) notes that in leisure studies, this orientation provides researchers with several options for data collection and means to examine data in ways that are more expansive. Additionally, she notes that this orientation allows for more reflexive methodologies, which benefits leisure studies as researchers are often trying to uncover meanings from people about their many interpretations of reality.

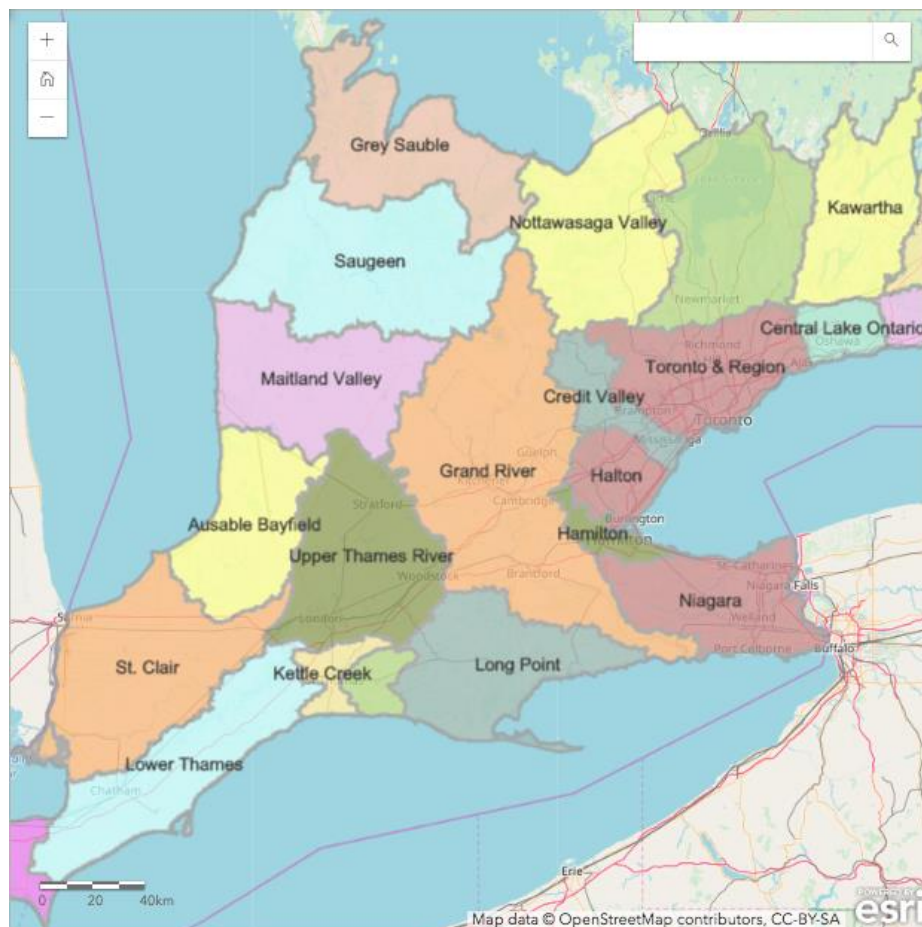
Ryan (2006) notes that researchers within this epistemology do not see themselves inevitably solving problems by arriving at a final solution to their investigations. Rather, their research can begin to answer questions and the aim is not to aggregate data to arrive at an “overall truth” (p. 19). Crotty (1998) agrees and points out that researchers can claim a “higher level of objectivity and certitude” for their scientific findings, however the “absoluteness is gone and claims to validity are tentative and qualified” (p. 30). Therefore, a post-positivist approach is appropriate for this study because of the goal of better understanding and constructing the relationships between engagement with nature and wellbeing outcomes.

### *Study Sites*

The intent of this research was to draw users from conservation areas and dedicated trail users from the field as well as association memberships. Therefore, targeted sites for this study

included Conservation Ontario conservation areas and the Bruce Trail Conservancy Network. Conservation Ontario manages 36 community-based, conservation authorities dedicated to watershed management, conservation, restoration, and managing Ontario's natural resources. The Bruce Trail Conservancy is a not-for-profit which maintains Canada's longest marked footpath trail of 900km from Niagara Region to Tobermory, Ontario. The Bruce Trail Conservancy is made up of nine membership groups which maintain respective sections of the Bruce Trail. The Conservation Ontario areas used for data collection were suggested by interested conservation authorities. Areas within in each authority were chosen based on their type of use (day versus overnight) activity offerings (hiking), ease of access, and popularity, information gained from the websites, and personal communications with administrators.

Figure 3. Conservation authorities map (Conservation Ontario, 2018)



While some areas offer over-night, front-country camping, the selected areas operate as day-use areas, and are open dawn until dusk. Day-use activities was an essential criterion in choosing a park because it facilitated data collection by increasing the potential sample size of trail users. Parks with few day-use activities posed logistical problems, such as approaching users, campers who may not leave their site while at the park, and infrequent use because of niche or seasonal activities, like rock climbing. While the Bruce Trail is predominantly backcountry trail use, users can participate in day-long excursions. The trail network is comprised of many short sections, loops, and opportunities for short trail trips alongside weekend-long, and overnight trips.

Figure 4. Bruce trail network map (Bruce Trail Conservancy, 2019)



In choosing the areas from Conservation Ontario to approach for data collection, five of the most accessible 36 conservation authorities to Waterloo were identified. From the five authorities, 14 specific conservation areas were targeted as sites for data collection. The conservation areas in the Southern Ontario region that expressed a willingness to participate included Nottawasaga Valley Conservation Area, Upper Thames Valley Conservation Area, and Ausable Bayfield Conservation Area, and they also assisted in promoting the study. Their promotion efforts meant that trail users of several other conservation areas and parks also could participate in the online survey. Of the individual Bruce Trail groups which comprise the Bruce Trail Conservancy, seven agreed to advertise the study to their members on their respective social media channels and newsletters. Further, the overarching governing body for the Bruce Trail Conservancy also disseminated information about the study on social media and web channels.

### ***Sample Selection and Procedures***

Prospective trail users were invited to participate voluntarily in the survey through online communications from individual conservation areas, Bruce trail groups, and the Bruce Trail Conservancy. Some in-person canvassing took place at selected Conservation Ontario sites, but overwhelmingly, responses came in online. In consultation with the researcher, the participating conservation areas created content to advertise the study through their newsletters and social media (see sample advertisement in Appendix A). Similarly, Bruce Trail users were invited to complete the survey via the respective groups to which they belonged through newsletters, social media posts or at general meetings by group organizers. Potential participants had to be at least 16 years of age to participate in the survey. Those who agreed to participate responded to the survey questions based on their most recent experience at their chosen trail location. Therefore, participants in the study included past and present visitors to the conservation areas and Bruce

Trail, and any other trail users who had a recent trail experience and wished to participate in this study. As such, the study is based on a convenience sample.

In order to complete the survey, participants were directed to an online survey site where they encountered a landing page with the information letter outlining the intent of the study and contact information for the researcher if any questions arose (see Appendix B). After reading the information letter, participants were directed to a consent form where their rights and responsibilities in the study were described (see Appendix C). By initiating the survey, participants provided implied consent; in other words, proceeding to the survey implies consent to participate (Alessi & Martin, 2010; Whitehead, 2007). If participants preferred, they had the option to request a paper copy of the questionnaire and a pre-paid stamped envelope to return the survey. Lastly, after completing the survey, participants had the option to enter a draw for one of three Mountain Equipment Co-op (MEC) gift cards valued at \$25. Participating in this draw was not linked to the survey responses, and entry ballots were saved on a secure server run through the University server. Participants also had the option to request a copy of the final study by leaving their email.

### ***Data Collection***

Data collection took place in from December 2018 through to January 2019. Given the nature of the weather at this time of the year, some on-site data collection was attempted, but ultimately, almost all surveys were completed through online participation. Data collection continued until online responses slowed and a viable sample size was reached.

### ***Survey Instrument***

For the purpose of this research, an online questionnaire was used (see Appendix D). The questionnaire includes close-ended, scale questions focusing on nature relatedness, place



attachment, place bonding, motivation, and wellbeing as well as demographics, trip characteristics, and other site-specific topics requested by conservation area managers.

### ***Core Concepts***

#### *Nature relatedness*

The shortened version of the 21-item nature relatedness scale created by Nisbet and colleagues (2009) was used. The nature relatedness scale measures one's subjective connectedness with nature using a series of statements that capture three sub-dimensions: (1) *sense of identification*, which is a sense of connectedness that could be reflected in spirituality, awareness of the environment and feelings of oneness with nature (2) *contact with nature*, which is defined as differences in the need for nature and comfort with wilderness; and (3) *pro-nature conservation attitudes*, which captures attitudes towards the environment (Nisbet & Zelenski, 2013). The short-form nature relatedness scale, called NR-6, was used for this study as the shortened version is adequate to cover identification and actual connection to nature. Pro-environmental behaviours are not central to the core concept of nature relatedness used in this study so were not included in the questionnaire. The NR-6 scale captures the first two subscales, identification and contact with nature, and respondents indicated their level of agreement with each statement using a 5-point Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree". The statements concerning identification are as follows: (1) "I always think about how my actions affect the environment"; (2) "my connection to nature and the environment is a part of my spirituality"; (3) "my relationship to nature is an important part of who I am", and (4) "I feel very connected to all living things and the earth." The statements concerning contact with nature are (1) "my ideal vacation spot would be a remote, wilderness area", and (2) "I take notice of wildlife wherever I am" (Nisbet & Zelenski, 2013). Composite measures were created for each dimension and for the scale overall by averaging the responses to the items.

## *Place*

Drawing on literature in leisure studies focusing on place attachment and place bonding, the questionnaire included all seven dimensions that make up place attachment (four dimensions) and place bonding (five dimensions). A total of 25 statements were assessed by respondents along a 5-point Likert scale ranging from 1 = “strongly disagree” to 5 = “strongly agree”. To measure place attachment, studies by Kyle and colleagues were consulted; specifically, Kyle, Mowen and Tarrant’s (2005) study examining place motivation and place attachment and Kyle, Graefe and Manning’s (2005) study on place attachment in recreational settings. Place attachment is based on four dimensions: place dependence, affective attachment, place identity, and social bonding.

Place dependence is measured using four items: (1) “I enjoy hiking the trails in this conservation area more than any other trails”; (2) “I get more satisfaction from visiting the trails in this conservation area than from any other trails”; (3) hiking in this conservation area is more important than hiking in any other place”; and (4) “I wouldn’t substitute any other trail for the type of recreation I do here”.

Place Identity will be measured using three items as follows: (1) “I feel the trails in this conservation area are a part of me”; (2) “visiting the trails in this conservation area says a lot about who I am”; and (3) “I identify strongly with the trails in this conservation area”.

Affective attachment will be measured with four items: (1) “the trails in this conservation area mean a lot to me”; (2) “I am very attached to the trails in this conservation area”; (3) “I feel a strong sense of belonging to this conservation area and its trails”; and (4) “I have little, if any, emotional attachment to this conservation area and its trails”.

Lastly, social bonding will be measured using three items: (1) “my friends/family would be disappointed if I were to start going to other conservation areas and using the trails there”; (2)

“if I were to stop visiting this conservation area, I would lose contact with a number of friends”; and (3) “many of my friends/family prefer this conservation area over the others”.

A composite measure of place attachment, following the reverse-coding of relevant items, the mean score of each dimension was created by first calculating the mean score on each dimension then calculating an overall mean score of place attachment based on the four dimension scores.

For place bonding in recreation environments, the work of Hammitt and colleagues (2006) was used, which measures three additional dimensions separate from, but linked to those comprising place attachment: place familiarity, belongingness, and rootedness. Again using a 5-point Likert scale of agreement, place familiarity is measured using the following four items: (1) “I have made many memories of hiking in this conservation area”; (2) “I have hiked this conservation area many times and am quite familiar with it”; (3) “I could draw a rough map of this conservation area”; and (4) “I know the conservation area like the back of my hand”.

