

CHAPTER 6

Reconnecting with nature

The health of our environment is directly linked to human physical and mental health and well-being. With the acceleration of climate change, we must re-evaluate our perceptions and unsustainable interactions with nature and explore how we can respectfully re-engage with and steward the ecosystems that we depend upon.

Chapter Highlights

- *In a Canadian survey, 87% expressed greater happiness when connected to nature, yet 85% voiced concern that their future children will not have the opportunity to enjoy the nature we experience today.*
- *Anthropocentrism refers to an environmental responsibility that is derived from human interests alone, while a biocentric worldview focuses on the protection of all living beings and that nature has inherent value beyond what it provides to humans.*
- *Climate-related emotional responses, such as eco-anxiety and solastalgia, affect communities impacted by climate change, particularly rural, remote, and Indigenous communities that are disproportionately affected by the climate crisis.*
- *Action steps to re-engage with nature operate on different levels of social organization, including youth, community, and society, and are based on leverage points identified through systems thinking.*

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Table of Contents

Land acknowledgement	136
Our current disconnected relationship with nature	137
Why we must re-engage	140
How do we define nature?	141
Western worldview	141
Land ownership and commodification	142
Poisoning the land: Environmental racism	143
Indigenous worldview	144
Two-Eyed Seeing	146
Health benefits of nature	147
Physical health	147
Mental health	148
Mental health impacts of climate change	149
This is how we re-engage: From theory to practice	151
The role of research	152
Starting with children and youth	153
Advantages of childhood environmental education	153
Nature- and play-based learning	154
Community-directed strategies for sustainability	155
Community gardens	155
Prescribing nature	157
Strengthening societal connectedness with nature	158
People-nature reconciliation	159
Ecosystem-based conservation planning	160
Rural engagement with nature	162
Conclusion	165

We don't inherit the earth from our ancestors, we borrow it from our children."
– Native American proverb, often attributed to Chief Seattle

With humility, we recognize that the authorship team for this chapter are settlers on the land we now call Canada. We are grateful to live, work, learn, write, and play on the unceded, traditional, ancestral territories of the Squamish, Musqueam, and Tsleil-Waututh Nations and their peoples, where the Rural Health Services Research Network of BC (RHSRNbc) is situated. We approach this chapter and the specific sections exploring Indigenous perspectives on and relationships with nature, from a position of cultural humility and as respectful learners. We recognize that Indigenous knowledge is dynamic, ever-evolving, and not homogeneous but reflects Indigenous peoples' unique cultures, languages, and histories. We respectfully acknowledge that Indigenous Knowledge-holders are the only people who can genuinely define Indigenous knowledge for their own communities. We are grateful for the exceptional Indigenous-led research that informs this section of the chapter referenced below. We commit to continue listening to, learning from, and amplifying Indigenous voices, communities, and organizations and exploring pathways towards decolonization, reconciliation, and collaborative relationships.

As readers, you may be joining from different traditional, ancestral, unceded and occupied Indigenous Lands. We encourage you to learn or remember the lands upon which you live by exploring a virtual, interactive map of Indigenous territories, treaties, and languages at <https://native-land.ca>.

Adaptation to ecosystem disruption is achieved through sustainable ways of living and efficient response. In chapter 3 we explored adaptation at the global levels, but adaptation is also important to resilience. Australia's National Strategy for Disaster Resilience defines a resilient community as "one whose members support one another and work together in ways that enable them to cope with and recover from stress and trauma" [1]. When adaptation actively incorporates local knowledge and traditional resources, it allows communities to prevent, respond to, and recover from climate-induced outcomes relatively independently, without over-reliance on external support. This creates a self-sustainable system against ecosystem disruption and leads to increased resilience and decreased vulnerability.



Introduction

Our current disconnected relationship with nature



In the modern world, where we live primarily in urban, industrialized settings, we have seemingly lost our sense of rich relationships with the ecosystems and species of Earth. Until the development of agriculture and the domestication of plants and animals, humans lived in intimate interconnection with the surrounding non-human life (1). Agriculture began nearly 12,000 years ago and considerably changed society, prompting a shift from the traditional nomadic hunter-gatherer lifestyle to constant settlements and a dependable food source. Agriculture-enabled permanent establishments led to cities, and subsequently, the global population exponentially increased. As farming expanded to meet demand, humans began to perceive themselves as separate from the rest of nature, which they could control and commodify.

While there is common awareness that we are somehow dependent on and connected to the natural world, most people tend to be cut off from nature in their day-to-day life. The living space of the present-day has moved from the outdoors to nearly entirely indoors; in 2014, it was found that Canadians spent only 6% of their day outside (2). This physical separation from nature and our destructive actions over the past centuries (primarily industrialization and the extraction of natural resources) have resulted in catastrophic effects on Earth's ecosystems upon which humans and animals depend. The current environmental crisis, including anthropocentric climate change, is affecting all life on Earth and consequently the lives of future generations.



Photo by Shane Rounce on Unsplash

Humans are often drawn to nature and other living systems despite our growing disconnection from the natural world. The biophilia hypothesis, first introduced by Edward Wilson in 1984, suggests that humans have an innate, genetically based tendency to affiliate with other forms of life (3). This is shown in a survey of 1000+ Canadians, where 87% agreed that they feel happier when more connected to nature (4). Moreover, 85% of the respondents expressed concern that their future children or grandchildren will not enjoy the green spaces we experience today (4). Ironically, while we shelter our lives from nature, there is a growing desire to bring nature indoors to our daily

lives through living walls or house plants. Emerging research shows that active interaction with interior flora can reduce physiological and psychological stress (5).

Are we a part of nature, or are we apart from nature?

How we answer this question dictates the ways in which we see and interact with the world. If we answer that we see ourselves apart from nature, we see nature as the “other.” We do not implicitly need to consider nature as something that we are connected to or required to understand and engage within a reciprocal relationship. With this perspective, we are inclined to see ourselves as above nature, using it for our own means without worrying about the harmful consequences of our actions. The separation between humans and

nature makes it increasingly challenging for us to empathize with nature; the less empathy we have, the less we care about the natural world. The result is a lack of consideration, connection, and reciprocal relationship with nature.

On the contrary, if we prescribe fundamental human connection to nature by viewing ourselves as a part of nature, we are no longer a separate entity but a species among others in the natural world's broader ecosystem. With an understanding that humans and nature are part of one system, we acknowledge that when we damage nature, we, in turn, harm ourselves.

Just as this nuance shapes our worldview, [Chapter 5](#) of this series discussed that cultural values are key influencers of an individual's beliefs, shaping social behaviours, including pro-environmental practices. This growing research field demonstrates how a connection with nature contributes to physical, emotional, mental, and spiritual wellness (6,7). Along with improved well-being and health, time in nature has also been associated with pro-environmental attitudes and practices (8).

Chapter 6 seeks to understand how humans may interact with all ecosystems of Earth and how we can re-engage with nature, especially in the face of rapidly accelerating climate change. Drawing on Indigenous knowledge and ways of knowing, this chapter seeks to explore how we can, individually and collectively, move forward in more balanced and respectful ways. This chapter presents the mounting evidence that nature benefits health and well-being. We offer practical strategies for re-engaging on different levels of social organization, including individuals (emphasizing childhood environmental education), communities, and society. Finally, we posit that rural be used as a model in our re-connection with nature and explore what urban can learn from rural surrounding respectful engagement and a stronger connection to nature.



