



HUMAN HEALTH AND WELL-BEING MOTIVATIONS AND BENEFITS ASSOCIATED WITH PROTECTED AREA EXPERIENCES: AN OPPORTUNITY FOR TRANSFORMING POLICY AND MANAGEMENT IN CANADA

Christopher J. Lemieux¹, Paul F.J. Eagles^{1*}, D. Scott Slocombe², Sean T. Doherty², Susan J. Elliott³, and Steven E. Mock¹

* Corresponding Author, email: pfjeagles@uwaterloo.ca

¹ Department of Recreation and Leisure Studies, University of Waterloo, Waterloo, Ontario, Canada

² Department of Geography and Environmental Studies, Wilfrid Laurier University, Waterloo, Ontario, Canada

³ Faculty of Applied Health Sciences, University of Waterloo, Waterloo, Ontario, Canada

ABSTRACT

This paper reports the results of a study from two protected areas that identifies visitors' perceived health and well-being motives and benefits associated with visitation to, and experiences provided by, protected areas. First, the expected human health benefits received from visits, and in particular the anticipated improvements associated with psychological/emotional and social well-being, were perceived to be a major personal value in the preference and choice to visit protected areas. Second, the perceived benefits received from the experiences were substantial. Visiting protected areas can be considered a highly positive life experience, and the greatest well-being benefits were perceived to be psychological/emotional, social, cultural, and environmental. Finally, visitation to parks was perceived to have important benefits for child development, especially in terms of physical development, social knowledge and competency, and cognitive learning and language. Interestingly, the well-being benefits received from visits were often perceived to be greater by women than men, and especially with respect to several aspects of child development. These results suggest that the social capital housed within Canada's protected areas estate deserves consideration alongside ecological capital in policy and management programmes pertaining to conservation. Research is necessary to confirm if these findings are applicable more broadly.

INTRODUCTION

All levels of government in Canada, federal, provincial/territorial, and municipal, sponsor legislation, policies, and programmes for protected areas, including national and provincial parks, migratory bird sanctuaries, national wildlife areas, wilderness areas, conservation areas, ecological reserves, marine conservation areas, city parks, and many other designations. Canada's terrestrial protected areas at the provincial and national levels number more than 5,900, including approximately 97.5 million hectares and representing 9.6 per cent of Canada's total land base (CCEA, 2012).

In an era characterized by rapid socio-economic and environmental transformation, it will be increasingly important for protected area organizations to identify and implement programmes that are society-oriented,

and to develop outreach strategies that communicate this relevance to elected officials, key decision-makers, and the public. Even though protected areas make an important contribution to the conservation of biodiversity and maintenance and enhancement of ecological integrity, these areas also deliver essential ecosystem services, including the provision of clean air, clean water (see Costanza et al., 1997; Naidoo et al., 2008; Dudley et al., 2011), and spaces for human recreational use (Priskin & McCool, 2006; Stolton et al., 2010). An economic impact study conducted by the Canadian Parks Council (CPC), a consortium of federal, provincial and territorial protected areas' Ministers, revealed that the 43 million visitor days of activity provided by protected areas add over \$4.6 billion to Canada's Gross Domestic Product (CPC, 2010). The study also indicated that \$337.3 million (44 per cent of



Pinery Provincial Park, Ontario © Christopher Lemieux

the \$0.8 billion spent by national and provincial park agencies) was returned to three levels of government in taxes. Therefore, these areas are also of economic importance.

Research conducted primarily in the context of urban and suburban parks in developed countries suggests that the social benefits of parks and other forms of protected areas are substantial. A comprehensive literature review conducted to understand better how humans benefit from nature, carried out by Deakin University for Parks Victoria in Australia, indicated that humans are dependent on nature in a number of ways (Maller et al., 2008). The most obvious includes exposure to, and participation in, physical activities such as walking, hiking, cycling, swimming, canoeing and other outdoor activities. In turn, contact with nature, plants, animals, landscapes, and wilderness, offers a range of medical benefits to visitors, including: faster recovery from surgery (Ulrich et al., 1991) and better pain control (Diette et al., 2003), reductions and prevention of hypertension, enhanced ability to concentrate (Kuo, 2001) and lower self-reported stress (Kaplan & Kaplan, 1989; Kaplan, 1995; Lewis, 1996; Parsons et al., 1998; Frumkin, 2001). Children with attention and behavioural disorders have shown significant improvement after being in contact with nature (Frumkin, 2001). Research also suggests that exercise is more beneficial, leading to relief of anxiety and depression, when it occurs in natural settings like parks, rather than along urban streets (Hartig et al., 1991; Bodin & Hartig, 2003). Interestingly, it has been found that the psychological benefits of natural areas increase with an increase in biodiversity (Fuller et al., 2007).

Because these studies have largely focused on urban and suburban parks and none have been conducted within the context of Canadian provincial and national parks, a prominent gap within the literature exists. Furthermore, most studies focused primarily on the benefits associated with attention restoration and physical activity in natural environments, and ignored other aspects that affect both individual and collective health and well-being (e.g., social, cultural, economic, and intellectual well-being, see also Stolton & Dudley, 2010). Overall, Canada has fallen behind the U.S. (America's Great Outdoors Initiative, 2011), the U.K. (Pretty et al., 2009), and Australia (Maller et al., 2005) both in terms of understanding the relationships between nature, parks and protected areas, human health and well-being, and in the development of integrated public policy and education, interpretation, and outreach strategies. Indeed, understanding the impact of conservation initiatives on the human health and livelihoods of Canadians is one of Canada's "Top 40" research questions for conservation policy (Rudd et al., 2010).

Within Canada, conservation objectives inscribed in legislation and related policies on management remain primarily ecologically-focused [see Section 8(2) of the *Canada National Parks Act* (S.C.2000 c.32)] and administrators predominantly direct policy and state-of-the-park reporting on maximizing ecological integrity and biodiversity-related outcomes (Environment Canada, 2005). Despite the popularity of protected areas as places to visit for recreation and leisure purposes (e.g., physical activity and relaxation), and the large potential for promoting protected areas as places that support human health and well-being, scant research exists on

the diverse perceived health and well-being motivations and benefits associated with visitation, much less about specific management and policy interventions and their effects on subgroups (e.g., youth and the elderly). Accordingly, the role that protected areas play in human health has not been fully recognized (Stolton & Dudley, 2010). As the CPC concluded, “...while a healthy ecosystem is recognized as essential to human health, it seems that the development of programs that use the natural environment as a foundation to promote human health have only been explored in a very preliminary way” (CPC, 2006: 1).