Place belongingness is measured using five items: (1) “I am fond of this conservation area”; (2) “When I am in this conservation area I feel a part of it”; (3) “I feel connected to this conservation area”; (4) “This conservation area makes me feel like no other place can”; and (5) “I feel I belong at this conservation area”.

Lastly, place rootedness is measured using two items: (1) “This conservation area is like home to me”; and (2) “I rarely if ever hike in any other place than this area”. Only two of the original five items have been used in this study because as Hammitt and colleagues (2006) have argued, rootedness is such an intense level of place bonding few people realize such a connection with recreation places.

A composite measure of place bonding was created by calculating the mean score of each dimension after reverse-coding relevant items then calculating an overall mean score of place bonding based on the three dimension scores.

## *Motivation*

Motivation has been shown to be an influencing factor in recreational activity choice. Therefore, a measure of leisure motivation was included to serve as a potential explanatory and/or control variable during data analysis. Measuring leisure motivation in recreation experiences is often done using Manfreda, Driver, and Tarrant's (1996) Recreational Experience Scale (REP), which contains several domains of interest relevant to the current study. However, the selection of specific domains of the REP scale was guided by Kyle, Mowen and Tarrant's (2005) study, which used items from 12 domains of the REP scale. In their work, they conducted a confirmatory factor analysis that grouped items into six domains based on 17 final items. The six motive domains they derived were: (1) *learn* – opportunities to learn about natural and cultural history; (2) *autonomy* – experience of solitude and self-reflection; (3) *activity* – qualities or outcomes associated with leisure experience; (4) *social* – opportunities for social interaction; (5) *nature* – desire to interact with nature and enjoyment from interacting with nature, and (6) *health* – restorative benefits associated with place interaction. Examples of questions in this section include participating to “test my endurance”, “experience my own solitude”, and “to help reduce built-up tension.” Participants again responded to a 5-point Likert scale ranging from 1 = “strongly disagree” and 5 = “strongly agree”, from which composite measures on each motive were calculated.

## *Time Spent Outdoors and Wellbeing*

The last key concepts measured in the questionnaire were time spent outdoors and wellbeing, the independent and dependent variables, respectively, for the study. Time spent outdoors was measured using a 6-point index asking participants to indicate, in hours, how long they were on the trail during their most recent trip. Response options were: (1) half an hour or less; (2) 30 mins to 1 hour; (3) 1 to 2 hours; (4) 2 to 3 hours; (5) 3 to 4 hours; and (6) 4 or more hours. The index used in this study is consistent with categories from Beyer and colleagues

(2016) study on time spent outdoors, but fewer categories were included because trail users were predominantly day-users and short-term users of trails.

Wellbeing was measured using a single-item measure of life satisfaction based on the question, “how satisfied are you with your life in general?”, which is recommended by the OECD (2013) in its approach to measuring subjective wellbeing. Participants answered along a 10-point scale ranging from 1 = “not at all satisfied” to 10 = “very satisfied”. Such a global measure of wellbeing has been validated in the literature (OECD, 2013) and generally embraces the constituent physical, psychological, social and spiritual dimensions in a single measure of overall subjective wellbeing.

#### *Demographic characteristics*

Lastly, in order to generate a profile of the participants, three categories of questions were asked: (1) demographics; (2) trip characteristics; and (3) other associated behaviours.

Demographics questions included the following characteristics and were collected to provide a general profile of trail users: (1) sex at birth; (2) gender; (3) age; and (4) education level.

Questions concerning characteristics of the trip were as follows: (1) the conservation area or park the trail user last visited; (2) proximity of the trail user’s household to the conservation area or park; (3) duration of time spent in the conservation area or park on the most recent visit; (5) frequency of use of the conservation area or park in a typical month; (6) number of years individual has spent visiting this conservation area or park; and (7) the type of group visiting the site.

Lastly, questions regarding other associated behaviours, most of which were requested by managers at the conservation areas, included the following: (1) the number of businesses in the nearby community visited before or after the visit to conservation area; (2) how the trail user heard about this conservation area; (3) any amenities the trail user felt this conservation area

should consider adding; (4) perception of the entry payment system as easy or cumbersome; and (5) perception of the entry fee price (i.e., low, reasonable, high) (Wolf & Wohlfart, 2014).

### ***Ethics***

To ensure that all of the participants understand their rights and responsibilities that took part in this study, all ethical procedures outlined by the Tri-Council Policy Statement on ethical conduct for research involving humans training (TCPS-2) was adopted. This study required submission of an ethics application for research involving humans. This study is a minimal risk study as defined by the Office of Research Ethics (ORE) at the University of Waterloo:

... research in which the probability and magnitude of possible harms implied by participation in the research is no greater than those encountered by participants in those aspects of their everyday life that relate to the research. (Office of Research Ethics, 2018).

### **Data Analysis**

Collected data were downloaded from the online survey tool Qualtrics™ and were analyzed using SPSS version 25. Before analyses began, the data were checked and cleaned of invalid responses or technical errors. For example, responses occasionally included values falling outside legitimate ranges, and incomplete questionnaires were removed from inclusion in the final sample. In addition, data were checked manually to re-assign written-in responses for locations under “other areas visited” to a conservation area code if the area was included in the preceding list of locations. Reliability analyses were run for the core concepts, and in particular, for the nature relatedness scale because an item was omitted from the survey.

To begin data analysis, descriptive statistics were calculated and analyzed to provide a profile of the characteristics of the sample. Selected demographic groups within the sample were compared on their trail use characteristics and any differences among subgroups identified using t-tests and analyses of variances (ANOVAs). The core constructs and their sub-scales were also examined to see if there were differences based on selected demographic groups. Following

these descriptive analyses, inferential statistics were used to explore and understand potential relationships and the influence of nature relatedness, place attachment and motivation on the relationship between the time spent in nature and wellbeing. To do so, regression models were run to determine the contribution of each construct to wellbeing, which set the stage for moderation and mediation analyses using the SPSS add-on module, PROCESS, developed by Hayes (2018).

Chapter 4  
**Things I Picked Up Along the Way**  
**Results**

This chapter presents the results of this study. The first section describes the overall sample by its demographics and trail use behaviours as well as how the participants measured on the core constructs. Following this, group comparisons were done to identify any significant differences. Then the core constructs of place and nature relatedness were examined for significant relationships to provide insights into their interactions. Finally, these constructs were examined for what, if any, interactions with the time spent outdoors–wellbeing relationship.

### **Trail Users**

#### *Sample Characteristics*

The sample for this research consisted of participants who used trails within conservation areas or parks and designated trail systems. Of the trail users in the study ( $n = 691$ ), females made up almost two-thirds of the sample (64.1%). The average age of the sample was 59 years of age with a plurality of participants falling into the age range of 55 to 64 years. Most of the trail users held a college diploma (43.3%) followed by those holding a university degree (e.g., BA, BSc) (26.7%). None of the participants in the sample held a graduate university degree (e.g., MA, MSc, PhD) (see Table 2)

The break-down of age and education levels by gender are shown in Table 3. When men are compared to women on education levels, a higher percentage of women have completed higher education and the difference is significant ( $X^2 = 16.725, p = 0.001$ ); however, the practical significance of this difference may not be compelling because the sample is predominantly female.



Table 2. Demographic characteristics for trail users.

<b>Characteristic</b>	<b>n</b>	<b>Pct.</b>
<b>Sex</b>		
Male	242	35.9
Female	433	64.1
<b>Age</b>		
35 years and under	40	6.0
36-54 years	145	21.9
55-64 years	234	35.3
65-74 years	190	28.7
75 years and older	54	8.1
<b>Education</b>		
High school or less	85	12.6
Post-secondary education (e.g., certificate, trade, apprenticeship)	118	17.4
College Diploma	293	43.3
University Degree (e.g., BA, BSc.)	181	26.7
Graduate Degree (e.g., MA, MSc, PhD)	0	0.0

Table 3. Demographic characteristics of trail users by gender.

<b>Characteristic</b>	<b>Males</b>		<b>Females</b>		$\chi^2$	<i>p</i>
	<b>n</b>	<b>Pct.</b>	<b>n</b>	<b>Pct.</b>		
<b>Age</b>						
35 years and under	13	5.4	27	6.4	20.54	<0.001
36-54 years	42	17.6	103	24.5		
55-64 years	72	30.1	162	38.5		
65-75 years	82	34.3	106	25.2		
75 years and older	30	12.6	23	5.5		
<b>Education</b>						
Highschool or Less	45	18.7	39	9.0	16.72	0.001
Post-secondary education (e.g., certificate, trade, apprenticeship)	36	14.9	81	18.8		
College Diploma	90	37.3	202	46.8		
University Degree (e.g. BA, BSc.)	70	29.0	110	25.5		

### ***Trail Behaviours***

Trail use behaviours involve users' length of stay, reason for visit, trail use, distance travelled from household, monthly visits, and frequency of years visiting the area. Of the total trail users, the make-up of the type of area visited (i.e., conservation area, backcountry trail, provincial/federal park, or another area) is identified. Most trail users visited for 2 to 3 hours (29.2%) and many travelled 5 to 10 kilometres (kms) away from their household to visit areas (15.7%). However, the largest number of users (62.8%) travelled 10 km or more to get to the site (see Table 4). The users did this roughly once every 2 weeks in a month, with the largest number of users visiting once a month (50.8%). Most trail users had been visiting these areas for 20 or more years (27.9%), with the second largest group reporting they have been visiting for between 5 and 10 years. Visitors used the trails predominantly for recreation reasons, specifically hiking. Of the areas that trail users reported visiting, backcountry trails (e.g., the Bruce Trail) were most prevalent ( $n=451$ , 65.3%), followed by conservation areas ( $n=103$ , 14.9%), provincial or federal parks ( $n=25$ , 3.6%), while the rest visited another undisclosed urban or local park/trail system ( $n=112$ , 16.2%).

Trail behaviours showed varying results for men and women. Trail activity, whether hiking or some other activity engaged in while on the trail, showed a significant difference between men and women ( $X^2=7.624$ ,  $p = 0.006$ ) although over 95% of both men and women reported participating in principally hiking when on the trails (see Table 4). Visit intention, whether for recreation or other uses, showed no difference between men and women, based on both Chi-square ( $X^2= 0.285$ ,  $p = 0.594$ ) and Fisher's exact test ( $p = 0.664$ ). When it came to visiting trail areas, there were no significant differences in how far men and women travelled away from their household ( $X^2 = 6.276$ ,  $p = 0.179$ ). Further, once they arrived, their length of stay in the trail area was not significantly different.

Table 4. Descriptive statistics for trail users trail-use behaviours

Characteristic	Males		Females		$\chi^2$	<i>p</i>
	n	Pct.	n	Pct.		
<b>Length of stay in area</b>						
1 hour or less	17	7.1	43	10.0	7.982	0.092
1-2 hours	58	24.3	135	31.5		
2-3 hours	65	27.2	94	22.0		
3-4 hours	39	16.2	71	16.6		
4 or more hours	60	25.1	85	19.9		
<b>Distance of area from household</b>						
1 kilometre or less	13	5.4	36	8.3	6.276	0.179
1-2 kilometres	7	2.9	24	5.6		
2-5 kilometres	20	8.3	35	8.1		
5-10 kilometres	38	15.7	78	18.1		
10 or more kilometres	164	67.8	259	60.0		
<b>Visits per month</b>						
Daily	8	3.8	34	9.0	9.577	0.023
Once a week	45	21.4	101	26.9		
Once every two weeks	43	20.5	58	15.4		
Once a month	114	54.3	183	48.7		
<b>Years visiting area</b>						
Less than one year	33	13.9	56	13.1	4.119	0.532
1-2 years	16	6.7	28	6.5		
3-4 years	31	13.0	55	12.9		
5-10 years	44	18.5	97	22.7		
11-20 years	39	16.4	83	19.4		
20 years or more	75	31.5	109	25.5		
<b>Main reason for visiting</b>						
Recreation	227	97.0	406	96.2	0.285	0.664
Commuting, work break or other	7	3.0	16	3.8		
<b>Main type of trail use</b>						
Hiking	228	95.0	423	98.6	7.624	0.006
Other	12	5.0	6	1.4		
<b>Outdoor area type</b>						
Back country trail (e.g., The Bruce Trail)	155	64.0	285	65.8	2.025	0.567
Conservation Area	32	13.2	67	15.5		
Provincial or Federal Park	11	4.5	14	3.2		
Other	44	18.2	67	15.5		

Lastly, users were asked about how many times they visited in a month and how many years they had been visiting the particular area. Chi-square analysis showed significant differences between men and women for monthly visits ( $X^2 = 9.577, p = 0.023$ ) with women reporting visiting more frequently at the once and once every other week categories, while men more frequently reporting visiting once a month. The number of years users had been visiting showed no significant difference between genders ( $X^2 = 4.119, p = 0.532$ ).