Photo by Adam Vradenburg on Unsplash

Adaptation to ecosystem disruption is achieved through sustainable ways of living and efficient responses. In chapter 3 we explored adaptation at the global levels, but adaptation is also important to resilience. Australia's National Strategy for a Resilient Community defines a resilient community as "one whose members are connected to one another and work together in ways that enable it to function in the face of stress and trauma" [1]. When adaptation actively incorporates local knowledge and traditional resources, it allows communities to prevent, respond to, and recover from climate-induced outcomes relatively independently, without over-reliance on external support. This creates a self-sustainable system against ecosystem disruption and leads to increased resilience and decreased vulnerability.



Section 1

Why we must re-engage

A resilient community as "one whose members are connected to one another and work together in ways that enable it to function in the face of stress and trauma" [1]. When adaptation actively incorporates local knowledge and traditional resources, it allows communities to prevent, respond to, and recover from climate-induced outcomes relatively independently, without over-reliance on external support. This creates a self-sustainable system against ecosystem disruption and leads to increased resilience and decreased vulnerability.

How do we define nature?

The English word nature is borrowed from the Old French word nature, taken from the Latin, *natura*, meaning "course of things; natural character, constitution, quality; the universe." In ancient times, this literally meant "birth" (9). As we already explored, how we define nature will inform our journey towards re-engagement. To a great degree, nature is a socio-cultural construction, and one's context greatly influences its expression (10). For this reason, we hesitate to propose a rigid working definition of nature for the context of this chapter. Rather, we aim to explore how nature is understood from contrasting worldviews, including a modern Western and an Indigenous perspective.

Western worldview

With the influence of Christianity throughout the Western world, contrasting views of nature emerged throughout the centuries. These ranged from valuing nature as God's creation to the Enlightenment era, when the advancement of scientific knowledge afforded humans the power to control nature according to their own desires (11,12). As colonies were established in North America, different empires issued royal charters under the direction of the monarchs, thus embedding ideologies of land ownership in the continent (12). From there, the ideas of European thinkers such as John Locke were embraced by colonists. Locke proposed that humans have the divine right, as given by God, to use the land in ways that benefit them (13). He advocated for private accumulation and ownership due to its perceived benefits of encouraging labour and the consequent production of commodifiable goods, thus allowing for the fulfillment of God's command to flourish (13). This came to be one of the justifications endorsed by early colonists that would result in the colonization of land taken from the Indigenous peoples residing on it, whom Locke claimed were wasting the land in their traditions that greatly differed from Western practices and ideals (13).



Photo by Gryffyn M on Unsplash

In the 20th century, polarizing views of the human-nature relationship emerged. Anthropocentric views tie nature's value to human existence and welfare (14). Meanwhile, biocentric views are oriented towards protecting nature and non-human organisms, with the perspective that nature has inherent value outside of its usefulness to humans (14). Biocentric views are also rooted in spirituality and connection to nature (14). While it can be argued that both views have a claim in advancing environmental efforts, overall, biocentrism consistently aims to protect the environment much more than anthropocentrism.

However, as capitalist structures are deeply embedded in the Western world, anthropocentric views have been favoured due to their better alignment with capitalist values, as depicted in the **Figure 1** continuum. This dominating capitalist value system is reflected in the development of waste facilities and sewage plants, which have negatively created withdrawal (raw materials, land) and additive (environmental pollution, illness) impacts on the land (15). The literature calls for a deeper examination of the morals and values promoting environmentalism and preservation of the natural world (14).

Land ownership and commodification

The social constructionist perspective argues that land ownership is an artificial, socially constructed concept (16). Origins of this concept date back to colonial times when royal charters were established for the imperialistic gains of European empires based on the search for resource-rich land from which they could generate wealth (13). These ideologies are not just artifacts of the past but are still realized today. The influence of capitalist and neoliberalism ideologies in the Western world has embedded the commodification of land in our norms and structures, with the key focus on generating capital (17,18). This strongly relates to anthropocentrism, which favours the unregulated use of land and nature in a way that benefits human welfare (14). These ideologies drive and promote ideals of dominion and ownership of land.



Figure 1. Anthropocentrism-biocentrism continuum

Colonial conceptions of borders and ownership were different from Indigenous peoples who lived on the land before settlers colonized it. While some larger groups had more defined boundaries, the more common approach to 'borders' was defined by language, seasonal travel, hunting and fishing use, and landscape rather than the rigid, distinct lines that we now think of as borders (19,20). Borders were dynamic and overlapping, based on family groups and knowledge of the land rather than definite land boundaries owned by one nation. While concepts of sovereignty were important to nations such as the Anishinaabeg in Ontario, there were still trans-national relationships based on mutual respect with other groups (19,21,22). Overall, boundaries were more commonly defined by identity and culture rather than based on concepts of ownership.

Poisoning the land: Environmental racism

In 1982, Black activist Benjamin Chavis coined the term environmental racism. The term encompasses the hidden racial discrimination in environmental policymaking and targeting of communities of colour for constructing toxic pollutant-producing sites and the exclusion of POC from leadership and ecology movements (22). Environmental racism relates closely to what has been mentioned previously about both the Western human-nature relationship and land ownership. Integrating these concepts within an anthropocentric worldview leads to how we treat nature and those who lived on and continue to live on these lands.

The neoliberal philosophies that drive modern-day capitalism uphold systems of inequality to favour those in power, grounded in the colonial mindsets of white settlers. Those of lower socioeconomic status and racialized communities are left with worse outcomes as decisions concerning their well-being are frequently made without their consultation (23,24). As countries like Canada and the United States became more and more industrialized, the market demand for chemical plants, sewage treatment facilities, and other harmful industries grew. Those in power frequently decided to place these industries in marginalized communities, such as Black neighbourhoods, Indigenous reserves and low-income neighbourhoods (15). In Ontario, privatization and neo-liberal reforms have historically reduced industry monitoring and reporting requirements. This severely impaired the ability of provincial ministries and local agencies to regulate and monitor environmental conditions, allowing for unregulated and uncontrolled damage and poisoning of the land (15). **Figure 2** depicts the proximity between toxic waste sites and communities of colour in

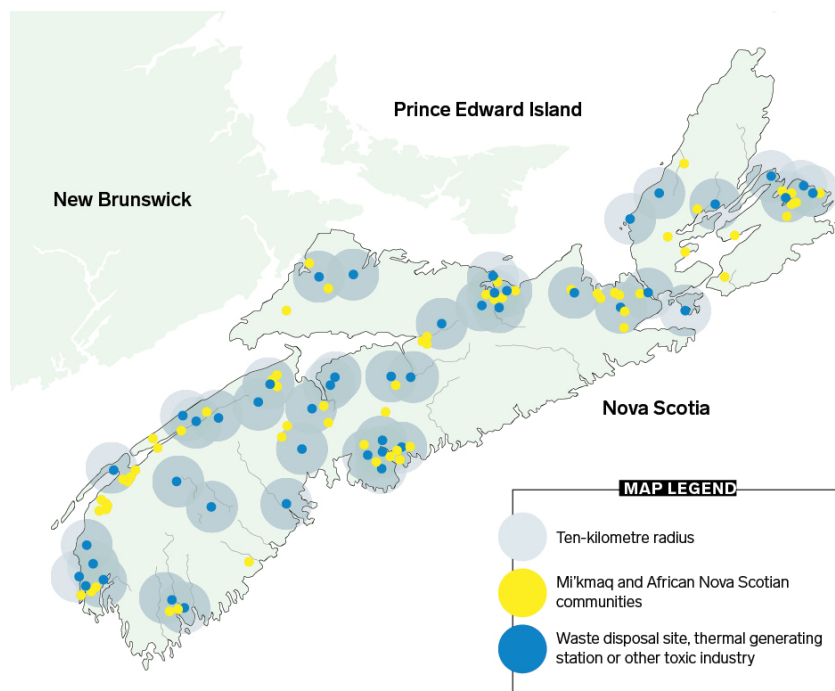


Figure 2. Map of chemical facilities and communities of colour. Retrieved from <https://www.enrichproject.org/map/>

Nova Scotia. The result has been alarming rates of cancer and other non-communicable diseases afflicting those living close to environmental toxins created by these facilities, primarily African Nova Scotian and Mi'kmaw communities (25).

