Trees Ontario

A Healthy Dose of Green Forum

Wednesday, September 12, 2012 The Gallery, Ontario Heritage Centre, Toronto









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Summary Report

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Executive Summary

On Wednesday, September 12, 2012, Trees Ontario convened a multi-disciplinary group of experts to discuss the roles of trees and forests in building healthy communities. Thirty-seven people attended, representing the medical, public health, environmental, forestry, planning, parks, heritage and education sectors.

The Forum was convened by Trees Ontario, in partnership with Conservation Ontario, to initiate dialogue towards integrated and comprehensive actions to improve human and ecosystem health. The day began with opening remarks by Rob Keen, CEO of Trees Ontario, and Don Pearson, General Manager of Conservation Ontario. Dr. John Howard, Chair of the Canadian Association of Physicians for the Environment, provided a keynote address and Rob Keen talked about the key findings of Trees Ontario's paper *A Healthy Dose of Green*. Participants engaged in round-table discussions about existing and planned activities regarding healthy communities and ecosystems. Steve Hounsell, a member of the Ontario Biodiversity Council, talked about the relationships between biodiversity and health. The day concluded with some observations by Dr. John McLaughlin, Professor and Senior Scientist at the Dalla Lana School of Public Health, University of Toronto.

PRESENTATIONS

Don Pearson noted that although there are many documented links between human health and the environment, we need public policy to transition this knowledge into implementation actions. We're still at a point where many people think that environmental quality is a luxury, but we need a paradigm shift. If we don't accomplish that, we can expect to see further reductions in environmental stability.

Dr. Howard illustrated the concept of ecosystem health by describing the progression from the traditional medical model to the patient-centred model to the ecosystem health model. He noted that unfortunately, our current medical system is not a health care system, but a sickness care system in which the majority of health care funding is spent in the last 6 months of one's life. Dr. Howard emphasized that many, perhaps all, diseases have an ecosystem health component and that we need to put less money into sickness care, and more into preventative measures such as healthy ecosystems.

Rob Keen cited the growing body of research pointing to evidence that supports the benefits of trees and green spaces for human health. For example, they have been linked to lower rates of asthma, heart disease, diabetes and some cancers; increased physical activity; lower stress levels; decrease in AD/HD symptoms in children; improved rehabilitation success and faster hospital recovery rates. Mr. Keen noted that it was essential to consider ALL forests at all scales —from street trees in urban centres, to the ravines in urban watersheds, to the large contiguous forests beyond our cities and towns. However, our forests are in crisis. Ongoing forest loss and fragmentation in the settled regions of Ontario are contributing to an unstable ecosystem, habitat loss and environmental degradation.

Mr. Keen noted that experts have determined that a minimum of 30% forest cover is required to maintain a healthy, sustainable ecosystem. However, the actual forest cover in Ontario's settled landscape averages 22%, and in some places, it is as low as 5%. To achieve 30% cover, we need to plant one billion trees. The good news is that Ontario has accomplished significant reforestation before and we can do it again. With a relatively modest investment in trees and forests we can reap great rewards by reducing health care costs and increasing the health, well-being and productivity of current and future generations of Ontarians.

Steve Hounsell referred to the Ontario Biodiversity Strategy (OBS) published by the Ontario Biodiversity Council in 2011. It emphasizes that biodiversity—genetic, species and ecosystem —is essential for health, prosperity and survival. Healthy ecosystems with their native biodiversity sustain healthy people and a healthy economy. These ecosystems provide services we all need: clean water, clean air, and productive soils that provide food, recreation opportunities and places for spiritual reflection.

A key goal of the OBS is to "mainstream biodiversity by incorporating biodiversity considerations into decision-making across the province, in different sectors and in our homes, workplaces and schools". The OBS recognizes that fundamentally, most people have become disconnected from nature, so making a link to personal health could be a strong motivator to protect biodiversity.

Dr. John Mclaughlin noted that the medical system in Canada is set up to treat illness, whereas health promotion and disease prevention mostly happen outside the formal health care system. Broadly speaking, society is beginning to recognize that the health benefits of greening and reforestation are real and multifaceted. This holistic approach works best for practitioners in the public health arena because they understand what is needed to build healthy communities.

Dr. McLaughlin observed that it is crucial to consider the cost-benefit analysis of any proposals for health care or health promotion. This isn't straightforward because the benefits in the ecological model are either difficult to measure or are not considered in the narrow way by which models are developed and used in decision-making. It is also valuable to engage the public in the dialogue, as active participation by the community can help governments make "the right decisions".

Dr. McLaughlin concluded that although many groups come together to discuss health promotion, the unique attribute of this Forum was that it focused on trees. This group is well positioned to take leadership for this initiative so that Canada becomes a leader in forest restoration and greening as part of building a better and sustainable future.

DISCUSSION

Discussion focused on potential partners, opportunities and tactics for collaboration. In addition to the sectors represented at the Forum, participants suggested a number of others that should be included, such as medical and health research, municipal councils, engineering, forestry, business, agriculture, social NGOs, health insurance and a broader range of people from the public health and medical professions. Specific recommendations included the Association of Local Public Health Agencies, Ontario Public Health Association, Association of Municipalities of Ontario, Municipal Engineers Association, Ontario Nurses Association, and Ontario Greenbelt.

Participants shared information about their activities, including opportunities for collaboration. They are compiled in the Inventory of Complementary Activities (Appendix B) of this report and span a range of activities including tree planting, forest conservation, awareness, education, research and policy.

Participants were unanimous in supporting a collaborative effort around biodiversity, environment quality and human health and made a number of specific suggestions. For example, they recommended a positive approach that would "invent the world we want to live in and then work towards it". We need to make sure that a good information base is readily available and that our work is science-based. A number of potential areas for collaboration were proposed, including a public awareness campaign, education, training, land use planning, policy and research.

A working group on health and biodiversity could coordinate specific projects. We should ask health related organizations (e.g. cancer, lung, heart and stroke) to endorse our message, this will help to support and add credibility to our work. Participants also recommended using a wide range of techniques, including community-based social marketing, The Natural Step, and smart technologies.

NEXT STEPS

Following the Forum, Trees Ontario offered to:

- Convene a small group from interested Forum participants to prioritize proposed opportunities for multi-sectoral collaboration and determine follow-up actions on targeted priorities;
- · Report back to Forum participants on a recommended plan of action; and
- Format the Healthy Dose of Green as an online, modular resource that can be easily updated and augmented.