### ***Core Constructs***

This study investigates how four core constructs – place attachment, place bonding, nature relatedness, and motivation – play a role in the relationship between time spent outdoors and wellbeing. In this section, the overall descriptive statistics for the sample on the core constructs and their respective dimensions are described, including the reliability of their respective scales.

When users were asked to indicate the extent to which they agreed with various statements related to their place attachment and place bonding, the results indicated levels of agreement slightly above the midpoint on the 5-point scale that these factors were important during their time spent outdoors on trails ( $M = 3.12, SD = 0.73$ ;  $M = 3.39, SD = 0.74$ , respectively) (see Table 5). When considering the four dimensions which comprise the overall measure of place attachment, affective attachment was shown to have the highest mean of the four dimensions ( $M = 4.08, SD = 0.78$ ), showing that trail users placed the highest relative importance on its role during their time spent outdoors. The remaining dimensions of place identity, dependence, and social bonding dimensions had mean scores hovering around the midpoint with the latter two dimensions showing relatively less importance to the overall construct (i.e., mean scores slightly below the midpoint).

Table 5. Cronbach's alpha reliability scores and descriptive statistics for core constructs.

Concept Dimension	Reliability		Descriptives Summary		
	Items	$\alpha$	n	Mean	SD
<b>Place Attachment</b>	<b>12</b>	<b>0.835</b>	<b>683</b>	<b>3.12</b>	<b>0.73</b>
Affective attachment	4	0.831	685	4.08	0.78
Place identity	3	0.858	688	3.47	0.95
Place dependence	4	0.909	686	2.47	0.90
Social bonding	2	–	678	2.46	0.93
<b>Place Bonding</b>	<b>11</b>	<b>0.812</b>	<b>679</b>	<b>3.22</b>	<b>0.74</b>
Place familiarity	4	0.808	685	3.77	0.91
Place belongingness	5	0.846	674	3.73	0.74
Place rootedness	2	–	682	2.66	0.92
<b>Nature Relatedness</b>	<b>4</b>	<b>0.704</b>	<b>689</b>	<b>4.24</b>	<b>0.63</b>
<b>Motivation</b>	<b>15</b>	<b>0.811</b>	<b>684</b>	<b>3.50</b>	<b>0.54</b>
Health	3	0.743	689	4.32	0.61
Autonomy	3	0.834	687	3.71	0.91
Learn	3	0.877	687	3.45	0.89
Social	3	0.783	689	3.12	0.94
Activity	3	0.760	686	2.90	0.93

The reliability of each of the place attachment dimension scores was quite high: place identity ( $\alpha = 0.858$ ), place dependence ( $\alpha = 0.909$ ), and affective attachment ( $\alpha = 0.831$ ). Social bonding had an item excluded on the final survey and therefore with only two items comprising the scale, a reliability analysis could not be done. When all subdimensions were combined to comprise place attachment, the level of reliability was also high ( $\alpha = 0.835$ ). Place bonding showed similar results, with the levels of agreement that place familiarity ( $M = 3.77$ ,  $SD = 0.91$ ) and place belongingness ( $M = 3.73$ ,  $SD = 0.74$ ) received indicating the relative importance of these two dimensions compared to place rootedness ( $M = 2.66$ ,  $SD = 0.92$ ), which scored much lower in its importance to place bonding and fell below the midpoint of the scale. The reliability scores for overall place bonding ( $\alpha = 0.812$ ), place familiarity ( $\alpha = 0.808$ ), and belongingness ( $\alpha = 0.846$ ) were all quite good.

Nature relatedness had a higher mean score for trail users ( $M = 4.24$ ,  $SD = 0.63$ ) indicating that users generally agreed on the importance of identification and contact with nature. Overall, the overall scale has an acceptable level of reliability ( $\alpha = 0.704$ ). Lastly, when looking at motivation, trail users identified health as the motive with which they most agreed was their reason for spending time outside on the trails ( $M = 4.32$ ,  $SD = 0.61$ ), and the activity motive was the motive with which they least agreed ( $M = 2.90$ ,  $SD = 0.93$ ) (see Table 5). The overall reliability of the scale was high ( $\alpha = 0.811$ ) as were each of the motives: health ( $\alpha = 0.743$ ), autonomy ( $\alpha = 0.834$ ), learn, ( $\alpha = 0.877$ ), social ( $\alpha = 0.783$ ), and activity ( $\alpha = 0.760$ ).

### **Trail Users and Core Constructs**

The following section explores if there are significant differences among groups in the sample for the core constructs and their dimensions. Differences between men and women were analyzed for the core constructs and their dimensions, as well as the behavioural dimension length of time spent on trail and core constructs. Of the overall core constructs, only nature relatedness showed a significant difference between men and women ( $t = -4.480$ ,  $p < 0.001$ ). This finding is consistent with literature on women's relationships to nature where females tend to report stronger environmental concern, pro-environmental behaviour, and attitudes as well as experience nature settings differently than men (Dean et al., 2018).

The remaining overall core constructs did not reveal any significant differences between men and women: place attachment ( $t = -1.051$ ,  $p = .293$ ), place bonding ( $t = -0.940$ ,  $p = 0.348$ ), and motivation ( $t = -1.093$ ,  $p = 0.275$ ) (see Table 6). Only a few dimensions showed significant differences between the men and women: women were higher on place dependence within place attachment ( $t = -2.143$ ,  $p = 0.032$ ) whereas men were higher on place familiarity within place bonding ( $t = 2.234$ ,  $p = 0.026$ ). Women also placed greater importance on the health motive than did the men ( $t = -3.907$ ,  $p < 0.001$ ) (see Table 6). Overall, however, the men and women were

more alike in their levels of agreement across all dimensions of the core concepts than they were different.

Table 6. Summary of significant differences for dimensions by gender

Concept Dimension	Males		Females		<i>t</i>	df	<i>p</i>
	Mean	SD	Mean	SD			
<b>Place Attachment</b>							
Place Dependence	2.36	0.89	2.52	0.90	- 2.143	668	0.032
Place Identity	3.44	0.96	3.50	0.94	- 0.784	670	0.433
Social Bonding	2.47	0.89	2.46	0.96	0.090	661	0.928
Affective Attachment	4.06	0.78	4.10	0.77	- 0.728	667	0.467
<b>Place Bonding</b>							
Place familiarity	3.88	0.89	3.71	0.93	2.234	667	0.026
Place belongingness	3.66	0.72	3.77	0.75	- 1.843	666	0.660
Place rootedness	2.60	0.94	2.69	0.92	- 1.147	664	0.252
<b>Nature Relatedness</b>	4.10	0.69	4.32	0.55	-0.214	671	<0.001
<b>Motivation</b>							
Learn	3.44	0.92	3.46	0.88	- 0.193	669	0.847
Autonomy	3.70	0.87	3.73	0.93	- 0.383	669	0.702
Activity	2.89	0.93	2.91	0.94	- 0.355	668	0.723
Social	3.17	0.93	3.11	0.95	0.743	671	0.458
Health	4.21	0.63	4.40	0.57	- 3.907	671	<0.001

Significant differences on the core concepts and their dimensions were more frequent when examining groups based on time spent on the trail. Tables 7 through 10 summarize the results for overall constructs and Tables 11 through 13 summarizes the results for the dimensions. Within motivation, several groups were significantly different from one another, notably, groups who stayed an hour or less were different from groups staying 3-4 and 4 or more hours (see Table 10). Place attachment (see Table 7) and nature relatedness (see Table 9) showed no difference for groups with varying lengths of time spent on trails.

Table 7. Differences in place attachment based on time spent outdoors

Time Spent Outdoors	Place Attachment			F	p
	n	Mean	SD		
1 hour or less	60	3.13	0.59	2.381	0.502
1-2 hours	197	3.26	0.68		
2-3 hours	161	3.13	0.74		
3-4 hours	110	3.04	0.77		
4 or more hours	145	3.05	0.80		

Table 8. Differences in place bonding by time spent outdoors

Time Spent Outdoors	Place Bonding			F	p
	n	Mean	SD		
1 hour or less	60	3.37 <sub>a</sub>	0.64	5.266	<0.001
1-2 hours	197	3.40 <sub>a</sub>	0.69		
2-3 hours	161	3.16 <sub>a</sub>	0.74		
3-4 hours	111	3.10 <sub>a</sub>	0.76		
4 or more hours	146	3.12 <sub>a</sub>	0.77		

*Note:* Based on Scheffé post hoc test, none of the groups were significantly different from one another.

Table 9. Differences in nature relatedness by time spent outdoors

Time Spent Outdoors	Nature Relatedness			F	p
	n	Mean	SD		
1 hour or less	60	4.18	0.61	0.238	0.917
1-2 hours	197	4.22	0.04		
2-3 hours	160	4.24	0.05		
3-4 hours	111	4.25	0.05		
4 or more hours	145	4.26	0.06		

Table 10. Differences in motivation by time spent outdoors

Time Spent Outdoors	Motivation			F	p
	n	Mean	SD		
1 hour or less	60	3.29 <sub>a</sub>	0.47	7.620	<0.001
1-2 hours	197	3.43 <sub>ab</sub>	0.50		
2-3 hours	161	3.49 <sub>abc</sub>	0.53		
3-4 hours	111	3.59 <sub>bc</sub>	0.48		
4 or more hours	146	3.66 <sub>c</sub>	0.60		

*Note:* Superscripts indicate group means that are significantly different based on Scheffé post hoc test.

For place attachment, place dependence and affective attachment showed no significant differences between time spent outdoors groups, but differences were found in place identity and social bonding (see Table 11). However, post hoc tests did reveal any specific differences among



the groups based on time spent in the area. Among the place bonding dimensions, place familiarity and place rootedness showed significant differences in groups staying for 2 hours or less and those staying for 2 to 4 or more hours, whereas place belongingness did not show differences among groups spending different amounts of time on trails (see Table 12). With respect to motivation, all but autonomy and health showed significant differences among groups spending different amounts of time spent outdoors (see Table 13). Significant differences occurred in the motive to learn between those who stayed 2 hours or less and those staying 2 to 4 or more hours. With respect to social and activity motives significant differences between the same groups were found with those staying 3 hours or less, those staying 1 to 4 hours and those staying 2 to 4 or more hours being different.

Table 11. Differences in place attachment dimensions by time spent outdoors

<b>Dimension</b>	<b>n</b>	<b>Mean</b>	<b>SD</b>	<b>F</b>	<b>p</b>
Time spent outdoors					
<b>Place Dependence</b>					
1 hour or less	60	2.33	0.77		
1-2 hours	196	2.62	0.84		
2-3 hours	160	2.44	0.94	2.043	0.087
3-4 hours	110	2.38	0.89		
4 or more hours	144	2.48	0.97		
<b>Place Identity</b>					
1 hour or less	60	3.62 <sub>a</sub>	0.87		
1-2 hours	197	3.64 <sub>a</sub>	0.87		
2-3 hours	160	3.42 <sub>a</sub>	0.94	2.652	0.032
3-4 hours	110	3.39 <sub>a</sub>	0.94		
4 or more hours	145	3.38 <sub>a</sub>	1.02		
<b>Social Bonding</b>					
1 hour or less	59	2.33 <sub>a</sub>	0.78		
1-2 hours	195	2.55 <sub>a</sub>	0.84		
2-3 hours	158	2.56 <sub>a</sub>	0.98	2.773	0.026
3-4 hours	107	2.42 <sub>a</sub>	1.00		
4 or more hours	143	2.37 <sub>a</sub>	0.98		
<b>Affective Attachment</b>					
1 hour or less	60	4.24	0.63		
1-2 hours	196	2.06	0.75		
2-3 hours	160	3.96	0.76	1.546	0.187
3-4 hours	108	4.02	0.83		
4 or more hours	145	4.09	0.79		

*Note:* Based on Scheffé post hoc test, none of the groups were significantly different from one another.