“Environmental racism is based on this idea that we aren’t human enough to deserve a clean environment. Nobody cares if we get sick and die because we’re just Indigenous people. And industry and government are banking on that.”

- Molly Wickham (Supporting chief in the Cas Yikh House of the Gidimt'en Clan) (26)

It can be argued that environmental racism is fueled by neoliberalism in its commodification of nature, land, and natural ecosystems and the reproduction of a hierarchical system that continually oppresses those with the least amount of power (27,28). The lack of respect for the land and those who reside on it perpetuates the detrimental impacts of environmental racism caused by waste facilities and chemical dumping. This, in turn, can lead to health effects such as high rates of cancer and other non-communicable diseases, contributing to health disparities among racialized populations (29). In some cases, these facilities have had lasting impacts on the soil and water even after being shut down, which has impacted the ongoing challenges of accessibility to clean drinking water for these communities (26).

Indigenous worldview

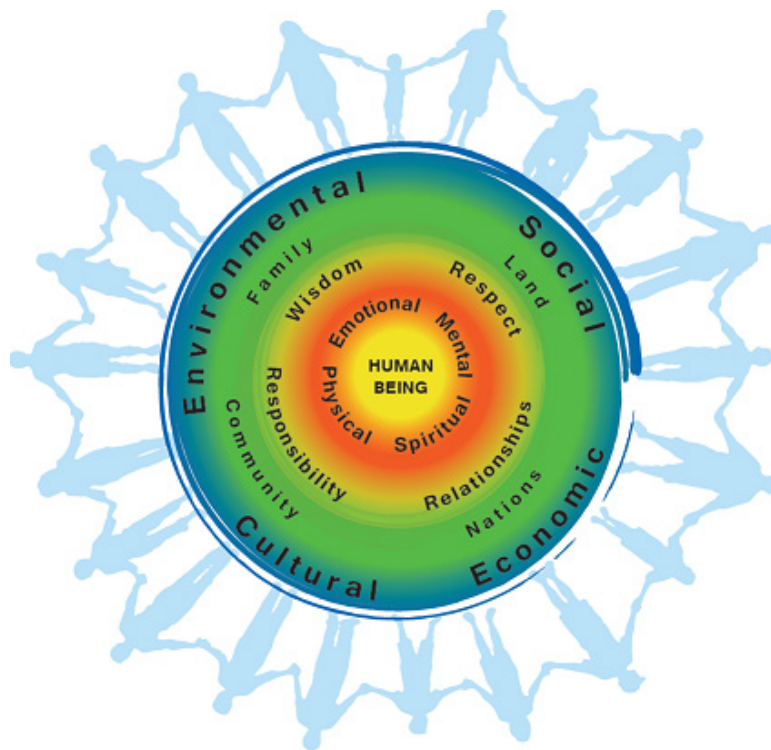


Figure 3. Perspective on Health and Wellness. First Nations Health Authority. Retrieved from <https://www.fnha.ca/wellness/wellness-for-first-nations/first-nations-perspective-on-health-and-wellness>

The Assembly of First Nations (AFN) is a national advocacy group representing First Nation citizens in Canada directed by Chiefs and chairs of the Elders, Women's and Youth councils. **The AFN writes what it means to honour the Earth:**

"From the realms of the human world, the sky dwellers, the water beings, forest creatures and all other forms of life, the beautiful Mother Earth gives birth to, nurtures and sustains all life. Mother Earth provides us with our food and clean water sources. She bestows us with materials for our homes, clothes and tools. She provides all life with raw materials for our industry, ingenuity and progress. She is the basis of who we are as 'real human beings' that includes our languages, our cultures, our knowledge and wisdom to know how to conduct ourselves in a good way. If we listen from the place of connection to the Spirit That Lives in All Things, Mother Earth teaches what we need to know to take care of her and all her children. All are provided by our mother, the Earth.

Indigenous peoples are caretakers of Mother Earth and realize and respect her gifts of water, air and fire. First Nations peoples have a special relationship with the earth and all living things in it. This relationship is based on a profound spiritual connection to Mother Earth that guided Indigenous peoples to practice reverence, humility and reciprocity. It is also based on the subsistence needs and values extending back thousands of years. Hunting, gathering, and fishing to secure food includes harvesting food for self, family, the elderly, widows, the community, and for ceremonial purposes." (30)

First Nations have long understood the intimate connection between the health of the land and individuals' health (30). The First Nations Perspective on Health and Wellness visual model (**Figure 3**), produced by the First Nation Health Authority (FNHA), presents a holistic vision of wellness (31). The second circle depicts that health is a balance between wellness's physical, mental, emotional, social, and spiritual aspects. The governing values that uphold wellness include respect, wisdom, responsibility, and relationships, which encircle the third ring. The fourth ring illustrates the people and spaces we are surrounded by; land, community, family, and Nations. The outer circle holds the determinants of one's health; environmental, social, cultural, and economical. Ecological health is a critical component of the overall health of First Nations people. The land sustains holistic well-being, encompassing physical, mental, emotional, and spiritual dimensions. The awareness that the environment and Indigenous People's health are intimately intertwined is key in protecting both from environmental threats. Indigenous People carry a responsibility to share knowledge of the land from which they originate and to care for the land, oceans, air, vegetation, food, and the entirety of nature (31).

Leslie Marmon Silko, a Laguna Pueblo Indian author, writes that human life is only possible when we view our environmental surroundings as kin (32). Indigenous People understand

that both they and the natural world belong to an ecological family of common origins; one's kin involves the ecosystem in its entirety (33). This "kincentric ecology" guides human-nature relationships and land management to ensure ecological wellness and sustainability (33). When humans fail to recognize their relationship within the place they live, work, play, and learn, all suffer and are unsustainable. For this reason, we chose to title this piece 'Reconnecting with nature' rather than 'reconnecting to nature', as the former implies that humans are inherently part of the natural ecosystem within which they reside.

Climate change disproportionately affects Indigenous communities and other vulnerable populations due to their close relationship with and dependence upon the land (34–37). Many Indigenous people consider themselves stewards of the land, leading to their leadership role in addressing climate change and sharing knowledge of environmental conservation (37–39). While the commodification of the land drives Western economic systems, the Seventh Generation Principle offers an alternative decision-making approach. This stewardship concept, originating with the Iroquois, urges the present generation to think about those living 140 years into the future. Our present-day decisions should be to the benefit of those seven generations beyond us (40,41).