Accordingly, it is important to explore systematically the human health and well-being values pursued through visits to parks, and especially to non-urban parks. The overarching objective of such research is to establish an empirical, baseline understanding of perceived health and well-being motivations and outcomes associated with visitation to, and experiences provided by, protected areas. To achieve this objective, a survey was undertaken of park visitors to determine an understanding of: (1) visitor motives related to human health and well-being; (2) perceived health and well-being outcomes associated with visitation (including the perceived developmental benefits for children); and, (3) the perceived adequacy of attention given to human health and well-being and conservation in terms of public policy. In so doing, this paper represents a first response to Canadian federal, provincial, and territorial calls for this type of research (CPC, 2006), and contributes to the larger discussion and debate on the role of health and well-being benefits associated with protected areas visitation.

METHODS

Perception is an essential part of how people experience and use natural areas (Relph, 1976), and the personal benefits obtained from visitation are the key element in societal acceptance and the approval of protected areas and their management (Bushell & Eagles, 2007). Research reveals multiple motivations for visiting and participating in activities provided by protected areas, including satisfaction from the realization of personal values (Manzo, 2003; Kreninchyn, 2006; Manning, 2011). Protected area values have been classified as: intrinsic (e.g., fauna, flora, ecosystems); on-site goods and services (e.g., plant products, animal products, scientific research and knowledge, education); community-oriented (e.g., culture, identity, spiritual meaning, social well-being, bequest for future generations); and individual-oriented (e.g., existence, physical health, psychological health, spiritual well-being) (Lockwood et al., 2006). While increasing

attention has been paid to on-site goods and services of the natural environment in recent years (i.e., the value of ecosystem services and natural capital, e.g., Costanza et al., 1997; Howarth & Farber, 2002; Anielski & Wilson, 2009), less attention has been given to the community and individual health values and benefits that visitors obtain from visitation to, and experiences provided by, protected areas.

SURVEY DESIGN

This paper uses a case study design to characterize systematically perceived health and well-being motives for visiting a park and the benefits obtained from visiting two protected areas in Canada. In so doing, *health* was defined as per the *Ottawa Charter* (Epp, 1986) as: “a resource for everyday living, which allows us to manage, cope with and even change our environments”. This definition moves beyond the relatively passive 1948 WHO definition of “the state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1948). Grounded in several distinct but complementary sets of literature, including subjective well-being (Diener et al., 2009), population well-being (e.g., Bobbit et al., 2005; Foster & Keller, 2007; Bradshaw & Richardson, 2009), and from theory and research on human health, well-being, and place (e.g., Manzo, 2003; Patterson & Williams, 2005; Eyles & Williams, 2008; Muhajarine et al., 2008), the research adopted a positive approach to measuring health-related factors that we refer to as “health and well-being assets” (i.e., outcomes) rather than focusing solely on deficits (e.g., specific diseases). In so doing, a questionnaire was developed to reflect the comprehensive suite of health and well-being indicators (or attributes), including those that extend beyond the physical and psychological/emotional (e.g., economical, intellectual, cultural, social, intellectual, and occupational). The Scale of Positive and Negative Experience (SPANE), developed by Diener et al., (2009) was also adopted in the survey. The SPANE assesses the full range of possible desirable and undesirable experiences and has been found to have several advantages over other measures of feelings.

Demographic questions about the visitors covered gender, place of residence, age, annual household income, and highest level of education completed. Visit characteristics included length of stay, type of travel group (i.e., single, couple, family), numbers in travel group, and activities undertaken (e.g., camping, hiking, reading, canoeing). A non-probabilistic convenience (opportunity) sampling technique was employed, which

may not be a representative sample of the park population. The questionnaire targeted individuals based on the common characteristic that they were visiting a protected area during the sampling periods. Potential respondents over 18 years of age were intercepted at various points in October 2011 (e.g., campsites, trails, and interpretive displays), on a next available basis, meaning the next adult and the researcher were ready to continue with surveying. All participants were informed about their anonymity and the confidentiality of the survey. Visitors' participation was voluntary. The questionnaire was completed onsite using iSurveysoft's iSurvey, an Apple® iPad™ survey application software. Questionnaire results were merged and formatted for descriptive statistical and correlation analysis using IBM SPSS Statistics version 20.0.

Questionnaire responses were coded as follows. *Visitor motivations* for visiting each protected area were measured with 10 items assessing diverse motivations [e.g., physical well-being (for physical activity like hiking, bicycling, swimming, canoeing), psychological/emotional well-being (for restoration from mental fatigue, relaxation, solitude and quiet)] assessed on a 5-point likert-type response scale (not at all important = 1, of little importance = 2, moderately important = 3, important = 4, very important = 5). *Well-being benefits* (outcomes of visitation) derived from visiting the protected areas were measured with a set of questions assessing the extent to which participants perceived visiting the park affected various aspects of their well-being (e.g., physical well-being, psychological/emotional well-being, social well-being) measured on a 7-point likert-type response scale (greatly worsened = 1, worsened = 2, somewhat worsened = 3, neutral = 4, somewhat improved = 5, improved = 6, greatly improved = 7). *Benefits for children* associated with park experiences were also assessed. Child development benefits was a measure of participants' perceived benefits from visiting parks and protected areas for children's health and well-being in general (e.g., physical development, social knowledge and competence, etc.) assessed on a 7-point likert-type scale (strongly disagree = 1, disagree = 2, slightly disagree = 3, neither agree or disagree = 4, slightly agree = 5, agree = 6, strongly agree = 7).

Also, Diener et al.'s (2009) *Scale of Positive and Negative Experience* (SPANE) was applied to assess visitor perceptions of overall experience. This psychometric scale produces a score for positive feelings (SPANE-P) (six items: Positive, Good, Content, etc.), a score for negative feelings (SPANE-N) (six items: Negative, Bad, Angry, etc.), and the two can be combined



The beach at Pinery Provincial Park, Ontario © Paul F. J. Eagles

to create a balance score (SPANE-B). Each item is scored based on how often one experiences those feelings during a visit using a 5-point likert type scale (very rarely or never = 1, rarely = 2, sometimes = 3, often = 4, very often or always = 5). The positive and negative scales are scored separately because of the partial independence of the two types of feelings (Diener et al., 2009). The total positive score (SPANE-P) can range from 6 to 30, as can the negative score (SPANE-N). However, the two scores can also be merged by subtracting the negative score from the positive score, the result of which can range from - 24 to 24 (SPANE-B). While normally employed using a four-week frame of reference, the scale converges well with measures of emotions and affective well-being and assesses the full range of possible desirable and undesirable experiences, based on the total amount of time having an experience. Therefore, the scale is applicable in all experience scenarios and situations, and can be used in many research situations and within the varying temporal frame of reference associated with park visits. The SPANE reflects well across different cultures (Diener et al., 2009).

