CONNECTING WITH THE EARTH:

RESPONDING TO THE IMPACTS OF CLIMATE CHANGE ON MENTAL HEALTH IN BC SCHOOLS

by

Tensley J. Koontz

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Connecting with The Earth:

Responding to The Impacts of Climate Change

On Mental Health in BC Schools

APPROVED BY Deanna C. C. Peluso, PhD

Dedication

In honour of Joseph Cornell (1979),

TO

Those who experience Nature's inspiring, transforming moments,

and who desire to share with others,

their love for the natural world.

AND

Z.K who by simply living her life.

has given me a greater understanding of my own.

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Abstract

In this paper, the question of what role school counsellors in BC schools should play to address the multitude of impacts climate change is having on mental health is examined. Clear and extensive links to mental health declines as a result of climate change are made (e.g., Clayton & Manning, 2018; Obradovich, 2018) and focus is put upon vulnerable groups and communities in Canada and British Columbia, school-aged children and youth in particular, to provide recommendations to schools and school counsellors in fostering mental wellbeing as it connects to climate change. The literature review further examines the available research on addressing the impacts of climate change on mental health, with attention brought to Ecopsychology and the practice of Nature-based therapy. Nature-based therapy is surveyed for its potential as both a prevention measure, in particular to cultivate resilience and self-efficacy, as well as an intervention to provide treatment for mood disorders and other impacts upon mental wellbeing connected to both acute and long-term climate change. The professional obligations of school counsellors in BC are called into question, and strong recommendations are made for training and professional development of school counsellors to become climate literate, as well as competent and comfortable in integrating Nature into their counselling practice and school communities.

Keywords: BC schools, climate change, ecopsychology, mental health, Nature, nature-based therapy, counsellor professional development, school counsellor

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Chapter 1: Introduction

Background Information

In 2014, the world's authoritative body on climate change, the Intergovernmental Panel on Climate Change (IPCC), declared that the warming of Earth's climate system is unequivocal; the atmosphere and oceans have warmed, snow and ice have diminished, sea levels have risen, and weather patterns have shifted (Edenhofer et al., 2014). The panel further concluded that virtually all such warming since the mid-1800s is the result of human activities. Climate change and climate-related events are increasingly recognized as one of the greatest threats to human health of the 21st century, and it is also increasingly recognized that mental health professionals will face climate-related mental health issues in their professional practices, particularly those practicing in more risk-prone areas or vulnerable communities (Bourque & Cunsolo Willox, 2014). While physical health impacts of climate change and related environmental alterations have been emphasized in literature and practice, it is more recent that the psychological and mental health impacts have been addressed (Swim et al., 2010, 2011; Obradovich et al., 2018). In 2017, the Lancet released a first full tracking report on climate change and health. In this report there was an explicit request for more information on, and actions to address, the often-unseen mental health impacts of climate change on human health (Watts et al., 2018). Further research has indicated that climate change and related environmental changes can profoundly impact

psychological well-being and mental health through both direct and indirect pathways, particularly among those with pre-existing vulnerabilities or those living in more risk-prone areas (Clayton & Manning, 2018). These mental health outcomes range from psychological trauma, depression and anxiety, to post-traumatic stress disorder, compounded stress, increased addictions and suicide rates (Bourque & Cunsolo Willox, 2014). Somewhat less obvious in their connection to climate change, major chronic mental health impacts include: higher rates of aggression and violence, an increased sense of helplessness, hopelessness, or fatalism, and intense feelings of loss and a lack of connection (Clayton et al, 2017). Along with growing accounts and data indicating climate change's impacts upon human health (Berry, 2009; Berry et al., 2010; Coyle & Susteren, 2012; Cunsolo Willox et al., 2012, 2013a, 2013b; Doherty & Clayton, 2011; Fritze et al., 2008; Page & Howard, 2010; Stanke et al., 2012; Swim et al., 2010, 2011), there is a growing field of research addressing those impacts (Clayton et al., 2017; Clayton & Manning, 2018; Watts et al., 2018; Kluttz, 2020; Hayes et al., 2019). Though literature describing the impacts upon physiological health experienced a head start, research linking climate change and mental health is gaining footing and reports are beginning to enter the public domain in Canada (e.g., Bush & Lemmen, 2019; Natural Resources Canada, 2021).