Two-Eyed Seeing

Etuaptmuk, the Mi'kmaq word meaning "the gift of multiple perspectives," is referred to in English as 'Two-Eyed Seeing' and was introduced to the academic community in 2012 by Mi'kmaq Elders Albert and Murdena Marshall (42). It is a manner of "learning to see from one eye with the strengths of Indigenous knowledge and ways of knowing, and from the

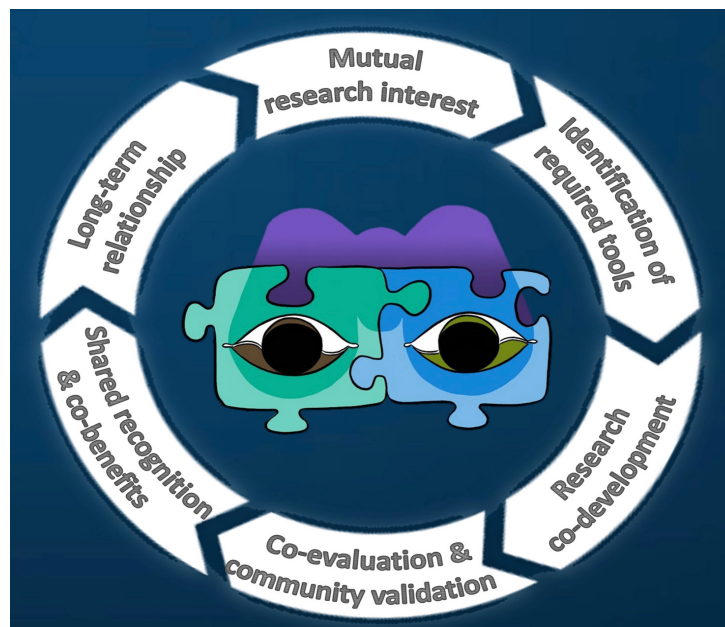


Figure 4. Framework for the application of Two-Eyed Seeing to research. Retrieved from <https://onlinelibrary.wiley.com/doi/full/10.1111/faf.12516>

other eye with the strengths of Western knowledge and ways of knowing, for the benefit of all" (43). Two-Eyed Seeing advocates for the co-existence of knowledge, recognizing that knowledge and perspectives are ever-evolving and champions the evolution of a better way of doing things (44). It is a constant undertaking that prioritizes strengthening relationships, co-learning, and adaptation (44). Using Two-Eyed Seeing as a starting point, one may gain a greater understanding of alternative ways of seeing the world and explore the implications of this understanding.

Evidence of climate change and global warming are pervasive, and we are already being forced to adapt and respond to this crisis. Western science and culture, including our unsustainable lifestyle and disrespect for our Earth, are embedded in the drivers of climate change. We must explore alternative ways of seeing the world in order to devise novel approaches that support adaptation strategies for rural communities to a changing environment. Applied here, Two-Eyed Seeing is the practice of merging collective Indigenous Knowledge with Western science on climate issues and our relationship with the natural world, thereby facilitating another perspective through listening to Indigenous and Western voices and creating space for meaningful collaboration and learning. Two-Eyed Seeing not only reinforces an interconnectedness between different peoples and perspectives but also between people and nature, highlighting humans' involvement in a greater ecosystem that our health relies upon (44).

Health benefits of nature

There is a growing interest in the effect of the natural environment on human health. An emerging body of evidence shows a positive association between greenspace contact and mental and physical health, which we describe below.

Physical health

A study in 2019 by White et al. examined associations between recreational nature contact of 19,000+ English participants and their self-reported health and well-being in the previous week [45]. Those who reported spending ≥ 120 minutes in nature in the last seven days reported significantly better health and well-being than those who reported no exposure. Interestingly, this relationship was also found for those with long-term illness or disability, purposing that the association did not simply imply that healthier people spend more time in nature (45). Based on these findings, the Park Prescription Program (PaRx) recommends two hours of nature time per week, at least 20 minutes at a time [46]. Further, a systematic review and meta-analysis of 103 observational studies and 40 intervention trials of populations of any age



Photo by Paul Polo on Unsplash

assessed the impacts of exposure to greenspace on various health outcomes [47]. The meta-analysis demonstrated statistically significant reductions in heart rate, diastolic blood pressure, salivary cortisol, type 2 diabetes, and stroke incidence associated with increased greenspace exposure [47]. It is worth noting that although this systematic review, published in 2018, did not implement date restrictions on its search strategy, 96% of studies meeting the inclusion criteria were from the previous ten years, revealing the expanding interest to understand the relationship between nature and human health.

Regarding child health outcomes, Wolch et al. recruited 3172 American children aged 9-12 years and longitudinally followed them for eight years to collect health data, including body mass index (BMI) [48]. The data were analyzed to evaluate the relationship between attained BMI growth by age 18 and environmental variables, such as park space and access to recreational programs. A significant inverse relationship was identified; a greater park acreage within a 500-meter radius of children's homes was associated with a lower BMI at age 18. Additionally, a significant association was found between lower BMI at age 18 and an increased number of recreational programs within a 10 km radius of children's homes [48].



Figure 5. Conceptual model for mental health as an ecosystem service. Adapted from <https://w>

Mental health

A growing body of literature provides evidence of the benefits of nature on one's mental health (49). Hunter et al. noted the benefits of spending time in nature in reducing stress. The authors measured stress biomarkers of 36 participants taken before and after a timed experience in nature (50). The authors found a stress reduction, with the greatest benefits of nature felt between the 20-to-30 minute mark (50). The Ontario Health Study highlighted the importance of greenspaces in urbanized areas; people who lived in neighbourhoods with a higher density of trees on their streets reported significantly better mental health perceptions and significantly fewer cardio-metabolic conditions (51). They emphasized that an increased number of trees on a city block provided better perceptions of health comparable to an increase in income or a decrease in age (51).

Nature and green spaces have always been important to humans' psychological well-being, stemming from an evolutionary standpoint where humans have spent most of their history in nature (49). There is a crucial and irreplaceable role for nature in brain development and cognition. For example, greenspaces mitigate traffic-related

air pollution and allow for increased outdoor physical activity, which has been found to improve mental wellbeing and have benefits for children. Regarded as an “ecosystem service,” which is the contribution of living nature in enhancing an individual’s quality of life, nature has also been identified as a determinant of mental health and illness (49). Its ability to improve sleep quality can protect against mental illnesses, such as depression (49). Nature has also been demonstrated to play a significant role in decreasing the incidence of other mental conditions such as anxiety disorders and attention deficit hyperactivity disorder (ADHD) (52,53). Therefore, the necessity of nature preservation and greenspaces is evident and should be prioritized.

Mental Health Impacts of Climate Change

As the climate emergency exacerbates, scholars have noted the effects on our mental health at individual and societal levels (52,53). Four pathways have been identified in classifying the relationship between climate change and mental health; discrete events (e.g. natural disasters, extreme weather), direct effects from gradual changes (e.g. rising sea levels, increase in temperature), indirect effects associated with climate induced-changes to physical and social systems (e.g. political unrest), and perceptions of climate change (e.g. eco-anxiety) (52).



Photo by Cristina Gottardi on Unsplash

As climate change has led to increases in discrete events or extreme weather events, the literature has noted the consequences on mental health in the form of post-traumatic stress disorder (PTSD), depression, and anxiety disorders (52,54). These mental health impacts may persist long after the event has passed due to the potential of disruption to the physical and social environments. Furthermore, discrete events can have other long-lasting impacts such as financial hardship, affecting mental health (52).