CASE STUDY LOCATIONS

Survey sampling occurred in autumn 2011 in two protected areas: Pinery Provincial Park, Ontario (October 8-11, 2011) and Gatineau Park, Québec (October 21-23, 2011) (Figure 1). The Pinery Provincial Park is located in southern Ontario and attracts over 600,000 visitor days

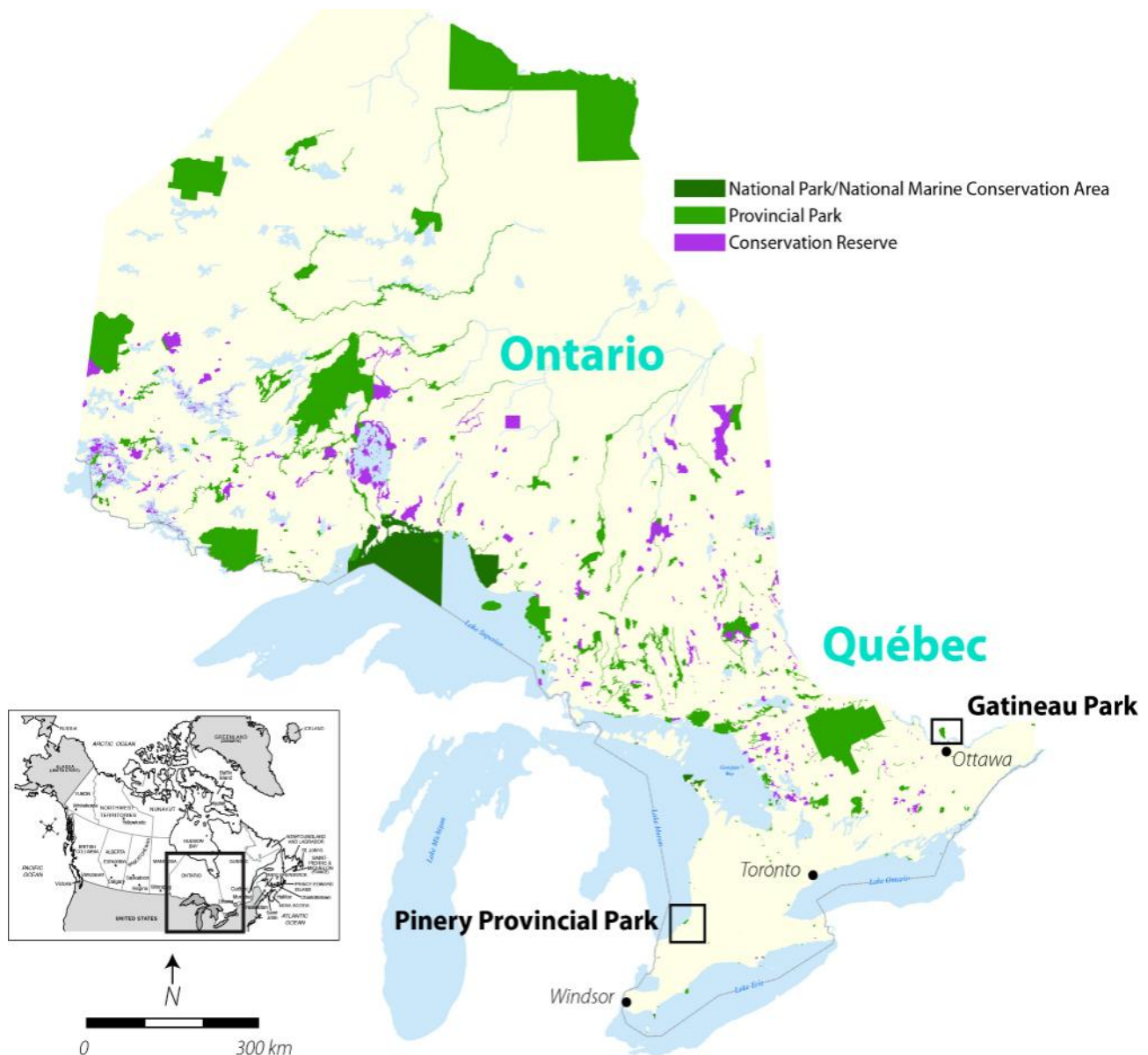


Figure 1: Location of study sites within the geographical context of Ontario's federal and provincial protected areas network. Map data from Ontario Parks.

of activity annually, the third highest of 335 provincial parks in the province (Ontario Parks, 2011). Administered by Ontario Parks it occupies an area of 25.32 km² and is classified as a Natural Environment Park and as IUCN category II (Gray et al., 2009). The protected area houses the largest oak savanna woodland remaining in North America, and offers outdoor recreational opportunities, including birding, bicycling, Nordic skiing, and swimming. It protects over 15 species at risk. The park has a long history of innovative ecological and outdoor recreation planning, with the first recorded use of the concept of carrying capacity in park management planning (Eagles, 2010).

Gatineau Park is located in Canada's National Capital Region, in southern Québec. Administered by the National Capital Commission, the protected area

occupies an area of 363 km² and is IUCN category II. Attracting over two million visits annually (National Capital Commission, 2011), Gatineau Park is a popular recreational destination offering a diversity of public facilities including beaches, campgrounds, picnic areas, trails, and parkways. There are 165 km of hiking trails and 90 km of trails for mountain bikes, and the Trans Canada Trail passes through the park. The protected area supports a broad diversity of wildlife, including many species at risk.

These protected areas were selected for their high autumn season visitor numbers, thereby providing a reasonable sample size over a short surveying period. Furthermore, both protected areas offer a diversity of activities and services allowing a range of attributes to be included in the survey.

Table 1: Sample demographic characteristics (n=166).

	Count	(%)
Age		
19-34	57	(34.3)
35-65	94	(56.6)
66+	12	(7.2)
Missing	3	(1.8)
Sex		
Male	92	(55.4)
Female	74	(44.6)
Missing	0	(0.0)
Income		
0-60K	36	(21.7)
60-100K	44	(26.5)
100 - 150K	33	(19.9)
150K+	35	(21.1)
Missing	18	(10.8)
Education		
Less than bachelors	55	(33.1)
Bachelors or higher	101	(60.8)
Missing	10	(6.0)

RESULTS

Collectively, 166 responses were collected (Gatineau n=57; Pinery n=109). The sample is slightly over-represented by males, at 55 per cent. All ages are represented, with the average of 43. The population is highly educated, with 61 per cent had having a university degree (Table 1). Also, 47 per cent were visiting with children and 85 per cent were employed.

HEALTH AND WELL-BEING MOTIVATIONS FOR VISITING PROTECTED AREAS

This section illustrates the visitors' reported motivations for visiting the protected areas (Tables 2 and 3). At least 80 per cent of the sample evaluated 8 of the 10 health and well-being indicators included in the study as either a 'very important', 'important', or 'moderately important' motivation for the visit. With means greater than 4, the two most significant health and well-being motivations were social and psychological/emotional. Nearly 80 per cent of respondents indicated these motivations to be 'very important' or 'important'. The least important motivations were associated with economical and occupational well-being, with means less than 3 and less than 58 per cent of the sample indicating these attributes as 'very important', 'important', or 'moderately important'.