Introduction

On Wednesday, September 12, 2012, Trees Ontario convened a multi-disciplinary group of experts to discuss the roles of trees and forests in building healthy communities. Thirty seven people attended, representing the medical, public health, environmental, forestry, planning, parks, heritage and education sectors (see list of participants in Appendix A).

Rob Keen, CEO of Trees Ontario, welcomed participants to the Forum. He noted that it was designed to provide an opportunity to share and discuss our collective experiences, perspectives and challenges. Trees Ontario convened this Forum to initiate dialogue towards integrated and comprehensive actions to improve human and ecosystem health. Rob noted that some say we have to deal with the economy first and then the environment, but he firmly believes that we should consider the environment as a key to our sustainability —for both our health and our economy.

Rob introduced Don Pearson, General Manager of Conservation Ontario and thanked him for CO's assistance in hosting the Forum.

Don Pearson noted that although there are many documented links between human health and the environment, we need public policy to transition this knowledge into implementation actions. We're still at a point where many people think that environmental quality is a luxury, but we need a paradigm shift. If we don't accomplish that, we can expect to see further reductions in environmental stability.

Suzanne Barrett, Facilitator, provided an overview of the day's agenda and logistics. The agenda included a keynote address by Dr. John Howard, Chair of the Canadian Association of Physicians for the Environment. Rob Keen made a presentation with highlights of Trees Ontario's paper *A Healthy Dose of Green*. Participants then engaged in round-table discussions about existing and planned activities regarding healthy communities and ecosystems. Steve Hounsell, member of the Ontario Biodiversity Council, talked about the relationships between biodiversity and health. The day concluded with some observations by Dr. John McLaughlin, Professor and Senior Scientist at the Dalla Lana School of Public Health, University of Toronto.

Agenda

September 12, 2012 10:00 AM-3:30 PM Ontario Heritage Centre, The Gallery

10:00 AM	Welcome—Rob Keen, CEO, Trees Ontario
10:10 AM	Opening remarks–Don Pearson, General Manager, Conservation Ontario
10:20 AM	Agenda review–Suzanne Barrett, Facilitator
10:25 AM	Keynote address—Dr. John Howard, Chair, Canadian Association of Physicians for the Environment
10:55 AM	Presentation of A Healthy Dose of Green-Rob Keen
11:15 AM	Discussion of recommendations in A Healthy Dose of Green-all
11:45 AM	Discussion of complementary activities of participants and their organizations—all
12:45 PM	LUNCH
1:30 PM	Discussion of complementary activities of participants and their organizations—all
2:15 PM	Opportunities for a collaborative campaign-all
3:00 PM	Biodiversity and health–Steve Hounsell, Member, Ontario Biodiversity Council
3:10 PM	Discussion of biodiversity and health working group-all
3:20 PM	Concluding Remarks–Dr. John McLaughlin, Professor and Senior Scientist, University of Toronto, Dalla Lana School of Public Health, and Rob Keen
3:30 PM	Adjourn

Ecosystem Health: Linking Trees and Human Health

Highlights of Keynote Address by Dr. John Howard, MD, FRCPC, Professor of Paediatrics and Medicine Schulich School of Medicine University of Western Ontario and Chair, Canadian Association of Physicians for the Environment

My objective today is to present a new model to show how we can consider trees in Ontario in a way that embraces social, economic, political and environmental issues. At the University of Western Ontario, we strive to use the concept of ecosystem health as an educational system. We teach students about the progression from the traditional medical model to the patientcentred model to the ecosystem health model.

In the traditional medical model, the doctor addresses two questions: *What is the disease? How do I fix it?*

In the patient-centered model, which is what we are trying to apply now, we add two more questions: *What is my patient's unique illness? How do I help my patient?* This model takes into account the patient's context and the environment begins to appear in that context.

The ecosystem health model, which is where we want to go, breaks out the context into different dimensions—physical, economic, social and political. This model examines the interaction of the patient with the context. It also can change what the "patient" is—a family, community, system.

The ecosystem health model adds some more, critically important questions. For example, in the case of asthma, the doctor would ask the following questions: What is the disease? How do I fix it? What is my patient's unique illness? How do I help my patient? Why is this patient here? Why are 1/3 of SW Ontario kids on puffers? Why is asthma so prevalent today? Is it the air, housing, immune development?

Unfortunately, our current medical system is not a health care system, it's a sickness care system, and the majority of the health care dollar is spent in the last 6 months of one's life.

Some important points to consider in moving towards ecosystem health:

- · Many, perhaps all, diseases have an ecosystem health component
- · We need to put less money in sickness care
- · Uncertainty is just as important as certainty
- · Accountability should be balanced with responsibility

When we add forests to our ecosystem health model, we see that forests are about wellness, shade, clean air and happiness. Then we need to ask: How do we become responsible for our forests? What's the lifespan of our trees? How do we prevent deforestation?

We need to figure out how to ask our citizens and policymakers those questions. Our healthcare systems care about the living but spend money on the dying. We don't spend money on the un-conceived generations to come—if we did, conditions would also be better for today's people. But I remain optimistic that things can be done to improve ecosystem health.

A Healthy Dose of Green

Highlights of Presentation by Rob Keen, CEO, Trees Ontario

The focus of today's Forum is to discuss the relationships between healthy ecosystems and healthy people and how resources are allocated to address these areas. Although Trees Ontario's main area of focus is tree planting and forest restoration, when I refer to ecosystems and the natural environment, I am encompassing the entire ecosystem including grasslands, wetlands, water systems etc., all of which deliver key ecosystem services and all need to be considered.

We're here to learn from each other, sharing our knowledge, experiences and challenges. I think that this is somewhat of a unique gathering—bringing together experts such as yourselves, from cross-sectoral, multi-disciplinary backgrounds. I hope this will stimulate dialogue, opening up new lines of communication and presenting the opportunity to work together as a network for health and environment collaboration.

There is ample evidence that support the benefits of trees and green spaces for human health. For example, they have been linked to:

- · Lower rates of asthma, heart disease, diabetes and some cancers
- · Increased physical activity
- · Lower stress levels
- · Decrease in AD/HD symptoms in children
- · Improved rehabilitation success and faster hospital recovery rates

When referring to forests, I'm referring to ALL forests at all scales—from street trees in urban centres, to the ravines in urban watersheds, to the large contiguous forests to the north of us. And we also need to recognize that despite their differences, there are significant and similar values in all these types of forests. For example, riparian planting is important everywhere to ensure that our watersheds are protected from runoff, stormwater and contamination.