While gradual changes are less visible immediately, they arguably affect more people in their severity and long-term consequences. Global warming, for example, has raised concern due to the causal relationship between warmer temperatures and aggression (55). Several studies have theorized the mechanisms driving the direct effects of temperature on aggression. Embodied cognition is a psychological concept that suggests our responses to environmental stimuli influence how we think. Heat-related aggression occurs as higher temperatures produce discomfort, which can precede increased irritability and hostile perceptions of others (55). Irritability can also result from the physiological effects of heat on emotional regulation. Simultaneously, the indirect effects of climate change on aggression include food insecurity and economic deprivation. Poor prenatal and postnatal nutrition can increase aggressive and anti-social behaviour (55,56). With the projected adverse effects of climate change on global food systems, reasonable evidence supports the hypothesis that climate change will increase violence. Furthermore, inequality and

economic deprivation are predictors of violence. As climate change-related disasters affect the economy, jobs, and living situations, there is a trend of growing inequality and economic deprivation (55). Risk factors for aggression and violence may occur due to decreased life satisfaction and increased resentment (57).

As first proposed by Glenn Albrecht, the Professor of Sustainability at Murdoch University, psychoterratic states represent an umbrella term for psychological and emotional responses to climate change (58). These conditions have been operationalized in the literature and are growing in notoriety:

- Solastalgia: Psychological distress produced by environmental change impacting people. At the same time, they are directly connected to their home environment, exacerbated by feelings of powerlessness (59).
- Eco-anxiety: Anxiety related to the fear of the future of our environment (60).
- Ecological grief: Mourning due to the loss of ecosystems, species, and landscapes (61).
- Eco-paralysis: The inability to act on climate change due to the distress and feelings of hopelessness the issue has on someone (62).

These conditions are directly attributed to climate change and emphasize to an even greater extent how the destruction of our natural environment has negatively impacted not only our physical health but mental health on a societal level. Their classification is useful in understanding our response to stresses induced by environmental change and the resulting consequences to our infrastructure, systems, and populations (58).

Adaptation to ecosystem disruption is achieved through developing sustainable ways of living and efficient responses against its impact. In chapter 3 we explored adaptation at the global, national, and provincial levels, but adaptation is also important to build community-level resilience. Australia's National Strategy for Disaster Resilience defines a resilient community as "one whose members are connected to one another and work together in ways that enable them to cope with the effects of stress and trauma" [1]. When adaptation actively incorporates local and traditional resources, it allows communities to prevent, respond, and recover from climate-induced outcomes relatively independently, without over-reliance on external support. This creates a self-sustainable system against ecosystem disruption and leads to increased resilience and decreased vulnerability.



Section 2

This is how we re-engage: From theory to practice

resilient community as "one whose members are connected to one another and work together in ways that enable them to cope with the effects of stress and trauma" [1]. When adaptation actively incorporates local and traditional resources, it allows communities to prevent, respond, and recover from climate-induced outcomes relatively independently, without over-reliance on external support. This creates a self-sustainable system against ecosystem disruption and leads to increased resilience and decreased vulnerability.



Photo by Justin Kauffman from Unsplash

How do we begin to reconnect with nature as a means of directing society towards environmental sustainability? The following section will explore various action steps that can be pursued to re-engage with nature respectfully and collaboratively. These action steps operate on different levels of social organization and are based on leverage points identified through systems thinking. Before discussing these practical measures, it is valuable to acknowledge the role of research in generating evidence to inform interventions, practice, and policy with the ultimate goal of strengthening our relationship with the natural environment.

The role of research

Research has played a fundamental role in mapping the relationship between humans and nature, with various studies offering frameworks to conceptualize these types of connections. Ives et al. propose five categories of human connection with nature: material, experiential, cognitive, emotional, and philosophical connections (Figure 5) (63). These connections vary from external to internally defined and operate on different social scales across individual, community, societal, and institutional levels.

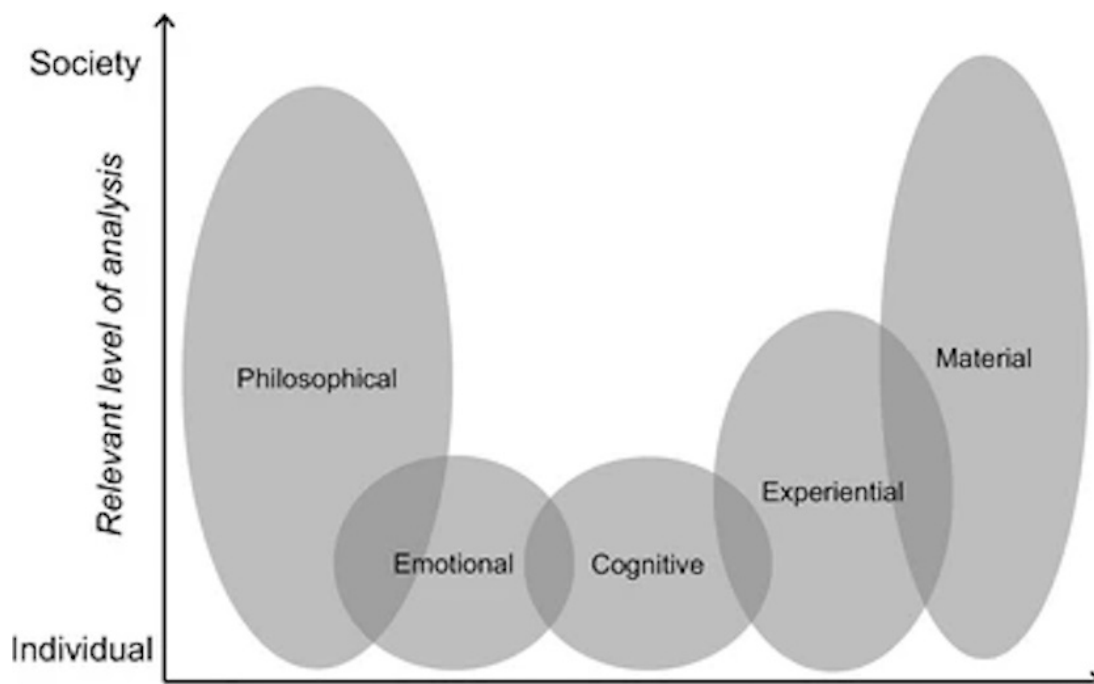


Figure 6. Conceptualizing different types of human-nature connections, along a spectrum from people's internal to external worlds (x-axis), and their relevance at different scales of analysis from individual to societal (y-axis). Retrieved from <https://link.springer.com/article/10.1007/s11625-018-0542-9/figures/1>

By conceptualizing the types of human-nature connections and how they interact with one another, research has also helped to identify deep leverage points for reconstructing healthy relationships between people and our natural environment (Figure 6) (64). As first proposed by Donella Meadows, leverage points within a complex adaptive system can be targeted to transform broad system behaviour and are most effective when initiating systems change from root causes rather than surface-level remedies (65). Simply put, small shifts at leverage points can lead to large changes in the overall system (66). The following section touches on leverage points that demonstrate significant potential in bringing about collective change amidst the current climate crisis. These practical strategies for sustainability intervention occur on the levels of youth, community, and broader societal engagement to stimulate transformational system change for a sustainable future.