Table 12. Difference in place bonding dimensions by time spent outdoors

<b>Dimension a</b>					
Time spent outdoors	<b>n</b>	<b>Mean</b>	<b>SD</b>	<b>F</b>	<b>p</b>
<b>Place Familiarity</b>					
1 hour or less	60	4.17 <sup>a</sup>	0.78	6.889	<0.001
1-2 hours	195	3.94 <sup>a</sup>	0.87		
2-3 hours	160	3.67 <sup>a</sup>	0.97		
3-4 hours	110	3.59 <sup>ab</sup>	0.95		
4 or more hours	144	3.66 <sup>b</sup>	0.81		
<b>Place Belongingness</b>					
1 hour or less	60	3.81	0.68	1.594	0.174
1-2 hours	196	3.82	0.73		
2-3 hours	159	3.69	0.71		
3-4 hours	110	3.63	0.76		
4 or more hours	143	3.73	0.73		
<b>Place Rootedness</b>					
1 hour or less	60	2.93 <sup>a</sup>	0.81	9.181	<0.001
1-2 hours	195	2.55 <sup>a</sup>	0.86		
2-3 hours	160	2.48 <sup>a</sup>	0.90		
3-4 hours	108	2.47 <sup>b</sup>	0.95		
4 or more hours	143	2.67 <sup>b</sup>	0.94		

Note: Superscripts indicate group means that are significantly different based on Scheffé post hoc test.

### Trail Users and Wellbeing

This section reports the statistics for trail users and core constructs on wellbeing. The overall sample had an average self-rated life satisfaction score of 8.46 ( $SD = 1.45$ ) on the 10-point scale. There were no significant differences between men and women trail users in their wellbeing ( $t = -0.047, p = 0.963$ ), however, there were differences based on education.

Generally, individuals reporting having completed higher levels of education also reported higher levels of wellbeing. Wellbeing was higher among those with post-secondary education, but it did not increase with additional levels of higher education showing a plateau effect ( $F = 4.899, p = 0.002$ ). Levels of wellbeing were not significantly different for groups who spent different amounts of time on the trails ( $F = 0.898, p = 0.465$ ).

Table 13. Differences in motivation by time spent outdoors

<b>Dimension</b>					
Time spent outdoors	<b>n</b>	<b>Mean</b>	<b>SD</b>	<b>F</b>	<b>p</b>
<b>Learn</b>					
1 hour or less	60	3.09 <sup>a</sup>	0.85	4.834	0.001
1-2 hours	196	3.38 <sup>a</sup>	0.88		
2-3 hours	161	3.50 <sup>ab</sup>	0.85		
3-4 hours	110	3.45 <sup>b</sup>	0.86		
4 or more hours	144	3.65 <sup>b</sup>	0.90		
<b>Autonomy</b>					
1 hour or less	60	3.73	0.96	0.603	0.661
1-2 hours	196	3.73	0.93		
2-3 hours	161	3.67	0.88		
3-4 hours	110	3.64	0.90		
4 or more hours	144	3.80	0.87		
<b>Activity</b>					
1 hour or less	60	2.51 <sup>a</sup>	0.86	12.250	<0.001
1-2 hours	195	2.73 <sup>ab</sup>	0.88		
2-3 hours	161	2.80 <sup>ab</sup>	0.89		
3-4 hours	109	3.09 <sup>bc</sup>	0.91		
4 or more hours	145	3.26 <sup>c</sup>	0.94		
<b>Social</b>					
1 hour or less	60	2.76 <sup>a</sup>	0.86	7.932	<0.001
1-2 hours	196	3.13 <sup>ab</sup>	0.97		
2-3 hours	161	3.41 <sup>abc</sup>	0.92		
3-4 hours	111	3.31 <sup>bc</sup>	0.86		
4 or more hours	145	3.13 <sup>c</sup>	0.93		
<b>Health</b>					
1 hour or less	60	4.35	0.63	0.389	0.816
1-2 hours	196	4.29	0.58		
2-3 hours	160	4.35	0.57		
3-4 hours	111	4.34	0.52		
4 or more hours	146	4.33	0.69		

Note: Superscripts indicate group means that are significantly different based on Scheffé post hoc test.

### Relationships among Core Concepts and their Dimensions

In this section, the direct relationships of the core constructs and their dimensions to wellbeing are considered. Of the four core constructs, place attachment was the only construct that had a significant positive relationship with wellbeing ( $r = .080, p = .035$ ) based on a significance level of .05 (see Table 14). The constructs of nature relatedness and motivation were close to meeting the .05 criterion for significance, with probabilities falling just outside the  $p < 0.05$  level (nature relatedness:  $p = 0.069$ ; motivation:  $p = 0.074$ ).

Table 14. Relationship between core constructs, dimensions and wellbeing

Concept <sup>b</sup> Dimension	Wellbeing <sup>a</sup>	
	<i>r</i>	<i>p</i>
<b>Place Attachment</b>	0.080	0.035**
Place Dependence	-0.002	0.950
Place Identity	0.080	0.035**
Social Bonding	0.094	0.014**
Affective Attachment	0.095	0.013**
<b>Place Bonding</b>	0.061	0.109
Place familiarity	0.091	0.071*
Place belongingness	0.051	0.183
Place rootedness	0.032	0.411
<b>Nature Relatedness</b>	0.069	0.069*
<b>Motivation</b>	0.068	0.074*
Learn	0.103	0.007***
Autonomy	0.042	0.267
Activity	-0.027	0.478
Social	0.098	0.010**
Health	-0.029	0.441

Note: \*  $p < .10$  \*\*  $p < .05$  \*\*\*  $p < .01$

<sup>a</sup> based on a 10-point scale where higher scores reflect a higher self-rated life satisfaction

<sup>b</sup> based on 5-point scales where higher scores reflect greater agreement with construct and dimension.

Several dimensions comprising the core constructs of place attachment and motivation were significantly and positively associated with wellbeing. Place identity, social bonding, and affective attachment were significantly related to wellbeing, and only place dependence was not. The social and learn motives also were significantly related to wellbeing, suggesting that satisfying these motives in the trail use experience contributes to higher wellbeing (see Table 14). As noted earlier, if motivation is considered a factor in facilitating the contribution of nature relatedness and place to wellbeing, then the relationships among these concepts could be assumed to be significant and positive as well. As shown in Table 15, motives are significantly related to almost all of the constructs and their dimensions. Notably, the social motive is the least strongly associated with place bonding, suggesting that these trail users do not necessarily require strong bonds to the places where they hike to facilitate strong social bonds with others. Literature on place constructs is rooted in motivational values, and therefore, going forward, we

can fairly safely assume these values are reflected in and captured by the core constructs and ultimately reflected in their contributions to wellbeing.

Table 15. Relationship between core construct dimensions and motivation dimensions

Concept <sup>a</sup> Dimension	Dimensions of Motivation <sup>a</sup>				
	Learn	Activity	Autonomy	Health	Social
<b>Place Attachment</b>					
Place Dependence	.234 ( $<.001$ )	.247 ( $<.001$ )	.221 ( $<.001$ )	.068 (.074)	.126 (.001)
Place Identity	.228 ( $<.001$ )	.161 ( $<.001$ )	.342 ( $<.001$ )	.209 ( $<.001$ )	.111 (.004)
Social Bonding	.212 ( $<.001$ )	.205 ( $<.001$ )	.136 ( $<.001$ )	.066 (.088)	.313 ( $<.001$ )
Affective Attachment	.180 ( $<.001$ )	.092 (.017)	.311 ( $<.001$ )	.248 ( $<.001$ )	.080 (.036)
<b>Place Bonding</b>					
Place familiarity	.081 (.034)	.034 (.377)	.238 ( $<.001$ )	.094 (.014)	-.049 (.201)
Place belongingness	.243 ( $<.001$ )	.163 ( $<.001$ )	.398 ( $<.001$ )	.248 ( $<.001$ )	.043 (.259)
Place rootedness	.106 (.006)	.134 ( $<.001$ )	.267 ( $<.001$ )	.070 (.070)	.012 (.745)
<b>Nature Relatedness</b>					
	.191 ( $<.001$ )	.155 ( $<.001$ )	.454 ( $<.001$ )	.429 ( $<.001$ )	.048 (.213)

*Note:* Correlations reported above with probability below in parentheses  
<sup>a</sup> based on 5-point scales where higher scores reflect greater agreement with construct and dimension.

### The Combined Contribution of All Constructs to Wellbeing

With the preceding results in mind, the next step in the analysis is to consider the combined and independent effect of nature relatedness and aspects of place – place attachment and place bonding – for their contribution to wellbeing. By first controlling for selected demographic characteristics, hierarchical regression can reveal the extent to which time in nature and the core constructs make a contribution to wellbeing over and above the control variables.

In the first set of three hierarchal regression analyses, one of the three core construct – nature relatedness (Table 16), place attachment (Table 17), and place bonding (Table 18) – was

entered at the second stage of the model after first controlling for selected demographics, and motivation and entering time spent in nature. In each case, age ( $B = 0.239$  to  $0.241$ ,  $p < 0.001$ ) and education ( $B = 0.142$  to  $0.143$ ,  $p < .001$ ) was significantly associated with wellbeing, but sex was not ( $B = 0.004$  to  $0.008$ ,  $p = 0.931$  to  $0.994$ ) (Model 1). Also, as expected based on the literature, time spent outdoors ( $B = -0.076$  to  $-0.079$ ,  $p < 0.01$ ) was significantly related to wellbeing. However, unexpectedly, the association of time spent outdoors was *negatively* related to wellbeing.

At the second stage of each model, the addition of the construct nature relatedness (see Table 16) made significant contributions to wellbeing, over and above the preceding factors. However, place attachment (see Table 17) fell marginally short of being significant, and place bonding (see Table 18) made no further significant contribution to wellbeing over and above the preceding factors. Overall, these factors explained just over 8% of the variation in wellbeing with age and education being the most important factors in the relationship. While the underlying motives for this leisure experience also make a positive contribution to wellbeing, extended periods of time in the outdoors on the trail actually appear to diminish overall wellbeing. However, the measure of time spent on the trail was a 6-category ordinal scale so it might not have been sufficiently valid measure to capture meaningful difference in time.