But, our forests are in crisis. Ongoing forest loss and fragmentation in the settled regions of Ontario are contributing to an unstable ecosystem, habitat loss and environmental degradation.

How much forest cover do we need? Experts have determined that an absolute minimum of 30% forest cover is required to maintain a healthy, sustainable ecosystem. However, this figure is based on the needs of forest birds, and others say that we need 40-50% cover. The actual forest cover in Ontario's settled landscape averages 22%, and in some places, it is as low as 5%.

So we must maintain, protect and enhance our natural environment—both rural and urban—and at least achieve a minimum of 30% forest cover. To achieve this minimum, we need to plant one billion trees. The good news is that we have done it before and we can do it again.

As we heard from Dr. Howard earlier, in Ontario we treat illnesses, spending billions of dollars on treatment, but we invest very little in prevention. With a relatively modest investment in trees and forests we can reap great rewards by reducing health care costs and increasing the health, well-being and productivity of current and future generations of Ontarians.

DISCUSSION

Discussion included the following comments (C), questions (Q) and answers (A):

C: It is important to involve the low-income/deprived urban communities that suffer because of the heat island effect. We must provide shade for these communities, and access to forests for low-income kids.

Q: Why isn't the forest industry included in today's Forum? A: The forest industry is mainly active in northern Ontario on crown lands, which are highly regulated. In the settled landscapes of southern Ontario, 95 percent of the forest is privately owned, we aren't dealing with the forest industry, and there's not much regulation. There are incentive programs like the Managed Forest Tax Incentive Program and the 50 Million Tree Program that encourage landowners to manage their forests and plant trees on their property, respectively.

C: In practical terms, managing and protecting urban trees can be a challenge that we should recognize and address. For example, many homeowners have to spend considerable funds on issues arising from tree roots in the sewers.

C: Business and industry need to be involved—and the interest is growing. There's a Canadian Business and Biodiversity Council that is working to help get businesses on board and give them a social licence to operate sustainably.

C: The Algonquin to Adirondack project is working with partners on the Canadian and American sides of the border to enlarge and connect the forests to allow for species migration through contiguous forest corridors in the face of climate change.

Q: Why isn't the farming community at the table today? Southern Ontario has a long heritage of farming and we should be working with the Greenbelt. A: Today's session is a starting point for dialogue, so there are many opportunities to involve others in future.

C: To motivate and change people's attitudes, we have to present concepts in a way that people want to hear. We have to invent the world we want to live in and then work towards it. This is much more effective than presenting "doom and gloom" scenarios.

C: We must work with existing realities. For example, we can capture students' interests by integrating their electronic devices into our educational programs in a constructive way.

Complementary Activities

Suzanne Barrett asked participants to work in small groups to share information about the complementary activities they are undertaking. Participants also used large sticky notes to record their activities and post them on flipcharts stationed around the room. After lunch, Suzanne asked a spokesperson from each table to report on the highlights of the activities discussed by each group. This information has been compiled in an Inventory of Complementary Activities (Appendix B).

Suzanne noted that it is impressive to see how much is already happening, and asked participants for their observations about opportunities for further collaborations. Some examples included:

- In 2013, conservation authorities are organizing a "Healthy Hikes" campaign across the province from May to October. Conservation Ontario is developing a special website that will feature health management tools and links. This provides lots of opportunities for partnerships.
- •The Ontario Professional Planners Institute publishes "call to action" papers on key issues and would be pleased to partner with others on the health theme.
- •The University of Waterloo recently released a study that looked at motivation and identified 8 different aspects of well-being as well as the subjects' perceptions of how their health was improved. It provides valuable information for future initiatives.
- Ontario Ministry of Natural Resources is looking for partners to collaborate on changing behaviours in response to climate change.

Biodiversity and Health

Highlights of Presentation by Steve Hounsell, a member of the Ontario Biodiversity Council (OBC)

The OBC published a new Ontario Biodiversity Strategy in 2011 with a time horizon to 2020. It emphasizes that we care about biodiversity because we need it for health, prosperity and survival. Healthy ecosystems with their native biodiversity sustain healthy people and a healthy economy. These ecosystems provide services we all need: clean water, air, productive soils that provide food, etc. They also provide for spiritual reflection—as humans, we need to be connected with nature.

A key goal of the OBS is to "mainstream biodiversity by incorporating biodiversity considerations into decision-making across the province, in different sectors and in our homes, workplaces and schools". The OBS recognizes that fundamentally, most people have become disconnected from nature, so making a link to personal health could be a strong motivator to protect biodiversity.

In our current system, almost 50% of government budgets go to health care. If we degrade our habitats we degrade our ecosystem's ability to provide us with the essential services upon which we rely.

Could a healthy ecosystem reduce our long-term healthcare costs? We need to make this personal so the public sees the connection.

One of the recommendations in the OBC strategy is to create a biodiversity and health working group that can do the things we're talking about today. We need to include many sectors, including health care, insurance, engineers and social organizations.

DISCUSSION

Discussion included the following comments (C), questions (Q) and answers (A):

Q: Why are you focussing on biodiversity rather than ecosystem health? A: Biodiversity is 3 layers (genetic, species and ecosystem), of which ecosystem health is one component.

C: Biomimicry is about models and systems that work in nature. All our organizations are important entities—each came to existence for a reason—leadership shows up, there is a spark, and there will be a movement—we are a model of diversity similar to what is out there in nature.

Q: How can we believe that personal health is a motivator for the environment when there are so many unhealthy habits in our society? A: For some people it IS a motivator. It's similar to when smoking was common—now by and large it's no longer the norm. Similarly, the closure of fossil fuel plants has been pushed by respiratory disease—we have to look at parallels in the past to see how to motivate people now.

Working Together

Rob Keen noted that there is great excitement and momentum in sharing information and ideas at this Forum, and asked how the group would like to continue this dialogue, increase public awareness and develop specific actions from our discussions? What kind of collaboration do we want to create to keep this moving forward? One suggestion is to convene a small group of people to brainstorm about next steps—will we need a public campaign, is there more need for research, should we focus efforts on communications? We need to think about the costs of inaction, the environmental crisis versus good news stories and a positive vision. What would you like to see emerge from today's Forum?

In summary, participants were unanimous in supporting a collaborative effort around biodiversity, environment quality and human health. They agreed that:

- We need to make sure that a good information base is readily available and that whatever we do is science-based.
- ·We need to involve the right players who will be able to make a difference.
- An awareness campaign should include key messages, audiences, tactics, outcomes and measures of success.
- We need to use a range of techniques, for example community-based social marketing, The Natural Step, and smart technologies.