Statement of the Problem

Research indicates that the mental wellbeing of people is being affected by events connected to our changing global climate (e.g., Obradovich, 2018, Clayton et al. 2017). As well, the growing threats associated with climate change to come (worsening asthma and allergies; heat-related stress; foodborne, waterborne, and vector-borne diseases; illness and injury related to storms, floods, droughts, and wildfires) are further impacting mental health and well-being (Hayes et al. 2018. Some psychological responses to climate change, including conflict

avoidance, fatalism, fear, helplessness, and resignation compound the issue and prevent us from addressing the core causes and solutions for our changing climate (Harper et al., 2021). Loss of a sense of place and connection to Nature directly exacerbates these feelings for many people, and impacts others within society vicariously (Cunsolo Willox et al. 2012; Tschakert et al. 2019; Clayton et al., 2017). School counsellors in the province of British Columbia are in a position to work with youth, their families, and school communities who are facing negative psychological effects of climate change (Flom et al., 2011). The approach of ecopsychology, practiced in a clinical sense since the 1990s and rooted in deep human traditional culture and biology, espouses guiding people toward improved mental health and resilience through connection to and therapeutic intervention in Nature (Roszak, 1995; Clinebell, 1996). In spite of a growing movement in British Columbia in early education to offer forest schools and nature kindergarten, for example, the Mill Bay Nature School (Cowichan Valley School District, 2021) and nature kindergarten programs in the Sooke school district (Sooke School District, 2021) on Southern Vancouver Island, these schools are exceptional and most operate in the independent school system. With just 12.4% of students in BC currently attending independent schools (ISABC, 2021), the subjects explored in this paper affect the majority of students and families in the province. At all levels, public education continues largely within the walls of man-made structures and school counselling programs, despite some innovative individuals and programs, also tend to function largely within the school building. Even an established program such as Take A Hike, (Take A Hike Foundation, 2021) which has operated since 2000 and now integrates counselling with outdoor education in six different school districts across British Columbia, remains a contracted organization separate from the school districts it provides service. School counsellor education in British Columbia is essentially devoid of teaching

outdoor therapeutic approaches, and professional development for counsellors, organized at a district and school level, may not explicitly educate counsellors on the effects of climate change on mental health or appropriate interventions. These practices, based upon the standards which school counsellors in BC are ethically and professionally bound, are interpreted as being inadequate. School counsellors are obligated not only to respond to the issues of mental health present in their school community, the first responsibility of school counsellors is to act in the best interests of the students (BC School Counsellors Association [BCSCA], 2021). As such, this paper espouses that not only is it a moral obligation, but also a professional obligation, for school counsellors to educate and counsel those in their school communities on how to manage the psychological effects of living on a planet that is experiencing the effects of a changing climate. To meet that outcome, changes in current practices around counsellor training and professional development are needed (Whitcomb, 2021).

Purpose of the Paper

This paper aims to provide readers a cursory climate literacy by compiling and presenting an overview of the existing literature on the effects of climate change upon mental wellbeing, particularly that of children and youth. While this paper provides an extensive view of the major impacts of climate change on human health, it is not aimed to be exhaustive. A secondary purpose is that, in gaining literacy on the problem, schools counsellors are encouraged to bring attention to climate change and mental health in their school communities. The importance of school counsellors being professional obligated to become knowledgeable and active on the subject of climate change and mental health is conveyed, with the purpose that this paper acts as a primer for readers to cultivate and deepen their base of knowledge to better serve their school communities. To this end, a review is conducted of the literature on ecopsychology and nature-

based therapy as an approach to build protective factors against climate change's mental health effects, as well as treat children and youth who are experiencing effects. Recommendations for training and integration of nature-based therapeutic practices into school counsellor training and school communities are made, the purpose being to inspire further exploration into this therapeutic approach as being part of a comprehensive school counselling program's approach to addressing the effects of climate change upon the mental wellbeing of their school communities.

Research Question

The question this paper aims to address is: what role can and should BC school counsellors and schools play in supporting the mental health of youth and school communities through the psychological effects of climate change, with the preferred outcome of fostering hope, resilience, adaptability, and the capacity for positive change?

Theoretical Framework

This paper is guided by the integration of four theoretical lenses: the Biophilia Hypothesis (Wilson, 1984), Ecopsychology (Roszak, 1995), Ecological Systems Theory (Bronfenbrenner & Morris, 2007), and Self-Efficacy Theory (Bandura, 1997).