Table 16. Contribution of time spent outdoors and *nature relatedness* to overall wellbeing

Factors	Model 1			Model 2		
	<i>B</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>t</i>	<i>p</i>
Age	.241	6.29	<.001	.249	6.51	<.001
Sex (Female)	.008	.22	.826	-.008	-.21	.832
Education	.143	3.75	<.001	.144	3.79	<.001
Time spent outdoors	-.079	-2.07	.039	-.086	-2.26	.024
Nature Relatedness	–	–	–	.096	2.49	.013
Adjusted R <sup>2</sup>		.073			.080	
F change		13.736			6.205	
Sig. of F change		<.001			0.013	

Table 17. Contribution of time spent outdoors and *place attachment* to overall wellbeing

<b>Factors</b>	<b>Model 1</b>			<b>Model 2</b>		
	<b><i>B</i></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b><i>B</i></b>	<b><i>t</i></b>	<b><i>p</i></b>
Age	.239	6.26	<.001	.234	6.11	<.001
Sex (Female)	.008	.21	.832	.004	.10	.920
Education	.142	3.71	<.001	.146	3.81	<.001
Time spent outdoors	-.079	.04	.038	-.072	-1.88	.059
Place Attachment	–	–	–	.068	1.77	.077
Adjusted R <sub>2</sub>		.072			.075	
F change		13.55			3.14	
Sig. of F change		<.001			.070	

Table 18. Contribution of time spent outdoors and *place bonding* to overall wellbeing

<b>Factors</b>	<b>Model 1</b>			<b>Model 2</b>		
	<b><i>B</i></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b><i>B</i></b>	<b><i>t</i></b>	<b><i>p</i></b>
Age	.248	6.29	<.001	.237	6.20	<.001
Sex (Female)	.013	.12	.907	.002	.05	.964
Education	.143	3.75	<.001	.146	3.82	<.001
Time spent outdoors	-.076	-2.01	.045	-.068	-1.76	.079
Place Bonding	–	–	–	.054	1.41	.157
Adjusted R <sub>2</sub>		.072			.074	
F change		13.68			2.01	
Sig. of F change		<.001			.157	

When the analysis is repeated for each core construct, but using its constituent dimensions for a closer look at their more specific contributions (see Tables 19 and 20), the results remain largely the same. These aspects of place attachment and place bonding do not appear to make a significant contribution to overall wellbeing. The lone exception is social bonding, which was only marginally significant ( $B = 0.80, p = .038$ ).

Table 19. Contribution of time spent outdoors and *dimensions of place attachment* to overall wellbeing

<b>Factors</b>	<b>Model 1</b>			<b>Model 2</b>		
	<i>B</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>t</i>	<i>p</i>
Age	.239	6.18	<.001	.230	5.94	<.001
Sex (Female)	.008	.22	.830	.013	.33	.741
Education	.141	3.66	<.001	.143	3.69	<.001
Time spent outdoors	-.079	-2.05	.041	-.067	-1.74	.082
Place dependence	-	-	-	-.094	-1.78	.076
Place identity	-	-	-	.052	.78	.436
Affective attachment	-	-	-	.032	.53	.600
Social bonding	-	-	-	.098	2.01	.045
Adjusted R <sup>2</sup>		.071			.078	
F change		13.22			2.14	
Sig. of F change		<.001			.074	

Table 20. Contribution of time spent outdoors and *dimensions of place bonding* to overall wellbeing

<b>Factors</b>	<b>Model 1</b>			<b>Model 2</b>		
	<i>B</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>t</i>	<i>p</i>
Age	.237	6.15	<.001	.228	5.82	<.001
Sex (Female)	.010	.26	.792	.015	.38	.703
Education	.141	3.67	<.001	.144	3.74	<.001
Time spent outdoors	-.077	-2.00	.046	-.066	-1.64	.101
Place familiarity	-	-	-	.075	1.46	.144
Place belongingness	-	-	-	.023	.41	.684
Place rootedness	-	-	-	-.026	-.48	.631
Adjusted R <sup>2</sup>		.071			.072	
F change		13.16			1.36	
Sig. of F change		<.001			.254	

### **Influencing Factors as Mediators of the Relationship with Wellbeing**

Given the findings above that showed that the various place-related constructs overall did not make a significant independent contribution to wellbeing, with the exception of social bonding, the next step in the analysis was to consider if any of the constructs and dimensions, particularly those with significant or close to significant contributions in regression analyses,



might act as a moderator or mediator in the relationship between time spent in the outdoors on the trail and overall wellbeing. Both moderation and mediation analyses were run in accordance to the literature review and suggestions that the core constructs could reasonably be explanatory factors for wellbeing benefits accrued from time spent outdoors as well as function as variables of influence in the time spent outdoors-wellbeing relationship at varying levels of a person's attachment, bonding and nature relatedness levels.

When running moderation analyses, age, education levels, gender and motivation served as control variables. Core constructs place attachment, place bonding, and nature relatedness were not shown to significantly moderate the relationship between time spent outdoors and wellbeing, nor were any of their dimensions. With the various motives showing strong correlations in earlier analyses, they were also tested as moderators. Even though the earlier correlation analyses showed that the motives learn and social were highly associated with wellbeing, and further, that time spent outdoors, and the motives learn, activity, and social were inter-related, none of the moderation analyses generated any significant results attributable to these motives.

Subsequently, when running the mediation analyses with each of the constructs and their dimensions to determine if any mediated the relationship between time spent in nature and wellbeing, the results of these analyses showed a couple of significant relationships. The core constructs nature relatedness (see Figure 5), and the dimensions of place attachment - social bonding (see Figure 6) and affective attachment were significant mediators. Lastly, the dimension of place bonding place familiarity was close to, but not a significant mediator.

Figure 5. The mediating effect of *nature relatedness* on the time spent outdoors wellbeing relationship

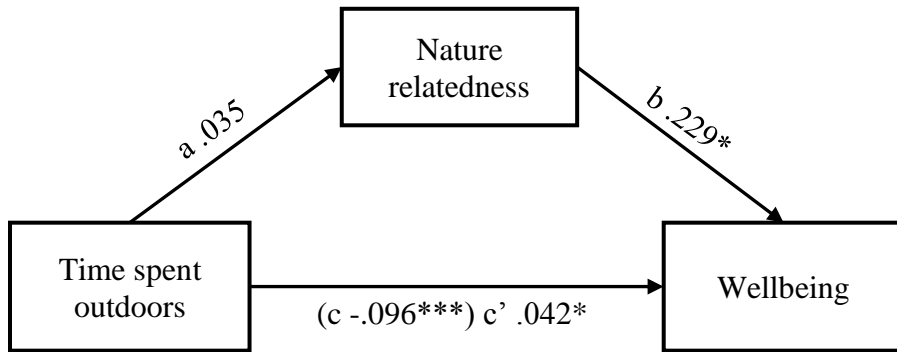
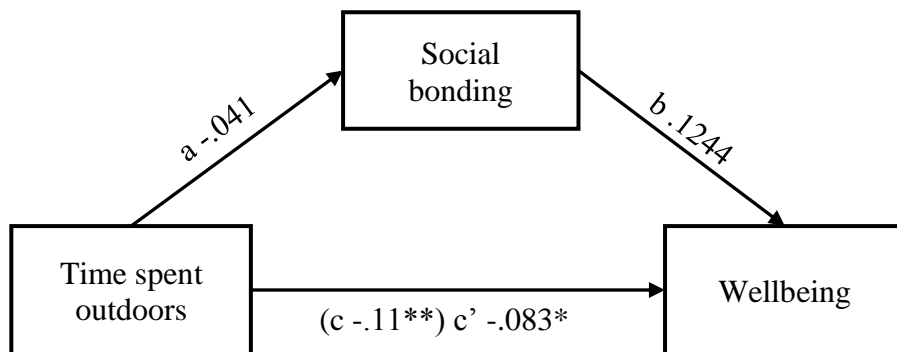


Figure 6. The mediating effect of *social bonding* on the time spent outdoors wellbeing relationship



Chapter 5  
**The Opening from the Woods**  
**Discussion**

The core constructs of place attachment, place bonding, and nature relatedness were examined for their relationship and potential role in influencing the time spent outdoors wellbeing relationship. Their potential roles were grounded in research using the biophilia hypothesis as the foundation for selecting constructs with associations that should exist within the time spent outdoors- wellbeing relationship. The results show that age, education levels, and length of time spent outdoors were all significant factors for wellbeing. Surprisingly, time spent outdoors had a negative association with wellbeing, and as noted earlier, this variable was measured on a 6-point ordinal scale, which might not have been substantial enough to measure this concept. However, the results for length of time spent outdoors and motivation are both consistent with the literature. Time spent outdoors has been found connected to wellbeing as well as predict physical activity levels which then provide physical and mental wellbeing benefits (Beyer et al., 2016; Cox et al., 2017; Korpela et al., 2014).

Motivation in this study was originally considered as a control variable to discover if it served to mask any of the significant effects potentially attributable nature relatedness, place bonding, and place attachment for their in the relationship between time spent outdoors and wellbeing. Drawing from the research using the recreation experience preference scale developed by Manfredi, Driver and Tarrant (1996), recreational pursuits are behaviours which aim to satisfy psychological and physical needs and are intended to measure which psychological goal states and what leisure activities lead to these goal states desired by recreationists. The role of motivation as a significant factor related to wellbeing has been examined extensively in the literature on leisure and motivations, self-determination theories, theory of planned behaviour in leisure contexts, and leisure constraint theory (Kleiber, Walker, & Mannell, 2011). Therefore,

given the extensive literature demonstrating the clear connections in the development of the place and nature relatedness constructs – as well as the strong correlations among the motives the constructs and their various dimensions – motivation was not included in the subsequent analyses. Further, by holding motivation back from these analyses, we get a clearer picture of the contribution of and mediating effect of the core constructs to wellbeing.

The core constructs of place attachment and place bonding were not significant factors when it came to gains in overall wellbeing from spending time outside. Nature relatedness fell just short of being significantly correlated with wellbeing ( $r = 0.069$ ,  $p = 0.069$ ), but was a significant mediator ( $p = 0.013$ ) in the relationship between time spent on the trail and wellbeing. Interestingly, time spent on the trail was negative related to wellbeing in the mediation analysis, albeit weakly Nisbet and colleagues' (2011) research on nature relatedness as a contributor to subjective wellbeing provided additional insight as to why, while the relationship was significant, time spent outdoors was still negative in this instance (see Table 16). The authors noted that egocentric concerns could be at play in the resulting levels. In their work, significant results for nature relatedness were not observed until other environmental scales were used and controlled for in analyses, and they theorized that lower life satisfaction could result from seeing the planet as threatened and in poor health (Nisbet et al., 2011). Similarly, Cleary and colleagues (2017) suggested other conditions that may be required to achieve meaningful wellbeing outcomes. They noted that mindfulness as well as ability to perceive nature's beauty – commonly measured using the engagement with natural beauty scale – appear to be requirements for high connectedness with nature and the health benefits related to time spent outdoors in western and Asian cultures. Since the lone NR-6 scale was used in this research, it is possible that other environmental scales which test environmental worldviews and values would have resulted in different findings as these outlooks and beliefs could be masking the potentially significant effects in mediation analyses. Place familiarity may have also played a limiting factor in this

study. Given the sample and characteristics of their uses of trails, their visited locations could have diminished rather than inspired wellbeing during their on-site experience.

The lack of a significant effect attributable to place attachment is also somewhat congruent with the literature indicating motivation and its dimensions are often predictive or influential of place attachment dimensions (Kyle, Mowen & Tarrant, 2004; Warzecha & Lime, 2001). In testing of the regression and mediation models with and without motivation as a control, dimensions of place attachment did produce significant outcomes further confirming the confounding role motivation plays. Social bonding was significant in both regression ( $p = 0.045$ ) and mediation ( $p = 0.038$ ) analyses without motivation as a control and affective attachment was almost significant in mediation analyses ( $p = 0.056$ ). Further, the additional dimensions associated with place bonding share two dimensions with place attachment: place identity and place dependence, but these, too, were not significant as mediators. Place bonding as an assessment separate from place attachment is largely absent from the literature, which creates limitations in understanding or suggesting why it had no influence on wellbeing in this study. Scannell and Gifford (2017) do note, however, one gap in the research that may serve as a starting point for explaining both place attachment and place bonding's lack of association with wellbeing. They note that there is little research on the psychological mechanisms that drive the research that could show how place attachment is related to greater wellbeing or if and how the place attachment dimensions fill specific niches that result in wellbeing outcomes. Similar to nature relatedness, psychological scales that assess personality and behaviour may be masking the effects that place attachment has on wellbeing (Cleary et al., 2017; Moulay et al., in press). As an overall construct, place attachment was shown to be directly correlated with wellbeing, but when controlling for demographic characteristics its association was reduced.