DISCUSSION

Discussion included the following comments (C), questions (Q) and answers (A):

C: We need a working group on human health and biodiversity. We need to include medical and health research, social NGOs and industries like insurance that have financial drivers. We must identify the barriers and develop strategies to ensure that we get the most out of our investments. It can't be just environmental groups. We have to bring in all strengths to develop a strategy to move forward.

C: We should think carefully about how to engage these communities. In addition to raising awareness, we should consider skills development, such as teaching people how to plant and care for trees, etc. We have to bring this work to the grassroots level.

C: We need to first ensure that we're aware of how we're defining health and healthcare. In this Forum, we only have a handful of people representing public health and the medical professions. It's great to involve the converted, but fundamentally we have to broaden the involvement if we are going to make the connection to health.

C: Health care is all about disease in our current system, and there are many invested interests in this approach. Moving to preventative health care is a challenge, even in the public health profession. We will need to tackle it in several ways, but one worthwhile step would be to approach the Canadian Public Health Association about collaborating on a position paper.

C: We need to create more opportunities to talk to doctors and nurses. For example we could participate in sessions where they gather for education and training. We also need the engineers —especially regarding infrastructure issues.

C: We're addressing land use decisions made in the past and those that will be made in the future. We need to involve municipal councils, maybe through the Association of Municipalities of Ontario (AMO). We need to engage in key decision-making processes, such as the 5-year cycle to review land use plans. We could also provide information to councillors, for example in municipal council handbooks.

C: We need to think about how to take the message that resonates here —to people that can make the changes—media and senior politicians. If the cancer, lung, etc associations endorse our message, this will help strengthen our movement. These organizations can support and add credibility to our message.

C: With regards to chronic illnesses and public health, it's one thing for an NGO to say it's good for you—but if a doctor tells you it's good for your health then the message is more effective. We have to partner with doctors. It's a 2-way street—we also have to promote <u>their</u> work.

C: This is nothing short of a social movement towards a vision of an ecologically sustainable future. Frameworks for building sustainability do exist—the main one is from Sweden—The Natural Step. Scientists agree on this model and there are processes we can use in each of our spheres to move forward.

C: There's an annotated list of studies on the health benefits of being in nature (see http://www.childrenandnature.org/documents/C118/). We need to speak to each sector—we need to understand what individual practitioners do on a day-to day basis, and their needs.

C: One contribution from the medical community could be to use prescription pads to prescribe time outdoors.

C: Shade would be a great theme to bring health and trees together. Municipalities (e.g. Toronto and Waterloo) have developed shade policies and schools are also looking to bring shade to their grounds. Shade addresses all the health benefits of cancer prevention and physical activity that connect trees to health in a measurable, attainable and fundable way. A united collaboration to endorse and support shade policies could also focus on neighbourhoods with low tree canopy in order to deal with this inequity.

Closing Remarks by Dr. John McLaughlin

Today's Forum was full of important ideas and discussions, and thank you for the opportunity to be part of it. Trees Ontario and the group at this Forum have clearly accomplished the first goal of the report—which was to begin a much-needed dialogue on how greening—in the truest sense of the word—can contribute to better health and communities. Today's discussion has covered much ground, but there are still some difficult questions to be addressed.

Society is beginning to recognize that the medical system is set up to treat illness, whereas health promotion and disease prevention mostly happens outside the so-called health care system. Broadly speaking there is some recognition that greening is part of the solution when it comes to improving health. I agree with the report's observations and today's discussions that the health benefits that can arise from greening and reforestation are real and multifaceted. Thus, I commend Trees Ontario in fostering this dialogue.

For any new program or strategy to succeed, we are clearly in times when it is essential to consider its cost-benefit. Although some assume that disease prevention saves money, estimating costeffectiveness is not straight-forward, in part because all the benefits of an ecological approach are either difficult to measure or not considered in the narrow way by which models are developed or used in decision-making. To move the initiative forward, attention should be given to this complexity, and you should ensure that there is evidence to support the claims that are made. In declaring the benefits and risks, it can also assist to engage the public in the dialogue, as active participation by the community can drive the program forward, and in turn, help governments find their positions and make "the right decisions."

With the full range of stakeholders actively engaged, it could evolve to a campaign or movement with momentum directed towards a shared goal. A clear focus will help—this is best if it is bold and ambitious, such as "here's what we do, we do it better than anyone else, there are real and important benefits to our communities, etc." There are no easy solutions for complex problems, so we must be both strategic and also reasonable when setting goals.

We're in an era of performance management, so measurement of progress is essential. One useful aspect of this is public reporting, which is now relatively easy through web and social media, but for such a program this could also be a way to inform and engage the public, as well as professionals and politicians.

So who are the most important partners for a greening movement? There was some discussion today about a need to involve doctors. This is fine, but note again that overall, the focus of physicians is the diagnosis and treatment of illness. It is important that they do this well—and they do. But the focus of this Forum is on health promotion and disease prevention, with a particular focus on the natural environment. Among medical doctors, it is mostly physicians working in the public health system, rather than hospitals and clinics, who understand what must be done to promote health, prevent disease, and build healthy communities. So sure, pursuing supports from the medical community is fine, but I also urge you to think more broadly.

Consider "whose job is it to promote environmental change to improve health?" This is one area that often falls between the cracks—the Ministry of Health and Long Term Care focuses on running the medical care system, while the Ministry of Environment focuses on the environment while expecting others to deal with health. Again, the Public Health system can do some of this, but their mandate is broad and there are few resources that could be allocated to the environment. Also, for some of the issues related to greening and reforestation, many other Ministries and community organizations could or should be involved. With there being no clarity about whose job it is, or who is accountable, it is not surprising that things have not been happening already.

By assuming some leadership, and pulling the diverse but interested groups together, I believe that agreement and supports will arise from many sectors. This is a good problem to have, because funding is not the first limiting factor—with many potential contributors, there is likely sufficient funding throughout the system—it is simply a matter of finding ways to bring it together.

I have been part of many discussions about the possibilities for better disease prevention, and indeed, this is of interest to many groups. What is unique about today's Forum is that we came together around trees, and that the health dialogue was begun by Trees Ontario. This is unique, the initiative has potential to be important, and the circumstances indicate that it is leadership that is lacking to steer the diverse stakeholders. Again, I commend Trees Ontario and all of you in getting this started. I see that the needed leadership is here in this room.

Canada should be a leader in forest restoration and greening as part of building a better and sustainable future. I believe that Trees Ontario is in a good position to seize this opportunity and run with it.