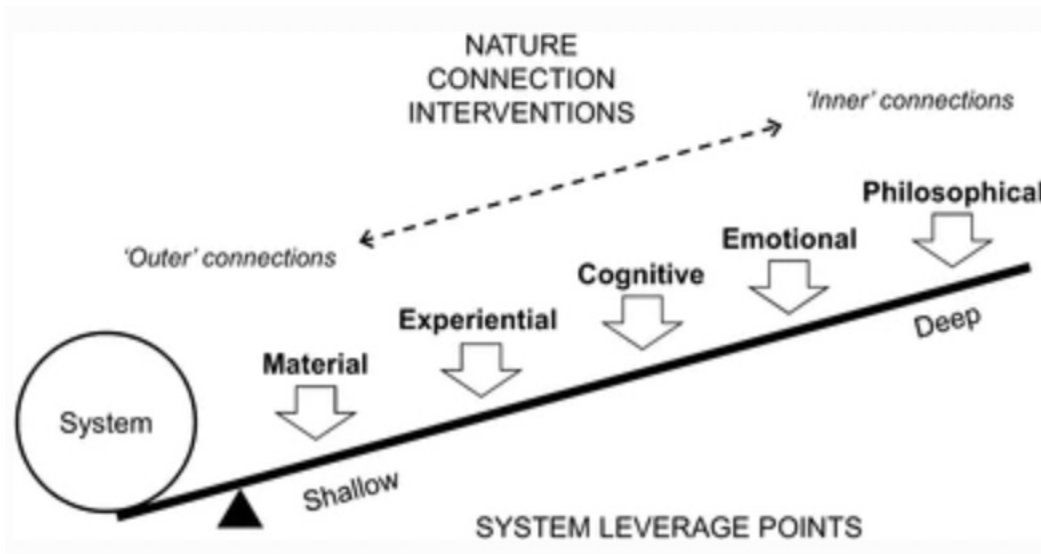


Figure 7. Outer connections to nature (e.g., material and experiential connections) are more likely to influence system parameters (such as resource stocks and flows), while inner connections (e.g. philosophical perspectives and emotional connections to nature) are more likely to influence the underlying goals and values embodied in a system. Retrieved from <https://link.springer.com/article/10.1007/s11625-018-0542-9/figures/2>

Starting with children and youth

Advantages of childhood environmental education

Environmental education is defined as the deep learning of our planet's natural systems and the steps we can take to protect our ecosystems, making it a powerful tool for initiating pro-environmental thinking and corresponding sustainability behaviours (67). For young people, environmental education establishes an understanding of how our ecosystems function and how individual and collective behaviour impacts the environment.

In the context of climate action, introducing environmental education early in life is a deep leverage point that supports youth in developing environmental literacy from childhood through to adulthood. Various studies have demonstrated the benefits of childhood

environmental education and outdoor experiences in promoting pro-environmental beliefs, attitudes, and behaviour later in life (64). Thus, engaging youth in environmental education is essential for building a foundational understanding of the natural environment and setting them on a trajectory towards adult environmentalism. Outlined below are several unique advantages of directing environmental education toward children (68,69):

- Environmental education can prevent the development of deeply ingrained behaviours that are harmful to the environment. In this way, the need to unlearn environmentally irresponsible behaviours in adulthood is avoided by establishing sustainable practices in early life stages.
- As individuals in the cognitive process of forming their worldviews, children can be encouraged to challenge the dominant worldview of our environment as a resource to be exploited for our benefit, instead nurturing a deep appreciation for our interdependence with the environment.
- A growing body of literature provides evidence for the influence of children's beliefs and knowledge on older individuals. In particular, a study by Damerell et al. demonstrated the transfer of wetlands knowledge from child to parent and uncovered a causal link between child-directed environmental education and positive water use behaviour at the household level (68).
- Children possess a longer period of influence to act as agents of change



In these ways, children assume the role of changemakers by taking steps to directly avert the climate crisis and leveraging their influence over previous generations to generate collective action against climate change.

Nature- and play-based learning

An important approach to effective youth-directed environmental education is to create opportunities for nature- and play-based learning. As used in the literature, nature-based ecological education is a holistic approach integrating environmental knowledge and connectedness to nature as complementary drivers of ecological behaviour (70). Through this learning approach, children can gain valuable understanding about the environment and develop a strong sense of connectedness with nature, that is, the perceived closeness between the individual and nature. Studies have demonstrated that connection with nature appears to be the strongest predictor of pro-environmental behaviour (70). Thus, beyond providing children with knowledge about how natural systems function and ought to be respected, cultivating a meaningful relationship with nature from childhood is suggested to set an individual on a trajectory toward adult environmentalism (71).

Case Study: Forest/Nature Schools by the Child and Nature Alliance of Canada

The Child and Nature Alliance of Canada (CNAC) supports program development, training, and implementation of Forest/Nature Schools across the country. As defined by the CNAC, Forest/Nature school is “a sustained process of regular and repeated sessions in the same outdoor space, supporting children to develop a reciprocal relationship with the Land, and an understanding of themselves as a part of the natural world.” (72) Variations in program delivery consist of spending a half or full day in various outdoor contexts such as greenspaces, playgrounds, woodlands, and shorelines (73). The curriculum is intentionally delivered through inquiry-based, emergent, and experiential learning approaches in these natural learning environments. These distinguishing features enable Forest/Nature schools to meet their fundamental objective: giving youth the agency and freedom to continuously direct their learning through explorative play, thereby fostering a deep connection with their natural surroundings (74).

Community-directed strategies for sustainability

Due to several distinguishing factors, sustainability interventions directed at the community level are an asset for reconnecting with nature. For one, implementing interventions within a community shifts the focus beyond the individual and plays to the strengths of collective action. As community-based interventions often require the combined efforts of multiple players, working with communities generates opportunities for collaboration, whether that be between various stakeholders, sectors, or generations. Accordingly, engagement at the community level necessitates interventions built on meaningful relationships. Because communities are unique, interventions should meet context-specific needs identified through community input. The following section will discuss how community gardens, park prescriptions, and ecosystem-based planning serve as practical strategies for reconnecting communities with the natural world.

Community gardens

During the First and Second World Wars, community gardens emerged throughout Europe and North America to relieve pressure from food shortages and maintain food security (75). Today, they represent shared spaces where people can grow diverse produce and re-engage with nature in a meaningful way. Community gardens can take many forms, such as allotment gardens where plots are divided for personal care or collectively managed gardens with a shared harvest (76). Existing research supports the range of positive health and well-being outcomes that community gardens bring to the table, including improved nutrition, food security,



Photo by Jonathan Kemper on Unsplash

community cohesion, mental health benefits, and environmental activism, to name a few (75,76). We will draw particular attention to the positive impacts of community gardens in facilitating connectedness with the natural environment.

Due to rapid urbanization over recent centuries, our relationship with nature has been severed as access to green space has become increasingly reduced (77). It is suggested that this expansion of built environments and modern lifestyle changes have led people to forget the interdependence between humans and natural ecosystems. Community gardens provide a means to re-incorporate nature into our everyday routines, especially within metropolitan contexts. Beyond providing a physical arena for reconnecting with nature, community gardens create spaces for environmental learning. In a study by Bendt et al., public-access community gardens were found to engage study participants in four learning streams: 1) learning about gardening and local ecological conditions, 2) learning about the politics of space, 3) learning about self-organization, and 4) learning about social entrepreneurship (77). Furthermore, community gardens serve as an experiential interface for co-creation between human and natural forces to instill a sense of connection to growing food (78). As previously discussed, close connectedness to nature is a precursor of sustainability behaviours (70).