Gatineau Park, Québec © Christopher Lemieux

Table 2: Perceived importance of health and well-being indicators related to respondents' motivations for visiting the protected areas (per cent of respondents) (n = 166).

Health and Well-being: Attribute and Description	Not At All Important	Of Little Importance	Moderately Important	Important	Very Important
Physical Well-being (for physical activity like hiking, bicycling, swimming, canoeing)	1.9%	5.0%	22.5%	35.0%	35.6%
Psychological/Emotional Well-being (for restoration from mental fatigue, relaxation, solitude & quiet)	1.3%	3.1%	16.9%	36.9%	41.9%
Social Well-being (for opportunity for increased social interaction/bonding with family, friends)	1.2%	6.8%	14.3%	34.8%	42.9%
Intellectual Well-being (for opportunity to engage in creative and stimulating activities)	3.8%	15.6%	30.6%	30.6%	19.4%
Spiritual Well-being (to connect with nature, inspiration of nature, seek meaning/purpose of life)	7.7%	10.3%	21.8%	31.4%	28.8%
Ecological Well-being (to experience the natural environment, sense of ecological citizenship)	2.6%	6.4%	21.8%	35.3%	34.0%
Environmental Well-being (to experience sense of place, outdoors, desirable weather conditions)	2.6%	11.5%	25.0%	35.9%	25.0%
Cultural Well-being (to experience cultural and historical heritage)	0.6%	17.9%	18.6%	32.7%	30.1%
Occupational Well-being (to improve my ability to work after my visit)	17.5%	26.6%	22.7%	25.3%	7.8%
Economic Well-being (to support local economy)	20.6%	30.3%	27.1%	14.2%	7.7%
Mean	6.0%	13.4%	22.1%	31.2%	27.3%

Table 3: Descriptive statistics and tests of significance for the importance ratings of health and well-being motivations of visitors for visiting the protected areas (n=166).

	Descriptive		Tests of Significance p-values			
	Mean	SD	Age ¹	Sex ²	Income ¹	Education ²
Physical Well-being	3.98	.98	.235	.055	.397	.096
Psychological Well-being	4.15	.90	.681	.002	.004	.307
Social Well-being	4.11	.97	.952	.080	.463	.719
Intellectual Well-being	3.46	1.09	.602	.499	.101	.370
Spiritual Well-being	3.63	1.22	.265	.016	.096	.576
Ecological Well-being	3.92	1.02	.286	.372	.153	.719
Cultural Well-being	3.74	1.10	.110	.296	.064	.783
Environmental Well-being	3.69	1.05	.563	.341	.034	.207
Occupational Well-being	2.79	1.22	.314	.364	.113	.641
Economic Well-being	2.58	1.19	.539	.088	.121	.036

¹ p-values associated with one-way ANOVA of mean rating by age and income categories

² p-values associated with t-tests of mean rating by dichotomous variables sex and education

When examined by demographic variables, there were no statistically significant differences in the rankings of motivations according to age. Therefore, age does not affect a person's rankings of the various health and well-being motivations to visit the park. There were a few significant differences in importance ratings, including that females tended to rate psychological and spiritual

motivations higher (p=.002 and .016, respectively), those with higher education tended to rate economic motivations somewhat lower (p=.036), those with the highest income tended to rate psychological motivations somewhat lower (p=.004), and those with lowest incomes tended to rate the environmental motivations higher (p=.034).

Table 4: Perceived health and well-being benefits (outcomes) associated with visiting the parks (per cent of respondents) (n = 166).

Health and Well-being Attribute and Description	Greatly Worsened	Worsened	Somewhat Worsened	Neutral	Somewhat Improved	Improved	Greatly Improved
Physical Well-being (from physical activity like hiking, bicycling, swimming, canoeing)	0.0%	0.0%	0.6%	14.7%	37.8%	35.3%	11.5%
Psychological/Emotional Well-being (from restoration from mental fatigue, relaxation, solitude & quiet)	0.0%	0.0%	0.6%	8.9%	24.1%	44.3%	22.2%
Social Well-being (from opportunity for increased social interaction/bonding with family, friends)	0.0%	0.0%	0.6%	16.6%	27.4%	42.0%	13.4%
Intellectual Well-being (from opportunity to engage in creative and stimulating activities)	0.0%	0.0%	0.0%	34.6%	33.3%	26.3%	5.8%
Spiritual Well-being (from connecting with nature, being inspired by nature, seeking meaning/ purpose of life)	0.0%	0.0%	0.0%	29.3%	31.1%	30.0%	12.3%
Ecological Well-being (from experiencing the natural environment, sense of ecological citizenship)	0.0%	0.0%	0.7%	24.2%	31.4%	32.7%	11.1%
Environmental Well-being (from experiencing sense of place, outdoors, desirable weather conditions)	0.0%	0.0%	1.9%	41.3%	32.3%	20.0%	4.5%
Cultural Well-being (from experiencing cultural and historical heritage)	0.0%	0.0%	0.6%	14.1%	27.6%	39.1%	18.6%
Occupational Well-being (by improving my ability to work after my visit)	0.0%	0.7%	2.0%	42.5%	30.7%	16.3%	7.8%
Economic Well-being (by supporting local economy)	0.6%	0.6%	1.3%	57.8%	24.7%	11.0%	3.9%
Mean	0.1%	0.1%	0.8%	28.4%	30.0%	29.7%	11.1%

PERCEIVED HEALTH AND WELL-BEING BENEFITS RECEIVED FROM VISITING PROTECTED AREAS

This section reports the visitors' benefits obtained from visiting the park (Tables 4 and Table 5 overleaf). Several of the 10 indicators exhibited means greater than 5 on the 7 point scale, and similar to the motivation results noted above, psychological/emotional and social benefits were perceived to be the most significantly improved aspects of well-being. This suggests that the perceived benefits, or actual outcomes, largely match the motivations for the visit. Even though the least significant benefits were economical and occupational well-being, 40 per cent or more of the respondents

indicated some degree of improvement with respect to these attributes. Of the 1,554 responses for set of attributes, 72 per cent were associated with a health and well-being improvement, while only 0.6 per cent were associated with a perceived worsened state.

When examined by demographics, the benefits received did not vary by the age of respondent. Therefore, age does not affect a person's rankings of the various health and well-being benefits receiving from visiting the park. Several significant trends were evident for sex and income. Females tended to rate the social ($p=.018$), spiritual ($p=.003$) and environmental ($p=.022$) benefits

Table 5: Descriptive statistics and tests of significance for the importance ratings of health and well-being benefits (outcomes) associated with visiting the parks (n=166).