Wrap-Up

Rob Keen thanked Dr. McLaughlin, the other speakers and all the participants for their contributions. He said that Trees Ontario would be in touch soon regarding next steps. These would include:

- Convene a small group from interested Forum participants to prioritize proposed opportunities for multi-sectoral collaboration and determine follow-up actions on targeted priorities;
- · Report back to Forum participants on a recommended plan of action; and
- \cdot Format the Healthy Dose of Green as an online, modular resource that can be easily updated and augmented.

Appendix A: Participant List

Name	Organization
Bill Kilburn	Back to Nature Network
Suzanne Barrett	Barrett Consulting
John Preece, Ph.D	British Consulate-General
Dr. John Howard	Canadian Association of Physicians for the Environment
Pegi Dover	Canadian Environmental Grantmakers Network
Theresa McClenaghan	Canadian Environmental Law Association
Logman Azar	Conservation Council of Ontario
Jo-Anne Rzadki	Conservation Ontario
Jane Lewington	Conservation Ontario
Don Pearson	Conservation Ontario
Dr. Faisal Moola	David Suzuki Foundation
Kiruthiha Kulenderin	David Suzuki Foundation
Jode Roberts	David Suzuki Foundation
Debby Martin	Evergreen Brick Works
Colleen Cirillo	Green Infrastructure Coalition
Deborah Kenley	Greening Corporate Grounds
Janet McKay	LEAF
Carol Oitment	Ministry of Tourism, Culture and Sport
Doris Chee	Ontario Association of Landscape Architects
Steve Hounsell	Ontario Biodiversity Council
Jack Gibbons	Ontario Clean Air Alliance
Carla Grant	Ontario Forestry Association
Barbara Heidenreich	Ontario Heritage Trust
Chris Haromy	Ontario Lung Association

Ala Boyd	Ontario Ministry of Natural Resources
Gary Nielsen	Ontario Ministry of Natural Resources
Christopher Lemieux	Ontario Ministry of Natural Resources
Loretta Ryan	Ontario Professional Planners Institute
Kiran Ghai	Peel Public Health
Melissa DeYoung	Pollution Probe
Jaan Pill	Preserved Stories
Alicia Tyson	Public Health Consultant
Karen Dobrucki	School Ground Design Consultant
Dean Middleton	Public Health Ontario
Megan Williams	Simcoe Muskoka District Health Unit
Pamela Gough, Trustee	Toronto District School Board
Mark Cullen	Trees for Life/the Urban Tree Canopy Coalition
Shelley McKay	Trees Ontario
Robert H. Keen, RPF	Trees Ontario
Dr. John R. McLaughlin	University of Toronto, Dalla Lana School of Public Health
Christopher J. Lemieux	University of Waterloo

Appendix B: Inventory of Complementary Activities

This inventory was compiled from the information provided by participants at the Health Forum. The activities are grouped according to the recommendations in A Healthy Dose of Green paper. They are:

- 1. Tree planting and forest conservation
- 2. Dialogue and collaboration
- 3. Research
- 4. Awareness and education
- 5. Policy

1. TREE PLANTING AND FOREST CONSERVATION

Representative	Programs and Descriptions
Jo-Anne Rzadki Conservation Ontario www.conservationontario.ca	 Conservation authorities are significant contributors to tree planting efforts in southern Ontario; 3 million trees/ year: Partner with Trees Ontario/MNR/ag sector/private corporations etc. Includes a range of other stewardship activities with private land owners Rural water quality: fish and wildlife habitat restoration
Deborah Kenley Credit Valley Conservation www.creditvalleyca.ca	 Greening Corporate Grounds Helping businesses and institutions green their grounds using ecological landscaping practices. We provide educational opportunities for staff and volunteers and coordinate planting events on their grounds A member of Partners in Project Green, TRCA Offered in the Region of Peel Credit Valley Conservation has also prepared reports: Ecosystem Services and Human Well Being Report Oct. forum on the Power of Green

Gary Neilsen Ontario Ministry of Natural Resources	• 50 Million Tree Program
Karen Dobrucki Evergreen Foundation and TCDSB www.evergreen.ca	 Creating more natural environments on school grounds (trees, trees, trees) Children's health issues Increasing tree canopy coverage on school grounds Reduction of heat island effect
Mark Cullen Trees For Life—The Urban Tree Collation www.markcullen.com	 Double our Urban Tree Canopy in Ontario's Urban Areas Marshalling resources of coalition members (non-profits) government/private donators to reach our goal We wish to elevate the discussion about urban trees from "nice to have" to being equal with other urban infrastructure
Steve Hounsell Ontario Power Generation Biodiversity Council	 Forest restoration linked to climate change mitigation and adaptation
Jack Gibbon North Gwillimbury Forest Alliance	• Preserve and enhance one of the ten largest forests in the Lake Simcoe watershed.
Janet McKay LEAF (Local Enhancement and Appreciation of Forests)	 Not for profit organization that engages residents of Toronto and York Region in urban forest stewardship Also involved with Urban Forest Stewardship Network, Green Infrastructure Ontario Coalition and Trees for Life Coalition
Barbara Heidenreich Ontario Heritage Trust	• Secure conservation land: fee simple ownership 10,000 acres and by easement agreement 9,000 acres. Total land protected 19,000 acres
Kiruthiha Kulenderin David Suzuki Foundation	 Partnership with Rona for community engagement for tree-planting in the Rouge National Park

2. DIALOGUE AND COLLABORATION

Representative	Programs and Descriptions
Jane Lewington Conservation Ontario	 2012 A.D. Latornell Conservation Symposium Trying to develop the foundation with practitioners and their partners to be able to think and talk about linkage between health, watersheds and people Theme: Prescription For A Healthy Environment, November 14-16 2012 Nottawasaga Inn, Alliston ON. www.latornell.ca 1,000 people attend this annual event Work in Ontario's environment 49 sessions, 8 streams (watershed management, Great lakes, water, biodiversity, sustainable communication, information management, resource management, communications stewardship)
Christopher M. Lemieux Ministry of Natural Resources Website—UofT Faculty of Forestry—"Connecting Nature and People"	 Regional Natural Heritage Systems Projects: Community- driven collaborative projects to design natural heritage systems to support healthy communities Kawarthas, Naturally Connected (NHS) Project Sustaining What We Value Project (in Leeds and Grenville Counties) Releaf Hamilton
Pegi Dover Canadian Environmental Grantmakers' Network www.cegn.org	 Developing a brief and communications work on "Environment and Health – looking at environmental connection to human health" (Bruce Lourie and Rick Smith, authors) Trying to connect environmental funders with health funders
Doris Chee Ontario Association of Landscape Architects www.oala.ca	 The association and its members are involved in numerous projects from policy making, stakeholder inclusion on various committees, to providing consultation services on design, issues and concerns with the environment Personally I represent the association on the steering committee of the Green Infrastructure Ontario. Participated on the Great Lakes Protection Act and Strategy