The Biophilia Hypothesis, introduced and popularized in 1984 by E.O. Wilson's book *Biophilia,* suggests that humans possess an innate tendency to seek connections and 'affiliate' with Nature and other forms of life. The concepts around this hypothesis are integral to ecopsychology and feature in Chapter 3's recommendations.

Ecopsychology studies the relationship between human beings and the natural environment through both ecological and psychological principles (Harper et al., 2019). Ecopsychology seeks to develop and understand ways of expanding the emotional connection between individuals and the natural environment, thereby assisting individuals with developing

sustainable lifestyles and remedying alienation from Nature (Buzzell & Chalquist, 2009). The concept of human-nature connection arises in the literature examined in Chapter 2 which addresses climate change effects on mental wellbeing, and is expanded upon in the recommendations discussed in Chapter 3.

Developed by psychologist Uri Bronfenbrenner, the Ecological Systems Theory views human development as a complex system of relationships affected by multiple levels of the surrounding environment, from immediate settings of family and school to broad social and cultural values, and changes brought through time (Bronfenbrenner & Morris, 2007). Along with these social and cultural influences, Bronfenbrenner's theory includes influence from the natural environment and therefore aligns with the tenets of ecopsychology and its view that humans are inextricably interconnected with, and our development influenced by, the natural environment (Roszak, 1995). At the root of the problem addressed in this paper, the changes to our climate and therefore the very nature of our environment impact health and wellbeing, lies the congruence of Ecopsychology and the Ecological Systems Theory.

The Self-Efficacy Theory was proposed by Albert Bandura in 1977 as a person's particular set of beliefs in their ability to succeed in a particular situation. The theory states that people develop their self-efficacy by interpreting information from four main sources of influence: (1) Mastery Experiences (Performance Outcomes), (2) Vicarious Experiences (Social Role Models), (3) Social Persuasion, and (4) Emotional & Physiological States (Bandura, 1997). Mastery experiences refer to experiences one gains when taking on a new challenge and finding success in doing so. This is considered the most influential source of efficacy information. Success builds a robust belief in one's personal efficacy, failures undermine it, especially if failures occur before a sense of efficacy is firmly established (Bandura, 1997). Vicarious

experiences mark the second most influential source of self-efficacy. Bandura states that when one has positive role models in their life, particularly those with a healthy self-efficacy, one is more likely to absorb these qualities and believe that they too possess capabilities and positive beliefs of self. Social persuasion, most influential when administered at a young age, refers to positive feedback while undertaking a complex task which persuades a person to believe they have the capabilities to succeed. Lastly, Bandura posits that the emotional, physical, and psychological well-being of a person can influence how they feel about their personal abilities in a particular situation. While building self-efficacy may be an easier task when feeling healthy and well, Bandura (1982) states that it is not the sheer intensity of emotional and physical reactions that is important, but rather how they are perceived and interpreted (p. 137). A person experiencing challenging situations, who learns to manage anxiety and enhance their mood, can improve their self-efficacy if they view their affective state as an energizing factor of performance rather than regarding it as debilitating. These concepts are integrated within the principles of Nature-based therapy and guide the recommendations in Chapter 3.

Significance of the Study

Climate change effects upon physical health and psychological wellbeing are being experienced by individuals, communities, and populations at present (Edenhofer, 2014; Bush & Lemmen, 2019). Left on its present course, we know the impacts of climate change will significantly alter the structure of the more-than-human world, including affecting the biodiversity and distribution of living organisms, and bringing more extreme temperatures, severe storms, rising sea levels, flooding, droughts, and wildfires (Edenhofer, 2014). We also know from our lived experiences and from climate modelling that changes to the climate will also significantly affect the personal health, sense of security, cultural practices, and economy of

British Columbians (Retooling for Climate Change, 2021). School counsellors and other mental health professionals are presently working with youth who are born into a world where humanity is explicitly aware and knowledgeable of the impact our species has placed, and continues to place, upon our planet (Le Treut et al., 2007, p. 1). These youth are developing within a world where they and the influences in their environment are experiencing the direct, indirect, and vicarious effects of our changing climate. School counsellors, given their role as front-line workers with youth and families whose mental health and well-being is being affected by climate change, are charged with the professional duty to act upon the mental health issues both present and emerging (BC School Counsellors Association, 2021). Therefore, there is need for recommendations to support school counsellors in BC, informing their literacy regarding climate change and its impacts upon mental health, and offering approaches to help support the wellbeing of their students and school community.