	Descriptive		Tests of Significance p-values			
	Mean	SD	Age ¹	Sex ²	Income ¹	Education ²
Physical Well-being	5.42	.90	.826	.166	.245	.041
Psychological Well-being	5.79	.91	.394	.091	.116	.480
Social Well-being	5.51	.94	.456	.018	.088	.667
Intellectual Well-being	5.03	.92	.755	.599	.006	.109
Spiritual Well-being	5.24	1.01	.730	.003	.003	.953
Ecological Well-being	5.29	.98	.801	.122	.009	.653
Cultural Well-being	4.84	.92	.901	.316	.021	.943
Environmental Well-being	5.61	.97	.968	.022	.123	.779
Occupational Well-being	4.84	1.01	.730	.121	.044	.822
Economic Well-being	4.54	.92	.504	.643	.185	.548

¹ p-values associated with one-way ANOVA of mean rating by age and income categories

² p-values associated with t-tests of mean rating by dichotomous variables sex and education

Table 6: Perceived improvement in various child development attributes associated with visits to parks (per cent of respondents) (n = 166).

Aspect of Child Development	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
Physical development	0.0%	0.6%	0.0%	2.5%	10.6%	35.6%	50.6%
Social knowledge and competence	0.0%	0.0%	1.3%	5.0%	14.4%	37.5%	41.9%
Cognitive learning and language (e.g., concentration)	0.0%	0.0%	1.3%	7.5%	18.9%	34.0%	38.4%
Communication skills	0.0%	1.9%	0.6%	15.9%	18.9%	33.3%	30.2%
Anxiety	0.6%	1.9%	1.9%	17.7%	15.8%	33.5%	29.1%
Hyperactivity/Inattention issues	0.6%	1.3%	3.8%	14.4%	23.1%	31.3%	25.6%
Personal-social behavior (e.g., self-discipline)	0.0%	1.9%	1.9%	27.0%	15.4%	27.7%	25.2%
Respiratory issues	0.0%	2.7%	2.0%	42.3%	13.4%	22.1%	17.4%
Mean	0.2%	1.3%	1.6%	16.5%	16.3%	31.9%	32.3%

as higher than males, whereas the lowest (less than \$60K) and middle (\$100-150K) income groups tended to rate the intellectual ($p=.006$), spiritual ($p=.003$), ecological ($p=.009$), cultural ($p=.021$) and occupation ($p=.049$) benefits higher.

Results revealed significant perceived health and well-being benefits identified by the respondents associated with children's visits to the case study protected areas across the entire suite of developmental attributes included in the study (Tables 6 and 7). Three of the eight child development attributes exhibited means greater than 5 on the scale up to 7. The most significant improvements in child development attributes were perceived to be those associated with physical development, social knowledge and competence, and cognitive learning and language (e.g., concentration).

Interestingly, 50 per cent or more of respondents agreed that some form of developmental improvement was achieved through visits to protected areas. Notably, the females rated 7 of the 8 benefits for children significantly higher than males (Table 7 overleaf).

SCALE OF POSITIVE AND NEGATIVE EXPERIENCE (SPANE)

The SPANE analysis revealed that visiting a protected area is perceived to be a highly positive life experience. Mean results indicate that the frequency of negative feelings experienced during a park visit is extremely low, and rank in the 6th percentile in terms of SPANE-N norms identified by Diener et al. (2009). The Cronbach's alphas, a measure of reliability of a psychometric test score, are good (SPANE-N = .82, SPANE-P = .84).

Table 7: Descriptive statistics and tests of significance for the importance ratings of perceived improvement in child development attributes associated with visits to parks (n=166)

	Descriptive		Tests of Significance p-values			
	Mean	SD	Age ¹	Sex ²	Income ¹	Education ²
Physical development	6.33	.84	.714	.000	.321	.455
Social knowledge	6.14	.93	.956	.005	.154	.739
Cognitive learning	6.01	1.00	.187	.005	.801	.501
Communication skills	5.72	1.18	.373	.008	.073	.649
Anxiety	5.62	1.28	.235	.010	.161	.793
Hyperactivity	5.54	1.25	.572	.023	.431	.969
Personal-social behaviour	5.42	1.28	.695	.017	.303	.133
Respiratory allergies	5.03	1.29	.600	.723	.226	.390

¹ p-values associated with one-way ANOVA of mean rating by age and income categories

² p-values associated with t-tests of mean rating by dichotomous variables sex and education

Table 8: Visitor perceptions of various statements associated with nature, protected areas and human health and well-being (per cent of respondents) (n = 166).

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
Contact with nature improves the quality of life of Canadians.	0.0%	0.0%	0.6%	3.8%	8.8%	30.8%	56.0%
The health and well-being benefits associated with experiencing nature should be reported alongside other health indicators in Canada.	0.0%	0.6%	1.2%	3.7%	9.3%	31.7%	53.4%
Having nature in close proximity, or just knowing it exists, is important to people regardless of whether they are regular users of it.	0.0%	0.0%	0.0%	3.2%	10.8%	28.5%	57.6%
Government agencies should develop education, interpretation, and outreach messaging that communicate the health and well-being benefits of protected areas.	0.7%	0.0%	0.0%	5.3%	11.3%	28.5%	54.3%

BROAD SOCIETAL IMPLICATIONS

The visitors provide strong support for the concept that the human health and well-being benefits of protected areas extend beyond users, and also hold the position that government agencies should begin reporting the health and well-being benefits of nature in Canada (Table 8). Furthermore, visitors strongly perceived that contact with nature improves the quality of life of Canadians. Visitors also agreed very strongly that government agencies should develop education, interpretation, and outreach messaging that communicate the health and well-being benefits of protected areas. While the Government of Canada's *Pan-Canadian Integrated Healthy Living Strategy* (Health Canada, 2005) recognizes that the natural environment has an impact on healthy living, greater recognition of contribution of protected area settings to the pursuit of healthy lifestyles is required.

DISCUSSION AND CONCLUSIONS

The analyses reveal findings with policy and management implications. First, results suggest that the expected human health and well-being motivations for visitation and benefits received from visitation are a major personal value in the preference and choice to visit. This finding from non-urban parks is consistent with studies at suburban parks that the emotional response evoked by a visit plays a significant role in choice processes (e.g., Araña & León, 2009; Lopez-Mosquera & Sanchez, 2012). Second, with 72 per cent of responses being associated with a health and well-being improvement, and only 0.6 per cent associated with a perceived worsened state, the benefits received from protected area experiences are substantial, with psychological/emotional, environmental, social, and physical benefits identified as the most significantly improved aspects. The SPANE results reveal that visiting



Interior river and boardwalk at Pinery Provincial Park, Ontario © Paul F. J. Eagles

protected areas is considered by visitors to be a highly positive life experience. Also, visitation to parks is perceived to have important benefits for child development, especially in terms of physical development, social knowledge and competence, and cognitive learning and language.

The authors feel that the results from the current study are sufficiently important that implications can be suggested. First, the research found that the survey instrument is a useful tool for future research. Since this study had a modest sample size from only two parks, more research is needed across space (i.e., in other locations across Canada and indeed globally), time (e.g., seasons), and different forms and classifications of protected areas (e.g., national, conservation areas, ecological reserves, migratory bird sanctuaries, etc.).