Colleen Cirillo
Toronto and Region
Conservation Authority

 Discussions with conservation authorities and public health departments, also Ontario Public Health

www.trca.on.ca

Bill Kilburn• Network of over 70 organizations in Ontario promotingBack to Nature Networkthe connection of children & families with nature:

www.back2nature.ca

- Teachers' GuidePolicy Papers
- ECE initiatives including gardens
- Awareness

Steve Hounsell Canadian Business and Biodiversity Council

www.businessbiodiversity.ca www.seracanada.ca www.biodiversityeducation.ca

- · Canadian Business and Biodiversity Council:
 - Mainstream biodiversity in business
 - Retain, restore, replace and recover habitats
- Socially and Environmentally Responsible Aggregates
 (SERA)
 - Certification standards for natural heritage (habitat protection and offsets)
- · Biodiversity Education and Awareness Network
 - BEAN is a collaborative network of groups and individuals representing private industry, formal and non-formal education, government, the environment and conservation
 - Building a provincial network that actively develops, delivers and supports biodiversity education and awareness

3. RESEARCH

Representative	Programs and Descriptions
Christopher Lemieux University of Waterloo	· Healthy Outside, Healthy Inside—examining health, motivations, actions and benefits related to parks and protected areas in Canada
Dean Middleton Public Health Ontario	 Air quality research—research into urban air quality Built environment and health—relation between the two Want to do more!
Colleen Cirillo TRCA www.trca.on.ca	 Tree studies for a number of municipalities in TRCA jurisdiction Some of these are accompanied by urban forest strategies
John Preece British Consulate General Science and Innovation Network	 Projects on climate change/adaptation/mitigation: Linking Canadian and UK academic expertise on relevant research (health, environment, biodiversity etc.)

4. AWARENESS AND EDUCATION

Representative	Programs and Descriptions
Carla Grant Ontario Forestry Association www.focusonforests.ca www.ontarioenvirothon.ca	 Focus on Forests—Providing resources for teachers, parents and students to connect to the natural environment: tree planting, outdoor classrooms, and lesson plans Envirothon—Curriculum-based academic competition to get high school students engaged and encouraged to study/learn about the environment. Outdoors and hands-on
Chris Haromy Ontario Lung Association www.on.lung.ca www.yourhealthyhome.ca	· Awareness—newsletters, websites, print materials
Melissa DeYoung Pollution Probe www.pollutionprobe.org	• Series of 12 Great Lakes Fact Sheets aligning with key issues related to the wealth of the Great Lakes. Topics include biodiversity, urban sprawl, ecosystem services, stewardship, climate change, habitat loss and wastewater management
Loghman Azar The Conservation Council of Ontario www.weconserve.ca	 10 Part learning workshops entitled: "Silent Partner" —solutions inspired by nature
Jode Roberts David Suzuki Foundation	• Natural Capital Promotion/Research: DSF has several public engagements and research projects coming in the next year that we hope to launch. The focus is on promoting the health & economic benefits of nature in their neighbourhoods
Christopher M. Lemieux Ministry of Natural Resources	 Communicating the value of nature's benefits (ecosystems services) Use ecosystem services as the focus to get Ontarians aware of the daily benefits (mostly under-appreciated) that each person derives from natural systems. The hope is that once aware, they will care and act to sustain those natural systems

Barbara Heidenreich Ontario Heritage Trust	 Trails Open Program: Started in 2007 in partnership with Bruce Trail Conservancy and spread to other trails Trails support heritage tree recognition & protection
Jane Lewington Conservation Ontario	 •Watershed Report Cards: Many CAs are launching a standardized format watershed report card together as a group Reports on surface water quality, forest conditions, and groundwater quality Will be promoted provincially & locally Report cards are a good tool to build awareness & encourage local engagement because they also provide residents with specific actions they can take Would appreciate help to promote report cards Healthy Hikes: In 2013 CAs are organizing a "Healthy Hikes" campaign across the province to run from May-end of October. Want to get people out into the Conservation Areas. Will be marketing tools, education & events. Developing special website to feature health management tools and links. Other agencies would be welcomed in this partnership. Could promote programs, undertake research & compile stats.
Gary Neilsen Ontario Ministry of Natural Resources	· Climate Change Awareness Presentations
Steve Hounsell Canadian Business and Biodiversity Council www.adaptnowcanada.ca www.businessbiodiversity.ca	 Climate Change Adaptation Project Canada includes adaptation needs for biodiversity
Karen Dobrucki Evergreen Foundation and TCDSB www.evergreen.ca	· Education for environmental stewardship

5. POLICY

Representative	Programs and Descriptions
Pamela Gough TDSB and Toronto Board of Health	 Environmental Education Initiatives-TDSB Schoolyard greening-TDSB Health Committee Toronto Board of Health and TDSB Sports and wellness academics in public school
Megan Williams Simcoe Muskoka District Health Unit www.simcoemuskokahealth.org	 Municipal Policy: Working with municipalities to develop healthy community design policy for their Official Plans and other planning documents, including implementation activities (ie. Shaded areas, green spaces) Active Transportation: Initiatives to encourage active transportation in urban and rural areas, trails, forested areas, etc.
Theresa McClenaghan + Guest Canadian Environmental Law Association www.cela.ca	 Provincial Policy Statements reform Environmental Health—land-use, pollution, equity, etc.
John Howard Canadian Association of Physicians for the Environment (CAPE) www.cape.ca	 Cosmetic Pesticide Campaign Renewable Energy/Conservation Organic farming Environmental policy changes that improve the health of Canadians
Colleen Cirillo Green Infrastructure Ontario Coalition www.greeninfrastructureontario.org	• Green Infrastructure Ontario Coalition is a group of related organizations, trade associations and agencies that advocate for green infrastructure funding and policy at the provincial level
Alicia Tyson Public Health Consultant	 Mental health Healthy eating Active transportation/built environment Building Healthy Communities: Facilitating 'priorities' development Developing Healthy Public Policy Creating community action plans Engaging and connecting stakeholders