Lastly, this research was situated in E.O. Wilson's biophilia hypothesis, which was considered the most reasonable framework to use as a starting point to identify factors at play

that could identify the mechanisms that explained the relationship between the time spent outdoors and wellbeing. One of the main assertions of this theory is that in humans' search for a fulfilling life, one's connection with nature is a dominant driver, and without this connection, negative outcomes could occur (Kellert & Wilson, 1993). Therefore, the notion that the environment and how a person connects to the environment, as seen in the nine biophilia values, should have resulted in a meaningful connection between nature relatedness and place attachment. However, while nature relatedness showed significant interactions, when considering the place constructs – given the results and potential explanations for the outcomes of this research – the biophilia hypothesis may have to be reconsidered and reshaped as a possible conceptual framework. The results of this research provided some support the biophilia hypothesis as the main underpinning of wellbeing accruing from time spent outdoors. However, authors have had disagreements with applying this theory to modern day situations, because its premise lies in evolutionary biology, and hence, there is a lack of evidence linking the theory through generations of humans to present day societal behaviour. The inability to track biophilia over time makes its underpinning weak and largely ignored in scientific and psychological circles (Sampson, 2012). Further, several authors note that the theory does not account for any individual (personality) or cultural variations (ethnicity or specialized groups). In the case of this research, trail users may hold additional values more strongly than others, while other values may be nonexistent for this group; however, because no comparisons are made between groups of people and the theory applies to humans broadly, understanding these assumptions is not possible (Beery et al., 2015; Cleary et al., 2017).

As evidenced in some of the critiques on nature relatedness and place attachment above, a theoretical underpinning which included considerations of motivations, values or personality, such as theory of planned behaviours or self-determination theory may have been an alternative conceptualization worthy of exploration. Additionally, including supplementary scales to

uncover masking effects of variables not considered at the outset may have influenced the final results due to the specialized nature of the sample. Finally, while the above point stands, biophilia hypothesis may still be suitable for future research with a more varied sample and different measurement strategies.

## **Conclusion**

The intent of this research was to gain a deeper understanding of how connections and engagement with nature elicit wellbeing beyond one's mere presence outside, and further, how place constructs influence their experience outside from past and present engagement with nature. The results show that the core constructs of place attachment and place bonding do not provide any further insights beyond other factors that drive the time spent outdoors- wellbeing relationship. However, nature relatedness did provide further insights into the relationship alongside dimensions of social bonding and affective attachment from within place attachment. While the discussion above notes that masking effects could be at play due to users having additional environmental world views and values influencing their levels of nature relatedness, additional explanations could be offered by reflecting on the demographic profile and the sampling that led to the final sample.

Two limitations of this study to exposing the intricacies of the time spent outdoors- wellbeing relationship include the lack of a diversity of trail users who comprised the sample and the impacts of data collection. The majority of respondents were users of the back-country Bruce Trail network, while few were general trail users of front-country trails like those found predominantly in conservation areas, provincial, or federal parks, or even urban areas. These users can be considered back-country day-users as the results show that the dominant length of time spent outdoors was 2 to 3 hours. Previous research on recreation specialization noted that there are differences in environment attitudes, behaviours, and preferences of highly experienced

and novice recreational users within a variety of recreational settings (Viriden & Schreyer, 1998). Specialization can be seen on a continuum of general to specific as reflected by one's experience, skills, equipment used, and value orientation, and as specialization increases so does the need for resources dependency which concedes that the degree of specialization be related to preferred recreation settings for groups of recreationists (Viriden & Schreyer, 1998). With this in mind, Bruce Trail users might be more specialized trail users, who participate in hiking on specialized trails (e.g., wild, not curated, not paved) with varied terrain ranging from easy to moderate to expert skill level for hiking. Additionally, the level of the trail may require significantly higher health and fitness levels than the average front-country trail user. Differences in environmental attitudes can be seen in the comparatively high scores and little variation among the trail users on nature relatedness ( $M = 4.24$ ,  $SD = 0.63$ ). Essentially, there might not have been sufficient variation in the types of trail users comprising to the sample to tease out the effects of the core constructs on their relationships to wellbeing.

Additionally, on the point of health and fitness, among the dimensions of motivation, health was a highly-rated motive averaging 4.32 on a 5-point scale ( $SD = 0.61$ ), again displaying little variation in the overall sample. The motivation for health and high levels of nature relatedness may exist solely because this is a group of specialized recreationists. Their nature relatedness was a significant influence in the time spent-outdoors wellbeing relationship, but this could also be because of their homogeneity in their specialized preference for a specific outdoor resource leading to different outlooks values and engagement with nature. Furthermore, for varying lengths of time spent on trails, the motives to learn, socialize, and be active were significant, which is consistent with their level of specialization and the significant relationships seen for motivation with wellbeing. These back-country hikers may have specialized needs for learning routes, hiking in groups of similar skill sets, and goal-oriented mindset of completing



trails. Specialization might indeed be a compelling factor interfering with other factors related to place were not significant influencers in the time spent outdoors-wellbeing relationship.

Lastly, the data collection process revealed two points of interest. First, with respect to seasonality, data collection took place in the winter months of January and February and therefore the survey asked about not about their current visit to the trails, but their most recent experience. For some survey participants, their most recent experience might have occurred four to five months earlier in the summer months of July, August or later in the fall. Recalling their experiences from the past instead of more recent impressions may have played a role in the accuracy of their answers.

Second, the questionnaire generated results that evoke some reflection on the possibility of a state versus trait consideration. The entirety of the survey, with the exception of how wellbeing was measured, asked about an experience at one point in time – the users most recent visit to a trail. However, wellbeing was measured using a 10-point life satisfaction scale, which is a global assessment of one’s subjective wellbeing and has typically been regarded as a trait characteristic, and less likely to “move” following a particular trail experience.

Finally, when considering the measures used for place attachment and place bonding, which are based on approaches frequently used by other researchers, attention must be given to the contexts in which these other studies were based. This research focussed on every-day, accessible, familiar, and local places to the people comprising the sample. However, measures for place attachment and place bonding have frequently been used independently, and typically not considered together in a single scale. As depicted earlier in Figure 1, the constructs are separate, but share the dimensions of place identity and dependence; however, it remains unclear whether the way in which they have been conceptualized translates seamlessly into equivalent measures. For example, place bonding is regarded as generating a deeper understanding of pre-existing place attachment concepts. Further, the development of the place-related constructs and

the subsequent research using them has been based important, attraction-based places, large tourist destinations such as the Pacific Crest Trail, Appalachian Trails, major canyons, and river systems for fishing and canoeing, and other significant major destinations. Consequently, the wording used in the statements in these scales might not be as relevant when considering local, possibly more mundane, but frequently visited locations in one's everyday surroundings. These are places that do not require significant time away to visit or hike and are not generally regarded as major attractions. The idea of reconceptualizing place attachment and place bonding and developing measures that use wording that are about less specialized, niche experiences may be pertinent when considering place-specific studies that are community or regional based.

Future research should be completed in order to gain a more holistic insight into possible factors at play driving the time spent outdoors-wellbeing relationship beyond mere presence in nature. Capturing a broader sample of varied skill levels for analysis should be the starting point. The sample captured in this research did not consist of a diverse enough sample of trail users of varying degrees of specialization and experience to reflect meaningful differences among groups. Capturing a sample that has a much more varied frequency of visiting outdoor trails might help capture more diverse experiences that possibly influence the degree to which place attachment and nature relatedness levels contribute to wellbeing outcomes. Additionally, assessing trail users with less commitment given to trail use (e.g., not travelling more than short distances to reach their destination) may also provide better insight to the effects that nature relatedness plays because such users are not going out of their way to travel to a wilder destination. This sample could include day-use, front-country users in conservation areas, provincial and federal parks, or a comparison to first-time trail users where motivations and specializations are not yet formed.

## References

### I Didn't Pull This Out of Thin Air

- Alessi, E.J., & Martine, J.I. (2010). Conducting an internet-based survey: Benefits, pitfalls, and lessons learned. *Social Work Research, 34*(2), 122-128.
- Anand, P. (2016). *Happiness, well-being and human development: The case for subjective measures*. UNDP Human Development Report.
- Beery, T., Jönsson, K.I., & Elmberg, J. (2015). From environmental connectedness to sustainable futures: Topophilia and human affiliation with nature. *Sustainability, 7*, 8837-8854.
- Beery, T.H., & Wolf-Watz, D. (2014). Nature to place: Rethinking the environmental connectedness perspective. *Journal of Environmental Psychology, 40*, 198-205.
- Beyer, K.M.M., Szabo, A., Hoormann, K., & Stolley, M. (2018). Time spent outdoors, activity levels, and chronic disease among American adults. *Journal of Behavioral Medicine, 41*, 494-503.
- Beyer, K.M.M., Szabo, A., & Nattinger, A.B., (2016). Time spent outdoors, depressive symptoms and variation by race and ethnicity. *American Journal of Preventative Medicine, 51*(3), 281-290.
- Canadian Index of Wellbeing. (2016). *How are Canadians really doing? The 2016 CIW national report*. Waterloo, ON: The Canadian Index of Wellbeing and University of Waterloo.
- Capaldi, C.A., Passmore, H., Nisbet, E.K., Zelenski, J.M., & Dopko, R.L. (2015). Flourishing in nature: A review of the benefits of connecting with nature and its applications as a wellbeing intervention. *International Journal of Wellbeing, 5*(4), 1-16.
- Capaldi, C.A., Dopko, R.L., & Zelenski, J.M. (2014). The relationship between nature connectedness and happiness: A meta-analysis. *Frontiers in Psychology, 5*, 976.

- Cervinka, R., Röderer, K., & Hefler, E. (2011). Are nature lovers happy? On various indicators of wellbeing and connectedness with nature. *Journal of Health Psychology, 17*(3), 379-388.
- Chen, H., & Tu, H. (2013). Understanding biophilia leisure as facilitating wellbeing and the environment: An examination of participants' attitudes toward horticulture activity. *Leisure Sciences, 35*, 301-319.
- Cheng, C., & Chou, S. (2015). The influence of place change on place bonding: A longitudinal panel study of renovated park users. *Leisure Sciences, 37*, 391-414.
- Cleary, A., Fielding, K.S., Bell, S.L., Murray, Z., & Roiko, A. (2017). Exploring potential mechanisms involved in the relationship between eudaimonic wellbeing and nature connection. *Landscape and Urban Planning, 158*, 119-128.
- Conservation Ontario. (2018). *Find a conservation authority, interactive map*. Accessed at: <http://conservationontario.ca/conservation-authorities/find-a-conservation-authority/>.
- Coon, J.T., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M.H., (2011). Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review. *Environmental Science and Technology, 45*, 1761-1772.
- Cox, D.T., Shanahan, D.F., Hudson, H.L., Fuller, R.A., Anderson, K., Hancock, S., & Gaston, K.J. (2017). Doses of nearby nature simultaneously associated with multiple health benefits. *International Journal of Environmental Research and Public Health, 14*, 172.
- Cresswell, T. (2004). *Place: A short introduction*. Malden, MA: Blackwell Publishing.
- Crotty, M. (1998). *The foundations of social research; meaning and perspective in the research process*. Thousand Oaks, CA: SAGE Publications.

- Dean, J.H., Shanahan, D.F., Bush, R., Gaston, K.J., Lin, B.B., Barber, E., Franco, L., & Fuller, R.A. (2018). Is nature relatedness associated with better mental and physical health? *International Journal of Environmental Research and Public Health*, *15*,1371, 1-18.
- Diener, E. (2000). Subjective wellbeing: The science of happiness and a proposal for a national index. *American Psychologist*, *55*(1), 34-43.
- Diener, E., & Ryan, K. (2009). Subjective wellbeing: A general overview. *South African Journal of Psychology*, *39*(4), 391-406.
- Doherty, S.T., Lemieux, C.J., & Canally, C. (2014). Tracking human activity and wellbeing in natural environments using wearable sensors and experience sampling. *Social Science and Medicine*, *106*, 83-92.
- Gill, D.L., & Bedini, L.A. (2010). Health, wellness and quality of life- accent the positive. In Payne, L., Ainsworth, B., & Godbey, G. (Eds.), *Leisure, health and wellness: Making the connections* (pp. 11-20). State College, PA: Venture Publishing, Inc.
- Grinde, B., & Patil, G.G. (2009). Biophilia: Does visual contact with nature impact on health and wellbeing? *International Journal of Environmental Research and Public Health*, *6*, 2332-2343.
- Hammit, W.E., Backlund, E.A., & Bixler, R.D. (2006). Place bonding for recreation places: conceptual and empirical development. *Leisure Studies*, *25*(1), 17-41.
- Heintzman, P., & Coleman, K.M. (2010). Leisure and spiritual health. In Payne, L., Ainsworth, B., & Godbey, G. (Eds.), *Leisure, health and wellness: Making the connections* (pp. 71-84). State College, PA: Venture Publishing, Inc.
- Henderson, K.A. (2011). Post-positivist and the pragmatics of leisure research. *Leisure Sciences*, *33*, 341- 346.