Second, the research revealed that the social, cultural, spiritual, and ecological/environmental aspects of human health and well-being suggest increased consideration within visitor experience monitoring and management programmes and associated reporting (e.g., 'state of the park' reporting). Given the substantial perceived benefits for child development associated with visitation to protected areas (especially by females), including those related to social knowledge, competence,

and cognitive learning and language, the intellectual and developmental attributes of well-being deserve particular consideration.

Third, it is desirable to develop appropriate indicators that reflect the comprehensive suite of population health and well-being indicators, including those that extend beyond the physical and psychological/emotional. Visitor experience data is fundamental to increasing the likelihood of the 'best' facilities and services for meeting visitor needs, rather than management decisions being the result of *ad hoc* decisions by managers (Wardell & Moore, 2005).

Fourth, it is possible to use this information to justify financial and political support for protected areas. The findings provide an opportunity to transform protected areas' policy mandates and management protocols with a greater emphasis given to the social capital of protected areas. The Government of Canada recently committed to the *Aichi Target*, which will guide efforts to save biodiversity through enhanced action to meet the objectives of the *Convention on Biological Diversity*. As such, the Government of Canada committed to protecting, by 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas (Environment Canada, 2010). This new strategic

direction is intended to conserve and sustain biodiversity and ecosystem services for present and future generations. Accordingly, it appears that there is sufficient justification to include social capital in ecosystem service assessments and strategic land-use planning exercises to provide additional compelling rationale towards such ambitious conservation targets.

Fifth, the research findings suggest that it might be desirable to redesign education programmes within protected areas, and communication and outreach strategies outside of them. For example, protected area agencies and public health agencies could work together to develop communication and outreach strategies aimed at informing the public on how protected areas enhance the quality of life and environments for all Canadians and contribute to healthy communities.

Sixth, increased levels of health research can help protected area practitioners and public health authorities more systematically address the health potential of protected areas, and better ensure that informed decisions are made in all areas of the health system including treatment, prevention, public programme and policy development. There is a need for more protected areas and public health policy integration. Over recent years, greater attention has been paid by governments and the public to aggregate reporting, largely due to increasing requirements for public accountability by government departments (including protected area managers) and the need for such data in pursuing funding (Wardell & Moore, 2005). Protected areas organizations will need to place greater emphasis on the social capital housed within protected areas in policy, management programmes, and state of the park reporting, and will need to develop strategic education, interpretation, and outreach programmes to communicate these values to elected officials, key decision-makers, and the public. As the Canadian Parks Council emphasized in the 'Healthy by Nature' discussion paper, *"Encouraging Canadians to spend more time in parks will support improved physical and mental/emotional health, and can also serve to provide opportunities to inform and educate them about the important connections between healthy ecosystems and healthy human populations."* (CPC, 2006: 2).

Despite the important social and well-established economic contributions that protected areas provide to society, visitor data are omitted from virtually all forms of protected areas status and state of the park reporting in Canada (see Environment Canada, 2005 for example). However, the environmental, ecological, and educational

motivations and benefits associated with protected area experiences were revealed to be substantial in this study. Furthermore, our study also revealed that the environmental benefits associated with protected area experiences exceed personal motivations or expected outcomes associated with this attribute. These findings are important for two reasons. First, there appears to be a net benefit associated with environmental well-being after people make the decision to visit a protected area. Second, these findings support the hypothesis that visitors to parks do so to satisfy certain values, including those that relate to conservation, which fosters greater understanding and support for protected areas (Priskin & McCool, 2006). In meeting the health needs of visitors, protected area managers should pay increasing attention to the type and quality of visitor experiences offered. In order for this expanded role to be realized, public health and park managers will need to work collaboratively toward understanding the links between the natural environment and human health and well-being.

ACKNOWLEDGEMENTS

This research was possible due to the gracious support of many people within Ontario Parks (Rob Davis, Will Wistowsky, Melody Cairns, Karen Rawlings, Brenda Ewart, Chris Geberdt, Ross Hart, Scott Varley, Selena Wolfe, Tim Marchand, and Kathy Copping) and the National Capital Commission (Catherine Verreault). Culum Canally, Lindsay Woodside, Megan Ihrig, and Vince Coccagna are thanked for assisting with data collection. This research benefitted from funding provided by the University of Waterloo Research Incentive Fund. Finally, the lead author would like to thank the many individuals who supported his postdoctoral appointment at Wilfrid Laurier University where the majority of the research presented within this manuscript was undertaken.

DISCLAIMER

The views expressed in this manuscript are those of the authors and do not necessarily represent the opinions of Ontario Parks, the Ontario Ministry of Natural Resources, the National Capital Commission, or other agencies and organizations referred to in the manuscript.