Ala Boyd Biodiversity Policy Section (MNR)	 Ontario Government Plan to Conserve Biodiversity: This program reflects major policy initiative of 15 ministries to conserve biodiversity across the government of Ontario operations Initiative endorses strategic elements of Ontario Biodiversity strategy by OBC and lays out ambitious action plans
Carol Oitment Ministry of Tourism, Culture and Sports	 Contribute to provincial policy that affects parks, open space, trails, recreation facilities and water based resources. Examples: Provincial Policy Statement Great Lakes Action Plan Lake Simcoe Recreation Strategy Government Response to the Biodiversity Strategy Back to Nature Network Active Transportation Working Group Policy lead on trails
Don Pearson Conservation Ontario www.conservationontario.ca	 Development of Natural Heritage Systems, in support of official planning compliance with the provincial policy statement. White paper on Watershed Management Futures, to stimulate broad discussion on role and responsibilities of provincial government transformation agenda (role, response, governance, sustainability, finance)
Jaan Pill Long Branch Historical Society	 Working on Heritage Conservation District designation for Long Branch (South East Etobicoke) including focus on heritage trees as heritage resource
Loretta Ryan Ontario Professional Planners Institute www.ontarioplanners.on.ca	• OPPI's central policy focus is on healthy communities, of which green infrastructure is an important component

Appendix C: Additional Resources

ADDITIONAL REFERENCES ON THE LINKS BETWEEN NATURE/BIODIVERSITY AND HEALTH

Contributed by: Barbara Heidenreich

Adevi, Anna A. and Mats Lieberg (2012) "Stress rehabilitation through garden therapy: A caregiver perspective on factors considered most essential to the recovery process" *Urban Forestry & Urban Greening* 11: 51–58

ABSTRACT: At the Alnarp Rehabilitation Garden in Sweden, people suffering from stress-related illness are rehabilitated through garden therapy. Empirical data were collected through in-depth interviews and focus-group interviews with the rehabilitation team. The present article is based on team members' understandings of significant factors to the stress recovery process. On-site observations were conducted to achieve a broader comprehension of the empirical data. The article is based on the caregivers' points of view, as they are presumed to be close to the course of events occurring in the garden therapy programme as a whole. The results reveal a generally complex picture of the rehabilitation form, but at the same time indicate three factors that are of primary importance: (1) sensory impressions, (2) self-chosen places in the garden, and (3) interactions between concrete and symbolic activities. The garden environment tends to "prepare, receive and open up" the participants before and after therapeutic elements, which is thought to be especially appropriate for this group. The results provide important knowledge about what kinds of factors contribute to relief and recovery from stress-related ill-health in the context of stress rehabilitation through garden therapy.

Corresponding author: E-mail address: anna.a.adevi@ltj.slu.se (A.A. Adevi).

Bratman, G., Paul Hamilton and Gretchen Daily (2012). ""The impacts of nature experience on human cognitive function and mental health"

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES gbratman@stanford.edu

Chivian, Eric and Aaron Bernstein, Eds. *Sustaining Life How Human Health Depends on Biodiversity*. New York: Oxford University Press, 2008. 566 pp. ISBN 9780195175097.

Reviewed by David P. Mindell in *SCIENCE* www.sciencemag.org Vol 323 (20 MARCH 2009): 1562-1563

Dean, Julie, Kate van Dooren, Philip Weinstein (2011) "Does biodiversity improve mental health in urban settings?" *Medical Hypotheses: Background: Hypothesis:Evidence: Implications:* Our hypothesised relationship between environmental change and mental health proposes conservation and restoration of biodiversity in urban environments as a form of intervention for improving human health. It also highlights the need for a better evidence base to demonstrate the synergistic benefits of increased biodiversity and mental health to decision makers. Well-designed quantitative epidemiological research is needed to establish the strength of any such causal relationship.

Fuller, Richard A., Katherine N Irvine, Patrick Devine-Wright, Philip H Warren and Kevin J Gaston (2007) "Psychological Benefits of Greenspace Increase with Biodiversity" *Biol. Lett.* 3, 390-394

ABSTRACT: The world's human population is becoming concentrated into cities, giving rise to concerns that it is becoming increasingly isolated from nature. Urban public greenspaces form the arena of many people's daily contact with nature and such contact has measurable physical and psychological benefits. Here we show that these psychological benefits increase with the species richness of urban greenspaces. Moreover, we demonstrate that greenspace users can more or less accurately perceive species richness depending on the taxonomic group in question. These results indicate that successful management of urban greenspaces should emphasize biological complexity to enhance human wellbeing in addition to biodiversity conservation.

Mace, Britton L., Paul A. Bell and Ross J. Loomis (2004) "Visibility and Natural Quiet in National Parks and Wilderness Areas: Psychological Considerations" *Environment and Behavior* http://eab.sagepub.com/cgi/content/abstract/36/1/5

ABSTRACT: For over a century, authorities have recognized cultural and psychological benefits of preserving national parks and wilderness areas. Yet, with increases in visitation and mechanized travel, air and noise pollution are intruding more and more into preserved natural areas. Psychological research shows that humans can detect very low levels of these pollutants in natural and laboratory settings, that air and noise pollution detract from the enjoyment of the visitor experience, and that people place a high value on naturally quiet, pollution-free settings. This article discusses how psychological research is essential for a more complete understanding of the value and the influence of both visibility and quiet surroundings with a focus on applied, field-based research in national parks and wilderness areas. The article concludes with recommendations for future directions in research in these areas and argues that implications of psychological research results should be addressed in the natural resource policy-making process.

McShane, Thomas O., Paul D. Hirsch et al ((2011) "Hard choices: Making trade-offs between biodiversity conservation and human well-being" *Biological Conservation* 144: 966–972

ABSTRACT: Win-win solutions that both conserve biodiversity and promote human well-being are difficult to realize. Trade-offs and the hard choices they entail are the norm. Since 2008, the Advancing Conservation in a Social Context (ACSC) research initiative has been investigating the complex trade-offs that exist between human well-being and biodiversity conservation goals, and between conservation and other economic, political and social agendas across multiple scales. Resolving trade-offs is difficult because social problems-of which conservation is one-can be perceived and understood in a variety of disparate ways, influenced (in part at least) by how people are raised and educated, their life experiences, and the options they have faced. Pre-existing assumptions about the "right" approach to conservation often obscure important differences in both power and understanding, and can limit the success of policy and programmatic interventions. The new conservation debate challenges conservationists to be explicit about losses, costs, and hard choices so they can be openly discussed and honestly negotiated. Not to do so can lead to unrealized expectations, and ultimately to unresolved conflict. This paper explores the background and limitations of win-win approaches to conservation and human well-being, discusses the prospect of approaching conservation challenges in terms of trade-offs and hard choices, and presents a set of guiding principles that can serve to orient strategic analysis and communication regarding trade-offs.