- Howell, A.J., Passmore, H., & Buro, K. (2013). Meaning in nature: Meaning in life as a mediator of the relationship between nature connectedness and wellbeing. *Journal of Happiness Studies, 14*, 1681-1696.
- Hummon, D.M. (1992). Community attachment: local sentiment and sense of place. In Altman, I. & Low, S.M. (Eds.), *Human behaviour and environment: Advances in theory and research; place attachment* (Vol 12., pp. 253-276). New York, NY: Plenum Press.
- Kamitsis, I., & Francis, A.J.P. (2013). Spirituality mediates the relationship between engagement with nature and psychological wellbeing. *Journal of Environmental Psychology, 36*, 136-143.
- Kellert, S.R., & Wilson, E.O. (1993). *The Biophilia Hypothesis*. Washington, DC: Island University Press.
- Keniger, L.E., Gaston, K.J., Irvine, K.N., & Fuller, R.A. (2013). What are the benefits of interacting with nature? *International Journal of Environment Research and Public Health, 10*, 913-935.
- Kim, H., Lee, S., Uysal, M., Kim, J., & Ahn, K. (2015). Nature- based tourism: Motivation and subjective well-being. *Journal of Travel and Tourism Marketing, 32*, S76-S96.
- Kleiber, D.A., Walker, G.A., Mannell, R.C. (2011). *A social psychology of leisure* (2nd ed.). State College, PA: Venture Publishing, Inc.
- Korpela, K., Bourdain, K., Neuvonen, M., Paronon, O., & Tyrväinen, L. (2014). Analyzing the mediators between nature-based outdoor recreation and emotional well-being. *Journal of Environmental Psychology, 37*, 1-7.
- Kyle, G., Graefe, A., & Manning, R. (2003/2004). Satisfaction derived through leisure involvement and setting attachment. *Leisure/Loisir, 28(3-4)*, 277-306.
- Kyle, G., Bricker, K., Graefe, A., & Wickham, T. (2004). An examination of recreationists' relationships with activities and settings. *Leisure Sciences, 26*, 123-142.

- Kyle, G., Graefe, A., Manning, R., & Bacon, J. (2004). Effect of activity involvement and place attachment on recreationists' perceptions of setting density. *Journal of Leisure Research*, 36(2), 209-231.
- Kyle, G.T., Mowen, A.J., & Tarrant, M. (2004). Linking place preferences with place meaning: An examination of the relationship between place motivation and place attachment. *Journal of Environmental Psychology*, 24, 439-454.
- Kyle, G., Graefe, A., & Manning, R. (2005). Testing the dimensionality of place attachment in recreational settings. *Environment and Behaviour*, 37(2), 153-177.
- Lawton, E., Brymer, E., Cough, P., & Denovan, A. (2017). The relationship between the physical activity environment, nature relatedness, anxiety, and the psychological well-being benefits of regular exercisers. *Frontiers in Psychology*, 8:1058.
- Lee, S.A., Manthiou, A., Chiang, L., & Tang, L.R. (2018). An assessment of value dimensions in hiking tourism: Pathways toward quality of life. *International Journal of Tourism Research*, 20,1-11.
- Low, S.M., & Altman, I. (1992). Place attachment: A conceptual inquiry. In Altman, I. & Low, S.M. (Eds.), *Human behaviour and environment: advances in theory and research; place attachment* (Vol 12., pp.1-12). New York, NY: Plenum Press.
- Lumber, R., Richardson, M., & Sheffield, D. (2017). Beyond knowing nature: Contact, emotion, compassion, meaning, and beauty are pathways to nature connection. *PLoS ONE*, 12(5), e0177186.
- Manfredo, M.J., Driver, B.L., & Tarrant, M.A. (1996). Measuring leisure motivation: A meta-analysis of the recreation experience preference scale. *Journal of Leisure Research*, 28(3), 188-213.
- Manning, R.E. (2011). *Studies in outdoor recreation: Search and research for satisfaction* (3rd ed.). Corvallis, OR: Oregon State University Press.

- Marcus, C.C. (1992). Environmental memories. In Altman, I. & Low, S.M. (Eds.), *Human behaviour and environment: Advances in theory and research; place attachment* (Vol 12., pp. 87-112). New York, NY: Plenum Press.
- Martyn, P., & Brymer, E. (2016). The relationship between nature relatedness and anxiety. *Journal of Health Psychology, 21*(7), 1436-1445.
- Mcintosh, D., & Wright, P.A. (2017). Emotional processing as an important part of the wildlife viewing experience. *Journal of Outdoor Recreation Tourism, 18*, 1-9.
- Michalos, A.C., Smale, B., Labonté, R., Muharjarine, N., Scott, K., Moore, K., Swystun, L., Holden, B., Bernardin, H., Dunning, B., Graham, P., Guhn, M., Gadermann, A.M., Zumbo, B.D., Morgan, A., Brooker, A.-S., & Hyman, I. (2011). *The Canadian Index of Wellbeing*. Technical Report 1.0. Waterloo, ON: Canadian Index of Wellbeing and University of Waterloo.
- Mitten, D., Overholt, J.R., Haynes, F.I., D'Amore, C.C., & Ady, J.C. (2016). Hiking: A low cost, accessible intervention to promote health benefits. *American Journal of Lifestyle Medicine, 12*(4), 302-310.
- Mock, S.E., Havitz, M.E., Lemieux, C.J., Flannery, P.D., Eagles, P.F.J., & Doherty, S.T. (2016). The contributions of parks commitment and motivations to well-being. *Journal of Park and Recreation Administration, 34*(3), 83-98.
- Moulay, A., Ujang, N., Maulan, S. & Ismail, S. (in press). Understanding the process of parks' attachment: interrelation between place attachment, behavioural tendencies, and the use of public place. *City, Culture and Society*.
- Mowen, A.J., & Rung, A.L. (2010). The effect of leisure environments on dimensions of health and wellness. In Payne, L., Ainsworth, B., & Godbey, G. (Eds.), *Leisure, health and wellness: Making the connections*. (pp. 109-120). State College, PA: Venture Publishing, Inc.



- Nisbet, E.K., Zelenski, J.M., & Murphy, S.A. (2009). The nature relatedness scale: Linking individual's connection with nature to environmental concern and behaviour. *Environment and Behaviour*, 41(5), 715-740.
- Nisbet, E.K., Zelenski, J.M., & Murphy, S.A. (2011). Happiness in our nature: Exploring nature relatedness as a contributor of subjective wellbeing. *Journal of Happiness Studies*, 12, 303-322.
- Nisbet, E.K., & Zelenski J.M. (2013). The NR-6: A new brief measure of nature relatedness. *Frontiers in Psychology*, 4, 813.
- Office of Research Ethics. (2018). Guide to completing a human research ethics application (Form 101). Retrieved from: <https://uwaterloo.ca/research/office-research-ethics/research-human-participants/application-process/guide-completing-human-research-ethics-application-form-101#Risks>
- OECD. (2013). *OECD guidelines on measuring subjective well-being*. OECD Better Life Initiative. Paris: OECD Publishing.
- Perkins, H.E. (2010). Measuring love and care for nature. *Journal of Environmental Psychology*, 30, 55-463.
- Perrin, J.L. (2018). Recognizing connection to nature: Perspectives from the field. *Applied Environmental Education and Communication*, 17(1), 3-13.
- Proshansky, H.M. (1978). The city and self-identity. *Environment and Behaviour*, 10(2), 147-169.
- Puhakka, R., Pitkänen, K., & Siikamäki, P. (2017). The health and well-being impacts of protected areas in Finland. *Journal of Sustainable Tourism*, 25(12), 1830-1847.
- Ramkissoon, H., Smith, L.D.G., & Kneebone, S. (2014). Visitor satisfaction and place attachment in national parks. *Tourism Analysis*, 19, 287-300.

- Raymond, C.M., Brown, G., & Weber, D. (2010). The measurement of place attachment: Personal, community and environmental connections. *Journal of Environmental Psychology, 30*, 422-434.
- Romagosa, F., Eagles, P.F.J., & Lemieux, C.J. (2015). From the inside out to the outside in: Exploring the role of parks and protected areas as providers of human health and wellbeing. *Journal of Outdoor Recreation and Tourism, 10*, 70-77.
- Ryan, A.B. (2006). Post-positivist approaches to research. In Antonesa, M., Fallon, A.B., Ryan, A. & Walsh, T. Eds.), *Researching and writing your thesis: A guide for post-graduate students* (pp. 12-26). Maynooth, IE: MACE, Maynooth Adult and Community Education.
- Ryff, C.D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069-1081.
- Sampson, S.D. (2012). The topophilia hypothesis. In Kahn, P.H., & Hasbach, P.H. (Eds.), *Ecopsychology: Science, totems and the technological species* (pp. 23-53). Cambridge, MA: The MIT Press.
- Scannell, L., & Gifford, R. (2017). Place attachment enhances psychological need satisfaction. *Environment and Behaviour, 49*(4), 359-389.
- Tuan, Y.F. (1974). *Topophilia: A study of environmental perception, attitudes and values*. New York, NY: Columbia University Press.
- Tuan, Y.F. (1977). *Space and place: The perspective of experience*. St. Paul, MN: University of Minneapolis Press.
- Virden, R.J., & Schreyer, R. (1988). Recreation specialization as an indicator of environmental preference. *Environment and Behaviour, 20*(6), 721-739.

- Warzecha, C.A. & Lime, D.W. (2001). Place attachment in canyonlands national park: Visitors' assessment of setting and attributes on the Colorado and Green rivers. *Journal of Park and Recreation Administration*, 19(1), 59-78.
- Whitehead, L.C. (2007). Methodological and ethical issues in internet-mediated research in the field of health: An integrated review of the literature. *Social Science & Medicine*, 65, 782-791.
- Williams, D.R., & Vaske, J.J. (2003). The measurement of place attachment: validity and generalizability of a psychometric approach. *Forest Science*, 49(6), 830-840.
- Wilson, E.O. (1984). *Biophilia*. Cambridge, MC: Harvard University Press.
- Wolf, I.D., & Wohlfart, T. (2014). Walking, hiking and running in parks: A multidisciplinary assessment of health and wellbeing benefits. *Landscape and Urban Planning*, 130, 89-103.
- World Health Organization. (1989). *Constitution*. Geneva: World Health Organization. 18 p.  
<http://www.who.int/iris/handle/10665/36851>.
- World Health Organization. (2018). *About WHO: Constitution of WHO: Principles*. Accessed at:  
<http://www.who.int/about/mission/en/>.
- Zelenski, J.M., & Nisbet, E.K. (2014). Happiness and feeling connected: The distinct role of nature relatedness. *Environment and Behaviour*, 46(1), 3-23.

## Appendices

## Appendix A. Sample Newsletter Insert Inviting Trail Users to Participate in the Survey

### How being in nature affects our wellbeing

Do you sometimes think about how being in nature raises your wellbeing? Do you think your use of the trails is a reason?



Rebecca Koroll, a graduate student in the Department of Recreation and Leisure Studies at the University of Waterloo, is interested in answering these questions and also knowing more about your experience from using the trails. With the encouragement of the Conservation Areas and the Canadian Index of Wellbeing, what she discovers could provide them with information that might help improve programs and services, and could increase users' commitment to environmental conservation.