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Figure 8. Model of the pathways of community gardens to wellbeing. Retrieved from <https://www.sciencedirect.com/science/article/pii/S2211335516300249#f0010>

Case Study: Alex Wilson Community Garden

The Alex Wilson Community Garden in Toronto, Canada opened in June 1998 to commemorate the life of Alex Wilson, a Canadian writer, landscape designer, and community activist (79). Located in the heart of a diverse urban neighbourhood, the garden was created to embody Wilson's passion for nurturing relationships between people, communities, and the natural environment by integrating community gardening with ecological restoration. Its design elements capture southern Ontario's regional terrain highlighting lakeshore, agricultural, and forest landscapes. The garden also serves the social needs of its community by providing opportunities for collaborative food production, a non-profit housing complex, and a drop-in centre for those experiencing homelessness. As a reflection of Wilson's work, the garden contributes to restoring the severed connection between our built and natural environment while paving the way for further sustainability efforts.



Alex Wilson Community Garden. Retrieved from <https://facebook.com/alexwilsonsgarden/photos/a.935472489850791/1622867491111284/?type=3&source=44>

"We must build landscapes that heal, connect and empower, that make intelligible our relations with each other and the natural world."

- The Culture of Nature (1992), by Alex Wilson (80)

Nature prescription programs

Nature prescription programs have emerged within the last 25 years to improve community health and promote environmental stewardship (81). These programs involve providing patients with formal prescriptions for outdoor activities written explicitly by a physician or healthcare provider (82). Typically, nature prescriptions come in two forms, either structured or unstructured. While structured prescriptions direct patients to participate in a specific outdoor activity (outdoor sports, organized games, walks, etc.), unstructured prescriptions refer patients to spend time more generally in an outdoor location like a community park or local greenspace. There is growing evidence supporting the physical, mental, and social benefits of nature prescriptions; however, advancements in evaluation methods are needed for existing nature prescription programs on issues such as patient adherence, improved health outcomes, best clinical practices, and overall effectiveness (82,83).

Despite these research gaps, the prevalence of nature prescription programs is expanding throughout the globe as driven by a growing body of literature revealing the health benefits of reconnecting with nature (82).

Case Study: PaRx

First launched in November 2020, PaRx is Canada's first national, evidence-based nature prescription program led by Dr. Melissa Lem in partnership with the BC Parks Foundation (84). They have established a program in which licensed healthcare professionals can register with PaRx to receive guides and patient resources for filling nature prescriptions (46). Currently, PaRx operates throughout British Columbia, Manitoba, Saskatchewan, and Ontario in commitment to advancing patient and planetary health. One of the program's most important goals is to promote nature's health benefits for adults, children, and the planet with particular emphasis on strengthening our connection with nature to reinforce sustainability behaviours. To advance this movement, their program includes a free Parks Canada Discovery Pass (valued at \$72) providing unlimited admission to national parks and conservation sites (85). As a standard recommendation, patients are directed to spend at least 2 hours a week in nature for at least 20 minutes each outing.



Retrieved from https://www.outdoorplaycanada.ca/portfolio_page/parx-a-prescription-for-nature/

Strengthening societal connectedness with nature

On a broader scale, society as a whole must shift towards more intentional and effective sustainability practices (86). To push this transformation forward, growing research supports the idea of reconnecting people with nature. In particular, the correlational literature demonstrates a strong association between nature connection and pro-environmental behaviour, suggesting that our relationship with nature could play an essential role in informing high-level policy and interventions (86). Rebuilding a respectful relationship with nature will necessitate the re-evaluation of cultural values, such as individualism and short-term orientation (87). It will require changes to how many of our political, social, and economic systems are designed (88). The following section will discuss the importance of people-nature reconciliation and ecosystem-based conservation planning (EBCP) in redirecting our societies towards sustainability.

People-nature reconciliation

In 2015, the Truth and Reconciliation Commission (TRC) put forward 94 Calls to Action to document the truth of Survivors, their families and communities, redress the legacy of residential schools in Canada and further the process of reconciliation (89). From the TRC Traditional Knowledge Keepers Forum in June 2014, Elder Stephen Augustine shared that other aspects of the human experience are imperative in the journey towards reconciliation, such as our relationships with the earth and all living things (90). Elder Reg Crowshoe shared the following statement at the Forum:

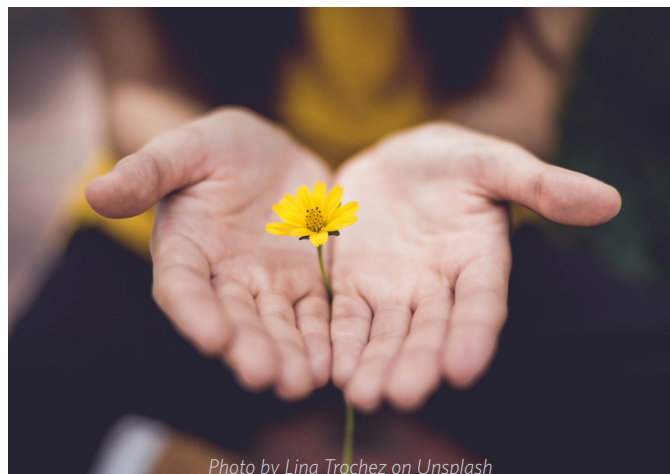
“Reconciliation between Aboriginal and non-Aboriginal Canadians, from an Aboriginal perspective, also requires reconciliation with the natural world.

If human beings resolve problems between themselves but continue to destroy the natural world, then reconciliation remains incomplete.

This is a perspective that we as Commissioners have repeatedly heard: that reconciliation will never occur unless we are also reconciled with the earth.”

- Elder Reg Crowshoe, The Final Report of the Truth and Reconciliation Commission of Canada, Volume 6, pg 13 (bold added for emphasis) (90)

These important statements highlight that our relationship with nature is a vital, yet often overlooked, part of furthering reconciliation. Von Essen and Allen write that people-nature reconciliation must happen alongside people-people reconciliation, where experts and locals must be reconciled to one another in terms of their different and often conflicting views of nature and its meaning to reach a consensus (91). Once this consensus has been established, people-nature reconciliation can be achieved. Aldo Leopold was a forest, wildlife biologist and author who pioneered writing about reconciliation with the natural world. He penned, “We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.” (92) Leopold writes about ‘land ethic,’ which he envisions as extending the ethics among and between people towards one that includes the biophysical world (93)



Ecosystem-based conservation planning

As pioneered by the Silva Forest Foundation, ecosystem-based conservation planning (EBCP) “is a method of ecosystem protection, maintenance, restoration, and human use that, as the first priority, maintains or restores natural ecological integrity—including biological diversity—across the full range of spatial (from very large to very small areas) and temporal (from short to long periods) scales.” (88) When applied to an ecosystem of interest, the goal of EBCP is to create an ecological framework for human activities where the protection, maintenance, and restoration of the ecosystem is prioritized for sustainability. This framework appreciates the hierarchical relationship between ecosystems, culture, and economies, where economies are recognized as part of cultures and cultures as part of ecosystems (94). Accordingly, by protecting the health of the overarching ecosystem, their respective cultures and economies also progress on a sustainable path. Two fundamental understandings form the groundwork of ecosystem-based planning (88). Firstly, ecosystems are diverse and come in many different flavours. In this regard, EBCP seeks to identify the context-specific characteristics of a unique ecosystem to guide ecologically responsible anthropogenic activity. Secondly, EBCP acknowledges that ecosystems are dynamic with many interacting parts. There is great emphasis on creating healthy ecosystems rather than focusing on each component in isolation. EBCP could play a pivotal role in moving the world towards a more sustainable future if we can reframe our societies and communities with this approach in mind.