Corresponding author: E-mail address: mcshane@bluewin.ch (T.O. McShane).

Nordh, Helena, Patrik Grahn, Peter Wa "hrborg (2009) "Meaningful activities in the forest, a way back from exhaustion and long-term sick leave" Urban Forestry&UrbanGreening8(2009)207–219

ABSTRACT: a rehabilitation project in a forest environment was carried out in a collaboration between Skogsstyrelsen (The SwedishForestAgency), Arbetslivsresurs(a state-owned company running work rehabilitation, making individual strategy plans) and the Swedish University of Agricultural Sciences, SLU, Alnarp. Out of a group of 34participants, 24 volunteered to be part of the research survey. Most of the participants had been on the sick list for a long time and suffered from depression and anxiety disorders. The interventions proceeded for 10 weeks and were held within a short distance from a smaller town in central Sweden. Three groups were set up to participate in the study: two groups during autumn 2006, followed by a short evaluation, and a third group during spring 2007. We have used a Triangulation approach to evaluate the study, including both qualitative and quantitative methods. The qualitative results suggest that it was a successful project, in that most of the participants enjoyed the program and experienced a general improvement in both their physical and mental state. However, toward the end of the program they had considerable worries about the future. The quantitative results show that: Participants improved concerning symptoms of illness and general functioning, but their quality of life declined. We suggest that the decline in quality of life at the end of the intervention depended upon the participants 'life situation after rehabilitation. This could be due to returning to uncertain life situations such as work, family, financial support, etc.

Park, Bum-Jin, Katsunori Furuya, Tamami Kasetani, Norimasa Takayama, Takahide Kagawa, Yoshifumi Miyazaki (2011) "Relationship between psychological responses and physical environments in forest settings" *Landscape and Urban Planning* 102: 24–32

ABSTRACT: The present study aimed to clarify the relationship between psychological responses to forest and urban environmental settings and the physical variables that characterize these environments, by examining the psychological responses of 168 subjects to their physical environment. Field experiments were conducted in 14 forests and 14 urban areas across Japan. The semantic differential (SD) method was employed in which a questionnaire was administered to subjects prior to their walks in the forests and urban areas. In addition, the profile of mood states (POMS) questionnaire was administered before and after the walks, as well as before and after they sat and viewed the forest and urban landscapes. The environmental variables measured were air temperature, relative humidity, radiant heat, wind velocity, and two indices of thermal comfort [predicted mean vote (PMV) and predicted percentage dissatisfied (PPD)]. Responses to the SD questionnaire indicated that compared to urban settings, forest settings are perceived as being significantly more enjoyable, friendly, natural, and sacred. The POMS measures of tension and anxiety (T-A), depression and dejection (D), anger and hostility (A-H), vigor (V), confusion (C), fatigue (F), and total mood disturbance (TMD) showed significant differences between the forests and urban areas. These results strongly support the suggestion that forest settings have attention restoration effects. The psychological responses to physical environments were also significantly related to air temperature, relative humidity, radiant heat, wind velocity, PMV, and PPD. The results of this study might be useful in designing restoration environments in urban areas.

Contact: E-mail addresses: bjpark@cnu.ac.kr (B.-J. Park),

Stagoll, Karen, David B. Lindenmayer, Emma Knight, Joern Fischer, & Adrian D. Manning (2012) "Large trees are keystone structures in urban parks" *Conservation Letters* (2012) 1–8 ABSTRACT: Large trees are considered keystone structures in agricultural and forestry production landscapes, but research demonstrating this in urban landscapes is urgently needed. If large trees are keystone structures in urban parks, it is imperative that this is recognized in policy to ensure their ongoing existence. We studied the role of large native trees for birds in urban parks in Canberra, Australia. We found that (1) large trees had a consistent, strong, and positive relationship with five measures of bird diversity, and (2) as trees became larger in size, their positive effect on bird diversity increased. Large urban trees are therefore keystone structures that provide crucial habitat resources for wildlife. Hence, it is vital that they are managed appropriately. With evidence based tree preservation policies that recognize biodiversity values, and proactive planning for future large trees, the protection and perpetuation of these important keystone structures can be achieved.

Contact: E-mail: karen.stagoll@anu.edu.au

Summers, J.K. et al ((2012) "A Review of the Elements of Human Well-Being with an Emphasis on the Contribution of Ecosystem Services" *AMBIO* ABSTRACT: Natural ecosystems perform fundamental life support services upon which human civilization depends. However, many people believe that nature provides these services for free and therefore, they are of little or no value. While we do not pay for them, we pay significantly for their loss in terms of wastewater treatment facilities, moratoriums on greenhouse gases, increased illnesses, reduced soil fertility and losses in those images of nature that contribute to our basic happiness. Little is understood about the well-being benefits of the natural environment and its ecosystem services. The interwoven relationship of ecosystems and human well-being is insufficiently acknowledged in the wider philosophical, social, and economic well-being literature. In this article, we discuss an approach to examine human well-being and the interactions of its four primary elements—basic human needs, economic needs, environmental needs, and subjective wellbeing—and ecosystem services.



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

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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 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-ofthe-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, identify, spiritual meaning, social well-being, bequest for future generations); and individual-oriented (e.g., existence, physical health, psychological health, spiritual wellbeing) (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 wellbeing (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

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The beach at Pinery Provincial Pork, 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, rarcly = 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 (0.0) 0-60K 36 (21.7) 60-100K 44 (26.5) 100 - 150K 33 (19.9) 150K+ 35 (21.1) Missing 18 (10.8) Education 55 (33.1) Bachelors or higher 101 (60.8) Missing 100 (6.0)			control (first) prototory	In the local part of the local of
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Missing 10 (6.0)		Bachelors or higher	101	(60.8)
	112	Missing	10	(6.0)

RESULTS

Collectively, 166 responses were collected (Gatineau n=57; Pinery n=109). The sample is slightly overrepresented 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

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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).

	Descript	ive	т			
	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 wellbeing 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

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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).

	Descripti	ve	lests of Significance p-values				
	Mean	SD	Age ¹	Sex ²	Income1	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 wellbeing 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)

	Descri	ptive	Tests of Significance p-values				
	Mean	SD	Age ¹	Sex ²	Income1	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 henefits 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.

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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.

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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.

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