To find out, Rebecca is conducting a survey of trail users and would really appreciate your help. She is asking about trail users' experiences, why they use the trails, how strongly connected they are to nature and the trails, and what characterizes users' trail use, like how often they visit and how long they stay.

To learn more about Rebecca's study and participate in her online survey, which will only take about 10 minutes and is completely anonymous, please go to this website – [www.ciw.ca/TrailUserSurvey](http://www.ciw.ca/TrailUserSurvey). If you have any questions, you can contact Rebecca directly by email at [rkoroll@uwaterloo.ca](mailto:rkoroll@uwaterloo.ca).

To take the survey, go to: [www.ciw.ca/TrailUserSurvey](http://www.ciw.ca/TrailUserSurvey)

## Appendix B – Information Letter on Website

### The relationship between engagement with nature and wellbeing

Thank you for your interest in participating in this study on the relationship between engagement with nature and wellbeing. There is considerable evidence that time spent in nature is related to the wellbeing benefits that people receive, but we are not entirely sure how or why. Your participation in this study will help us to discover what aspects of your time and experience in nature contribute to your overall wellbeing and how. I greatly appreciate your participation!

The survey will take you only about 10 to 15 minutes to complete. The questionnaire asks you about how long you have been on the trail during your most recent visit and what your experience was like. There are questions that ask you to rate how much you agree with statements like, “The trails in this area mean a lot to me” and “I get more satisfaction from visiting the trails in this area than from any other”. There are also some general questions about your time on the trail, such as how long you spent on the trail during your most recent visit and some questions about yourself, such as age, sex, and education. To show our appreciation for your participation in the survey, you will have an opportunity to voluntarily enter a draw to be eligible for one of three gift cards to Mountain Equipment Coop worth \$25 each when you get to the end of the online questionnaire.

Your participation in this study is *entirely voluntary*. You may decline to answer any questions you prefer not to answer by leaving them blank. Further, you may decide to end your participation in the survey at any time by advising the researcher or by closing your browser during the online survey. Consent cannot be withdrawn after submitting your questionnaire because your personal information will not be linked to your survey responses. Your participation is *entirely confidential* and no identifying information will ever be linked to any of the data you provide. If you choose to enter the draw, your entry will be kept in a separate electronic file and never associated with your responses. When information is transmitted over the internet, privacy cannot be guaranteed. There is always a risk your responses may be intercepted by a third party (e.g., government agencies, hackers). University of Waterloo researchers will not collect or use internet protocol (IP) addresses or other information which could link your participation to your computer or electronic device without first informing you.

All of the data collected will be stored for a minimum of 10 years on a password protected computer and in a locked office at the offices of the Canadian Index of Wellbeing at the University of Waterloo. Your identity will never be linked to the dataset. Please answer all of the questions just as you feel – there are no “correct” or “wrong” answers. All of the data from everyone who participates will be combined and analyzed together, so all of the findings will be reported in general and will not identify individuals. Additional protections and rights are described in the “Consent and Release” form, available [HERE](#).

This project has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE #40285). If you have any questions for the Committee, please contact the Office of Research Ethics, at (519) 888-4567, ext. 36005, or by e-mail at [ore-ceo@uwaterloo.ca](mailto:ore-ceo@uwaterloo.ca).

If you have any questions about the survey or would like to receive a summary of the results, please feel free to contact me by email at [rkoroll@uwaterloo.ca](mailto:rkoroll@uwaterloo.ca). If you wish, you can also contact my supervisor, Dr. Bryan Smale, at [smale@uwaterloo.ca](mailto:smale@uwaterloo.ca). Thank you again for considering participation in our study about engagement with nature and wellbeing!

[Start SURVEY](#)

Rebecca Koroll  
Master’s candidate  
University of Waterloo  
Waterloo, Ontario, Canada

Bryan Smale, Ph.D.  
Professor and Supervisor  
University of Waterloo  
Waterloo, Ontario, Canada

## Appendix C – Consent Form

### CONSENT and RELEASE

#### **Trail User Survey: The relationship between engagement with nature and wellbeing**

I confirm that I have read the information linked to this consent and release form and understand the proposed uses of my information. I understand that I may restrict/remove my information from the database prior to submitting the survey by contacting Rebecca Koroll at [rkoroll@uwaterloo.ca](mailto:rkoroll@uwaterloo.ca), or her supervisor, Dr. Bryan Smale at [smale@uwaterloo.ca](mailto:smale@uwaterloo.ca), at the University of Waterloo.

By filling in your responses and submitting the survey back to the researcher, you indicate with full knowledge of all foregoing, your implied consent to participate in this research study. If you do not wish to participate, please do not fill out the survey. If you have any questions or require additional information to assist you in reaching a decision about participation, please feel free to ask the researcher at any time. You may also contact the faculty supervisor. By providing your consent, you are not waiving your legal rights or releasing the investigator(s) or involved institution(s) from their legal and professional responsibilities.

- I agree to participate (you will now be directed back to the information letter).

## Connections between Time Spent Outdoors and Wellbeing

This study is about how our experiences in the natural environment, and particularly for people who use the trails, contribute to our wellbeing and in what ways. So, as you complete this questionnaire, we would like you to think about your most recent visit to a trail (e.g., one of the Conservation areas, the Bruce Trail).

1. Which area did you use on *your most recent visit*?

- Bruce Trail (go to question 3)
  - Halton Conservation Area
  - Lower Thames Valley Conservation Area
  - Ausable Bayfield Conservation Area
  - Kettle Creek Conservation Area
  - Nottawasaga Valley Conservation Area
  - Other. Please specify: \_\_\_\_\_
- } (go to question 2)

2. If you visited a Conservation Area, which of parks did you go to on *your most recent visit*?

- |  |  |
|--|--|
| <input type="radio"/> Fanshawe           | <input type="radio"/> Hilton Falls       |
| <input type="radio"/> Wildwood           | <input type="radio"/> Mount Nemo         |
| <input type="radio"/> Morrison Glen      | <input type="radio"/> Mountsberg         |
| <input type="radio"/> Rock Glen          | <input type="radio"/> Rattlesnake Point  |
| <input type="radio"/> Dalewood Reservoir | <input type="radio"/> Nottawasaga Bluffs |
| <input type="radio"/> Lake Whittaker     | <input type="radio"/> Petun              |
| <input type="radio"/> Crawford Lake      | <input type="radio"/> Tiffin             |
- Other. Please specify: \_\_\_\_\_

3. *When* was your most recent visit to the area?

Day: \_\_\_\_\_ Month: \_\_\_\_\_ Year: \_\_\_\_\_

## Your Relationship to the Natural Environment

Thinking back on your most recent visit, the questions that follow ask about characteristics of your relationship with the natural environment on the trails you have most recently visited. Please indicate to what extent you agree with each of the statements by checking the circles that best describe how you feel.



<b>“Thinking about my most recent trail visit...”</b>	<b>Strongly Disagree</b> ↓	<b>Disagree</b> ↓	<b>Neutral</b> ↓	<b>Agree</b> ↓	<b>Strongly Agree</b> ↓
I have made many memories of hiking on this trail .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have hiked this trail many times and am quite familiar with it.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My relationship to nature is an important part of who I am .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The trails in this area mean a lot to me .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a strong sense of belonging to the trails in this area.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I rarely if ever hike in any other place than this area.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hiking in this area is more important than hiking in any other place.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many of my friends/family prefer this area over the others.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This area is like home to me .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the trails in this area are a part of me .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am fond of this area .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I could draw a rough map of this area .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel connected to this area.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am very attached to the trails in this area.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am in this area I feel a part of it.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This area makes me feel like no other place can ....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My connection to nature and the environment is a part of my spirituality .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy hiking the trails in this area more than any other trails.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hiking in this area is more important than hiking in any other place.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the trails in this area.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visiting the trails in this area says a lot about who I am.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My ideal vacation spot would be a remote, wilderness area .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take notice of wildlife wherever I am.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know this area like the back of my hand .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
“Thinking about my most recent trail visit...”	↓	↓	↓	↓	↓
I wouldn't substitute any other trail for the type of recreation I do here .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I belong at this area.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My relationship to nature is an important part of who I am .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction from visiting the trails in this area than from any other.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I were to stop visiting this area, I would lose contact with a number of friends.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have little, if any, emotional attachment to this area and its trails.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

There are many reasons people use trails, some of which are listed below. For each of the following statements, please indicate the extent to which you agree by checking the circle that best describes your reasons for using the trails in this area.

“Thinking about this area and trails, I visit this area ...”	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	↓	↓	↓	↓	↓
to learn about the history of the area.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to learn about the natural history of the area.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to learn about the countryside .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to experience solitude .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to be on my own.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to think about my personal values .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to test my endurance.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to show others I can do it.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to take risks .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to be with members of my group .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to share my skill and knowledge with others .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to meet new people.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to help reduce built-up tension.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to relax physically.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
to get exercise.....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Finally, how satisfied are you with your life in general?

Very dissatisfied										Very satisfied
↓	2	3	4	5	6	7	8	9	↓	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Characteristics of Your Visit and Trail Use

To understand more about your time during your most recent visit to this area and your use of the trails, please answer each of the following questions about the characteristics of your visit.

If you visited a Conservation Area on your most recent visit, which of the following best describes the entry payment system?

- Easy                                       Confusing                                       Too much work

If you visited a Conservation Area on your most recent visit, how would you describe the entry fee price?

- Low     Moderate     High

What was the *main* reason for your time on the trail during your most recent visit?

- Recreation                                       Break from work  
 Commute to/from work                       Passing through/commuting to a destination

What was the *main* type of trail use you participated in during your most recent visit?

- Hiking     Cross-country skiing  
 Biking     Snowshoeing

Who were you with on your most recent visit to this area? (Check all that apply)

- Alone     With parents/children  
 With a partner                                       With colleagues/organized group  
 With friends/family

Approximately *how far* is your household to the area you visited most recently?

- 1 km or less                                       Between 5 and 10 kms  
 Between 1 and 2 kms                               More than 10 kms  
 Between 2 and 5 kms

In a typical month, how often would you visit this area?

- Almost daily
- About once a week
- Once every two weeks
- Once a month

Approximately *how long* do you stay during a typical visit to the area?

- Less than 30 minutes
- 30 minutes to 1 hour
- 1 to 2 hours
- 2 to 3 hours
- 3 to 4 hours
- More than 4 hours

How long have you been visiting this area?

- Less than 1 year
- 1 to 2 years
- 3 to 4 years
- 5 to 10 years
- 11 to 20 years
- More than 20 years

How did you first hear about this area?

- Word of mouth
  - From other users of the area
  - From an organization's newsletter
  - Through the media (e.g., newspaper, radio)
  - Through social media (e.g., Facebook)
  - Other. Please specify:
- 

Are you a member of any of the following types of groups or organizations? (Check all that apply)

- Voluntary environmental or conservation group
- Trail association
- Outdoor recreation club (e.g., hiking, biking, canoeing, kayaking)
- Running or hiking group
- Birders group

How many businesses near this area did you patronize before or after your most recent visit?

- None
- 1 business
- 2 or more businesses

Are there any amenities or services that you think should be provided in this area?

### Personal Characteristics

In this final section, we would like to know more about you so we can create groupings and see if people have different relationships with the natural environment and how that might affect their wellbeing.

What was your sex at birth? .....  Male  Female

What is your gender?.....  Male  Female  Or please specify: \_\_\_\_\_

What is your current age in years?..... \_\_\_\_\_ years of age

What is the highest level of education you have *completed*?

- |  |  |
|--|--|
| <input type="radio"/> Elementary school                                    | <input type="radio"/> College diploma                      |
| <input type="radio"/> High school  | <input type="radio"/> University degree (e.g., BA, BSc)    |
| <input type="radio"/> Post-secondary certificate, trade, or apprenticeship | <input type="radio"/> Graduate degree (e.g., MA, MSc, PhD) |

*Thank you for taking the time to complete the survey!*