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Case Study: Xaxli'p Survival Territory

Xaxli'p is an Indigenous government located in the Central Interior-Fraser Canyon region of British Columbia (95, 96). During the 1900s, the Xaxli'p territory experienced intense industrial deforestation under the legislation of the Province of British Columbia (97). Ever since, the Xaxli'p people have persisted in asserting the decision-making authority of the land known as their Survival Territory. To date, their efforts in negotiating with the government for control over Xaxli'p Survival Territory have been met by an interim measure under the Community Forest Agreement, which was signed on March 2, 2011. The Community Forest Agreement was developed through ecosystem-based conservation planning to protect their forests, water, wildlife, and cultural activities (95). Their Ecosystem-Based Plan offers a series of maps designating specific regions of land management, such as "Human Use Areas" for ecologically responsible activities (non-timber forest products, ecotourism, etc.) and "Cultural Use Protected Areas" for supporting the needs of the Xaxli'p people.

The following is an excerpt from the Xaxli'p Community Forest website (95):

"Ecosystem-based planning is a way of relating to and using forests that reflects Xaxli'p values. In 2001 Xaxli'p employed Silva Ecosystem Consultants to prepare the Ecosystem-Based Plan for Xaxli'p Survival Territory, with extensive involvement of Xaxli'p Elders and other Xaxli'p experts. The Ecosystem-Based Plan guides all land use within Xaxli'p Survival Territory."

Adaptation to ecosystem disruption is achieved through sustainable ways of living and efficient responses. In chapter 3 we explored adaptation at the global levels, but adaptation is also important to resilience. Australia's National Strategy for Disaster Resilience defines a resilient community as "one whose members support one another and work together in ways that enable them to prevent, respond to, and recover from stress and trauma" [1]. When adaptation actively incorporates local knowledge and traditional resources, it allows communities to prevent, respond, and recover from climate-induced outcomes relatively independently, without over-reliance on external support. This creates a self-sustainable system against ecosystem disruption and leads to increased resilience and decreased vulnerability.



Section 3

Rural engagement with nature

Resilient communities are those whose members are committed to one another and work together in ways that enable them to prevent, respond to, and recover from stress and trauma" [1]. When adaptation actively incorporates local knowledge and traditional resources, it allows communities to prevent, respond, and recover from climate-induced outcomes relatively independently, without over-reliance on external support. This creates a self-sustainable system against ecosystem disruption and leads to increased resilience and decreased vulnerability.

We have presented our current reality in which modern society is largely separated from the natural world. This fractured relationship has allowed us to carelessly perpetuate anthropogenic activities that drive climate change and disrupt our ecosystem. We may now look at how rural communities engage with nature. How can rural be used as a model? What lessons can urban learn from rural about respectful engagement and a stronger connection to nature?

Nearness to nature is core to living rurally, with the rural context creating a natural interface for humans and nature. Further, nature and parks are core to British Columbians, as the province boasts pure, unadulterated natural beauty of dense forests, rivers, coastline, and mountain ranges. Rural inhabitants have more opportunities to interact with nature than urban dwellers. While time in nature must be an active decision for those residing in urban settings, a relationship with nature is often inherent to the rural lifestyle. Our separation from nature is so great that programs such as the Park Prescription must prescribe this time to motivate people to prioritize this into their weekly rhythms (46). A program such as this would be generally unnecessary to a rural audience.

The proximity to nature, characteristic of the rural context, creates an opportunity for more care and respect and, therefore, motivation to engage in more sustainable habits. Research by Klassen in 2010 of 92 Manitoban high schoolers suggests that rural youth

have more opportunities to connect and develop deeper relationships with nature. On the contrary, urban youth are less connected to nature, though they hold similar environmental concerns (98). A youth-led, arts-based, participatory action three-year (2018-2020) research project was conducted in the British Columbian rural communities of Kimberly, Ashcroft, and Cache Creek to identify issues that mattered to them (99). One of the central themes of the discussions was youth's connection to the environment. When asked about community strengths and challenges,

nearly all youth shared nature, particularly bodies of water, as a community strength. Youth expressed pride in the beauty of nature that their community resides in and the opportunities for adventure, exploration, and growth it allows as a strength. Rural youth noted environmental pollution and inadequate infrastructure maintenance following a natural disaster as challenges and areas for improvement (99).

Urban bias, built on larger population sizes and consequently greater political and social influence, often negatively portrays rural people and communities. Rather than viewing rural through a deficit lens or one of lacking (resources, population size, etc.), we propose a value-added approach. Rural communities should be viewed through a strength-based



Photo by Krista Joy Montgomery on Unsplash

understanding by their urban counterparts. One of the most significant rural advantages is their natural settings embedded in surviving ecosystems and potential for connection with nature.

Furthermore, conducting research in rural areas has a distinctive advantage due to operating at a smaller scale. Experimenting with implementing innovative ideas is more feasible in rural settings due to this smaller system scale. The structure of the rural context, such as supportive social networks, may lend itself to better community uptake of nature-based programs as rural citizens may feel they play an essential role and have ownership in a community initiative. The potential for engaging rural community systems in rural health research such as environmental education, nature-based learning, community environmental initiatives, climate change resilience and adaptation strategies is much more feasible than attempting similar studies in urban, regional, or national settings. Evidence generated through the demonstration project innovations can be translated into larger urban areas.

We know that rural and remote Canadian communities, including Indigenous communities, experience disproportionately high health impacts of climate change (99,100). Many rural regions have experienced changing quality and access to water and food systems associated with anthropogenic changes in the environment, including changing rainfall, rising temperatures and growing extreme weather occurrences such as flooding and heatwaves (101). As rural residents witness devastating natural disasters and weather events happening to their communities, one may assume rural communities share a strong collective agreement regarding anthropogenic climate change science. Research published in 2016 demonstrates that the vast majority of Canadian citizens across the country agree that climate change is happening. Yet, more urban dwellers ascribe this environmental change to human activity than rural inhabitants (102). Disbelief in climate change science is higher in rural Canada, primarily in rural Alberta and Saskatchewan. Contrarily, the highest levels of climate change agreement are held in Quebec, Nova Scotia, and the coastal and Fraser Valley regions of British Columbia (102). Due to increasing climate change-related events, there is a need for updated research to understand the distribution of current public perceptions on climate change across Canada.



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Conclusion

How we perceive nature is critical to advancing the societal understanding, stewardship, and restoration of the ecosystems that we depend upon. This chapter presents the dominant ideologies that form our view of nature, land ownership, and power dynamics and challenges us to deconstruct our Western beliefs of nature. We present Indigenous views and knowledge of nature, which recognizes that nature holds intrinsic value fundamental to life. The literature suggests overwhelming evidence of the positive mental and physical health impacts of time spent in nature. Collectively we must reengage respectfully with the natural systems that ultimately sustain us.

This week, we encourage the reader to prioritize spending time in a natural space they love, either themselves or with family or friends. Walk, sit on the ground, be quiet, listen, take a deep breath, look around and then close your eyes for a moment. Use this time and space to reflect on your connection to the Earth under your feet. Honour the emotions you feel, whether it is deep peace or eco-anxiety. Reflect on your gratitude for the Earth, your dependent relationship with the air you breathe, the water you drink, the land you work, live and play on, and the interconnectedness between us all. And most importantly, keep coming back to this place or begin to explore further afield in search of the many wonders of nature.



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