REFERENCES

- America's Great Outdoors Initiative. (2010). *America's Great Outdoors: A Promise to Future Generations*. Washington, D.C.: Government of U.S.A. Available at: americasgreatoutdoors.gov/ [Accessed January 31, 2012].
- Anielski, M. and Wilson, S. (2009). *Counting Canada's Natural Capital: assessing the real value of Canada's boreal ecosystems: 2009 Update*. Ottawa, Canada: Canadian Boreal Institute.
- Araña, J.E. and León, C.J. (2008). Understanding the use of non-compensatory decision rules in discrete choice experiments: the role of emotions. *Ecological Economics* 68: 2316-2326.
- Bobbit, L., Green, S., Candura, L. and Morgan, G.A. (2005). The development of a county level index of well-being. *Social Indicators Research* 73, 19-42.
- Bodin, M., and Hartig, T. (2003). Does the outdoor environment matter for psychological restoration gained through running? *Psychology of Sport and Exercise* 4: 141-153.
- Bradshaw, J. and Richardson, D. (2009). An index of child well-being in Europe. *Child Indicator Research* 2(3): 319-351.
- Bushell, R. and Eagles, P.F.J. (2007). *Tourism and Protected Areas: Benefits Beyond Boundaries*. Cambridge: IUCN and CABI.
- CCEA - Canadian Council on Ecological Areas. (2012). *Conservation Areas and Reporting Tracking System*. CCEA: Ottawa, Canada. Available at: ceea.org/en_carts.html [Accessed January 31, 2012].
- CPC - Canadian Parks Council. (2006). *Healthy By Nature*. Canadian Parks Council: Ottawa, Canada. Available at: www.parks-parcs.ca/english/cpc/healthy-presentations.php [Accessed April 29, 2009].
- Canadian Parks Council (CPC). (2010). *The Economic Impact of Canada's National, Provincial, and Territorial Parks in 2009*. Ottawa, Canada: Canadian Parks Council.
- Costanza, R., d'Arge, R., de Groot, R.S., et al. (1997). The value of the world's ecosystem services and natural capital. *Nature* 387: 253-260.
- Diener, E., Wirtz, D., Tov, W., et al. (2009). New measures of well-being: Flourishing and positive and negative feelings. *Social Indicators Research*, 39 247-266.
- Diette, G.B., Lechtzin, N., Haponik, E., Devrotes, A., Rubin, H.R. (2003). Distraction therapy with nature sights and sounds reduces pain during flexible bronchoscopy: A complementary approach to routine analgesia. *Chest* 123: 941-8.
- Dudley, N., Higgins-Zogib, L. Hockings, M., et al. (2011). National parks with benefits: how protecting the planet's biodiversity also provides ecosystem services. *Solutions* 2 (6): 87-95.
- Eagles, P.F.J. (2010). Changing Societal Values and Carrying Capacity in Park Management: Fifty years at Pinery Provincial Park in Ontario. *Leisure/Loisir* 34(2): 189-206.
- Environment Canada (2005). *Protected Areas Status Report, 2000-2005*. Ottawa, Canada: Environment Canada: Available at: www.ec.gc.ca/Publications/default.asp?lang=En&xml=5A5F8028-B497-4441-92DE-4015F1E4F5D1 [Accessed January 31, 2012].
- Environment Canada. (2010). *The Strategic Plan 2011-2020 (Aichi Target)*. Envirozine: Environment Canada's Online Newsmagazine. Ottawa, Canada: Environment Canada. Available at: www.ec.gc.ca/envirozine/default.asp?lang=En&n=67262BD6-1 [Accessed January 31, 2012].
- Epp, J. (1986). *Achieving Health for All: A Framework for Health Promotion*. Ottawa, Canada: Health and Welfare Canada. Available at: www.hc-sc.gc.ca/hcs-sss/pubs/system-regime/1986-frame-plan-promotion/index-eng.php [Accessed 2 February 2012].
- Eyles, J. and Williams, A. (eds.). (2008). *Sense of Place, Health and Quality of Life*. Aldershot, U.K.: Ashgate Publishing Ltd.
- Foster, L.T. and Keller, C.P. (2007). *The British Columbia Atlas of Wellness (1st Ed.)*. Victoria, Canada: Western Geographical Press.
- Frumkin, H. (2001). Beyond toxicity human health and the natural environment. *American Journal of Preventive Medicine* 20(3): 234-240.
- Fuller, R.A., Irvine, K.N., Devine-Wright, P., Warren, P.H. and Gaston, K.J. (2007). Psychological benefits of greenspace increase with biodiversity. *Biology Letters* 3: 390-394.
- Gray, P.A., Paleczny, D., Beechey, T.J., et al. (2009). *Ontario's Natural Heritage Areas: Their Description and Relationship to the IUCN Protected Areas Classification System*. Peterborough, Canada: Ontario Ministry of Natural Resources.
- Hartig, T., Mang, M. and Evans, G.W. (1991). Restorative effects of natural environment experiences. *Environment and Behaviour* 32: 323-337.
- Health Canada. (2005). *The Integrated Pan-Canadian Healthy Living Strategy*. Prepared by: The Secretariat for the Intersectoral Healthy Living Network in partnership with the F/P/T Healthy Living Task Group and the F/P/T Advisory Committee on Population Health and Health Security (ACPHS). Ottawa, Canada: Health Canada.
- Howarth, R.B. and Farber, S. (2002). Accounting for the value of ecosystem services. *Ecological Economics* 41(3): 421-429.
- Kaplan, R. and Kaplan, S. (1989). *The Experience of Nature: a Psychological Perspective*. Cambridge, U.K.: Cambridge University Press.
- Kaplan, S. (1995). The restorative benefits of nature: toward an integrative framework. *Journal of Environmental Psychology* 15: 169-182.
- Kreninchyn, K. (2006). The only place to go and be in the city: women talk about exercise, being outdoors, and the meaning of a large urban park. *Health and Place* 12: 631-643.
- Kuo, F.E. (2001). Coping with poverty: Impacts of environment and attention in the inner city. *Environment & Behavior* 33: 5-34.
- Lewis, C.A. (1996). *Green Nature/Human Nature: The Meaning of Plants in our Lives*. Urbana, USA: University of Illinois Press.
- Lockwood, M., Worboys, G.L. and Kothari, A. (2006). *Managing Protected Areas: A Global Guide*. London, UK: IUCN and Earthscan.
- Lopez-Mosquera, N. and Sanchez, M. (2012). The role of satisfaction and emotional response in the choice mechanisms of suburban natural-areas users. *Environmental Management* 49: 174-191.
- Maller, C., Townsend, M., Pryor, A. Brown, P. and St. Leger, L. (2005). Healthy nature healthy people: 'contact with nature' as an upstream health promotion intervention for populations. *Health Promotion International* 21(1): 45-54.
- Maller, C., Henderson-Wilson, C.A., Pryor, L., Prosser, L. and Moore, M. (2008). *The Health Benefits of Contact with Nature in a Park Context - A review of relevant literature, 2nd edition*. School of Health and Social Development

- Faculty of Health, Medicine, Nursing and Behavioural Sciences, Melbourne, Australia: Deakin University.
- Manning, R. (2011). *Studies in Outdoor Recreation*. 3rd Edition. Corvallis, USA: Oregon State University.
- Manzo, L.C. (2003). Beyond house and haven: toward a revisioning of emotional relationships with places. *Journal of Environmental Psychology* 23: 47-61.
- Muhajarine, N., Labonte, R., Williams, A. and Randall, J. (2008). Person, perception, and place: what matters to health and quality of life. *Social Indicators Research* 85(1): 53-80.
- Naidoo R., Balmford, A., Costanza, R., et al. (2008). Global mapping of ecosystem services and conservation priorities. *PNAS* 105(28): 9495-9500.
- National Capital Commission (NCC). (2011). *Gatineau Park: Canada's Capital Region*. Ottawa, Canada: National Capital Commission. Available at: www.canadascapital.gc.ca/places-to-visit/gatineau-park/about-gatineau-park [Accessed February 1, 2012].
- Ontario Parks. (2011). *Park Statistics 2010*. Peterborough, Canada: Ontario Ministry of Natural Resources. Available at: www.ontarioparks.com/statistics/2010_park_statistics.pdf [Accessed February 1, 2012].
- Parsons, R., Tassinary, L.G., Ulrich, R.S., Hebl, M.R. and Grossman-Alexander, M. (1998). The view from the road: implications for stress recovery and immunization. *Journal of Environmental Psychology* 18: 113-140.
- Patterson, M.E. and Williams, D.R. (2005). Maintaining research traditions on place: diversity of thought and scientific progress. *Journal of Environmental Psychology* 25: 361-380.
- Pretty, J., Angus, C., Bain, M., et al. (2009). *Nature, Childhood, Health and Life Pathways*. Occasional Paper 2009-2. Interdisciplinary Centre for Environment and Society (iCES). London, U.K.: University of Essex.
- Priskin, J. and McCool, S. (2006). The Visitor Experience Challenge. *PARKS* 16(2): 1-2.
- Relph, E. (1976). *Place and Placelessness*. London, U.K.: Pion.
- Rudd, M.A., Beazley, K.F., Cooke, S.J., et al. (2010). Generation of priority research questions to inform conservation policy and management at a national level. *Conservation Biology* Doi: 10.1111/j.1523-1739.2010.01625.x.
- Stolton, S. and Dudley, N. (2010). *Vital Sites: The Contribution of Protected Areas to Human Health*. The Arguments for Protection Series. Gland, Switzerland: WWF.
- Stolton, S., Mansourian, S. and Dudley, N. 2010. *Valuing Protected Areas*. World Bank's Global Environmental Facility Coordination Team. Washington, D.C., USA: The World Bank.
- Ulrich, R.S. (1991). Effects of health facility interior design on wellness: Theory and recent scientific research. *Journal of Health Care Design*, 3: 97-109.
- Wardell, M.J. and Moore, S. (2005). *Collection, storage and application of visitor use data in protected areas: guiding principles and case studies*. Gold Coast, Australia: CRC for Sustainable Tourism.
- World Health Organization. (1948). *Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June 1946 and entered into force on 7 April 1948*. Geneva, Switzerland: World Health Organization.

ABOUT THE AUTHORS

Christopher J. Lemieux is a Postdoctoral Fellow in the Department of Recreation and Leisure Studies, University of Waterloo (Canada) and is a Director of the Canadian Council on Ecological Areas (CCEA). Dr. Lemieux's research focuses primarily on: (1) organizational adaptation to climate change within the parks and protected areas sector; and, (2) the human health and well-being benefits associated with protected areas experiences. Over the past decade, Chris has worked collaboratively with Ontario Parks, Parks Canada, the Canadian Parks Council and others on these and other protected areas policy and management issues. For more information, please visit Dr. Lemieux's website: sites.google.com/site/cjlemieux/.

Dr. Paul F. J. Eagles is a Professor at the University of Waterloo in Canada. He is a Planner, specializing in environmental planning. Over a span of 40 years Dr. Eagles has worked on a wide variety of planning and management projects, with an especially strong emphasis on nature-based tourism in parks and protected areas.

Scott Slocombe is Dr. John McMurtry Research Chair in Geography and Environmental Studies, Wilfrid Laurier University, Waterloo, ON, Canada. His research has focused on different aspects of the management of large complex regions, including parks and protected areas, for almost thirty years. He is a long-time member of the IUCN's World Commission on Protected Areas, and a past-President of the Canadian Network for Environmental Education and Communication (EECOM) and the Environmental Studies Association of Canada (ESAC).

Full Professor **Sean Doherty** (www.wlu.ca/~sdoherty) holds a Bachelors of Environmental Studies undergraduate degree (Waterloo), a Masters degree in Geography (Waterloo), a PhD in Civil Engineering (Toronto) and was a post-doctoral fellow in Urban Planning (Université Laval). He has used this mixed background to make a unique contribution to research focusing on human activity/mobility patterns and decision-making, including tracking methods, modelling, and the impacts on health, safety, and the environment.

Dr. Susan Elliott is a Professor in the School of Public Health and Health Systems and Dean of the Faculty of Applied Health Sciences, University of Waterloo. Dr. Elliott is a medical geographer, with primary research foci in the area of environment and health, the global environment, urban social geography, and philosophy

and method in the social sciences. She is involved in interdisciplinary research investigating the relationship between the environment and health at different spatial scales vis-à-vis risk perception, prevalence rates and community knowledge and practice.

Steven E. Mock received his degree in developmental psychology from Cornell University and is currently an

assistant professor in the Department of Recreation and Leisure Studies at the University of Waterloo. Dr. Mock's research is in the area of lifespan development with a focus on the social nature of coping and decision making, coping with stigmatized identities, and leisure as a coping resource.

RESUMEN

Este documento informa de los resultados de una investigación sobre dos áreas protegidas que destaca los motivos y beneficios que en materia de salud y bienestar perciben los visitantes como resultado de las experiencias relacionadas con sus visitas a las áreas protegidas. En primer lugar, los beneficios para la salud humana y, en particular, las mejoras anticipadas asociadas con el bienestar psicológico/emocional y social, se percibieron como un valor personal importante en la preferencia por las áreas protegidas. En segundo lugar, los beneficios percibidos de las experiencias fueron sustanciales. Las visitas a las áreas protegidas pueden ser consideradas como una experiencia muy positiva, y el mayor beneficio percibido fue en términos de bienestar psicológico/emocional, social, cultural y ambiental. Por último, se percibió que las visitas a los parques tenían importantes beneficios para el desarrollo de los niños, especialmente en lo atinente a desarrollo físico, conocimiento y competencia social, y aprendizaje cognitivo y del lenguaje. Curiosamente, fueron las mujeres quienes más bienestar percibieron como resultado de las visitas, y sobre todo con respecto a ciertos aspectos relacionados con el desarrollo infantil. Estos resultados sugieren que el capital social inherente a las áreas protegidas de Canadá merece ser considerado junto con el capital ecológico en los programas relacionados con las políticas y la gestión de la conservación. Es preciso profundizar las investigaciones para confirmar si estos hallazgos son aplicables en un contexto más general.

RÉSUMÉ

Ce document analyse les résultats d'une étude menée dans deux aires protégées et identifie les perceptions des visiteurs en termes de santé, les raisons de leur visite et les bénéfices attendus en termes de bien-être, et l'expérience procurée par ces visites. Tout d'abord, les bénéfices attendus de ces visites sur la santé et notamment les améliorations anticipées du bien-être psychologique/émotionnel et social sont perçues comme une valeur personnelle essentielle dans la décision et le choix de visiter des aires protégées. Deuxièmement, les bénéfices de cette expérience sont jugés importants par les visiteurs. Visiter des aires protégées est perçu comme une expérience humaine extrêmement positive, dont les plus grands bénéfices en termes de bien-être semblent se faire sentir dans les domaines psychologique, émotionnel, social, culturel et environnemental. Enfin, les visiteurs estiment que les parcs ont des bénéfices importants pour le développement de l'enfant, notamment en termes de développement physique, de connaissances et de compétences sociales, d'apprentissage cognitif et de langage. Il est intéressant de remarquer que les femmes sont plus sensibles aux bénéfices de ces visites sur le bien-être que les hommes, notamment en ce qui concerne plusieurs aspects du développement de l'enfant. Ces résultats suggèrent que le capital social de l'ensemble des aires protégées mérite d'être autant pris en compte que le capital écologique dans les politiques et les programmes de gestion liés à la conservation. De futures recherches confirmeront si ces résultats sont applicables plus largement.