Definition of Terms

- *anticipatory solastalgia*: whereas solastalgia relates to the experience of actual environmental loss, anticipatory solastalgia captures the paradoxical situation of people intensely experiencing the pristine and immaculate, while simultaneously realizing its fragility and imminent loss (Moratis, 2020).
- *climate change*: this paper follows the Intergovernmental Panel on Climate Change's use of the term, which defines it as "a change in the state of the climate that can be identified (e. g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent

anthropogenic changes in the composition of the atmosphere or in land use (Edenhofer et al., 2014).

- *ecoanxiety*: a chronic fear of ecological and environmental doom (Clayton et al., 2017, p. 29).
- *ecological grief:* the grief felt in relation to experienced or anticipated ecological losses, including the loss of species, ecosystems and meaningful landscapes due to acute or chronic environmental change (Cunsolo Willox & Ellis, 2018).
- *ecopsychology:* an interdisciplinary field synthesizing ecology and psychology, holding a core goal of bridging human culture's historical gulf between the psychological and ecological in order to see the needs of the planet and the person as a continuum (Harper & Dobud, 2021).
- *ecotherapy:* refers to those therapies that apply ecopsychology to therapeutic practice (Harper et al., 2019). It is an umbrella term for the therapeutic work that encompasses the natural world, such as Horticultural therapy, Forest Therapy, Nature-Based therapy, Animal-assisted therapy, Surf therapy, and Wilderness therapy (Harper & Dobud, 2021).
- *Nature*: That which is not artificial; A complex system of interrelationships between species and land which includes human and non-human species.
- *nature-based therapy:* located within a diverse range of ecotherapy practices (Harper et al., 2019, p. 125), it is an approach that views Nature as co-therapist, which engages conventional therapy in natural settings, and holds the primary concern of repairing disconnection that has transpired between humans and their larger ecological self (Harper, et al., 2019).

- *resilience:* the ability of a person or community to cope with, grow through, and transcend adversity (Hobfoll et al., 2015).
- *self-efficacy:* an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments (Bandura, 1977). Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behavior, and environment.
- *solastalgia:* emotional or existential distress describing a felt sense of homesickness, pain, isolation and loss of value of the present in response to environmental change (Albrecht, 2006).

Outline of the Remainder of the Paper

In the following chapters, a literature review is presented which examines the various ways in which climate change has been linked to mental health, in particular the acute and chronic impacts effected upon specific groups and communities, including children, youth, and mental health professionals. Research indicating ways to address the effects of climate change on mental health is also examined, at the individual and community levels, as well as specific school-based interventions. Following that, Ecopsychology and nature-based approaches are explored and research presented which indicates nature-based therapy as a potentially effective treatment option for many of the mental health declines linked to climate change. Chapter 3 incorporates the research evidence to present recommendations for schools and school counsellors around professional development and training, as well as outlining an introductory workshop on the fundamental principles of nature-based therapy.

Chapter 2: Literature Review

Introduction

This chapter seeks to examine the key links established within the literature between climate change and the psychological wellbeing of humankind, with the goal of deepening readers literacy on the topic of climate change effects and providing empirical weight and guidance for Chapter 3's recommendations for school counsellors and schools working with youth in British Columbia. The first section presents the various acute and chronic effects of climate change upon wellbeing, with emphasis placed upon the mental wellbeing of children and youth. The second section examines the inequalities that exist around the effects of climate change upon different populations. Lastly, the third section reviews the literature examining how to address the growing issue of adverse climate change effects upon the psychological wellbeing of individuals, particularly children and youth, and communities.

It is noteworthy that while apprehension about the effects of current and future climate change on human health is not a new phenomenon, interest in the less obvious and more 'unseen' linkages specifically between climate change and mental health are more nascent, and peer-reviewed research from prior decades is relatively sparse. An investigation by Berry et al. (2018) noted that from 2007-2016 a search for publications matching the terms "climate change AND health" yielded 9,672 results; however, just 208 returned for "climate change AND mental health". Further, only 29 of these critically evaluated mental health. This dearth of historical empirical data has limited widespread understanding of the effects climate change poses on mental health, and may be partially causal for the limited action in public health policy and practices. More recently however, public health authorities and organizations such as the American Psychological Association (Clayton et al., 2017) and the Intergovernmental Panel on

Climate Change (Edenhofer et al., 2014) have published comprehensive reports which examine the relationship between mental health and climate change. In Canada, reports by Natural Resource Canada, *From Impacts to Adaptation: Canada in a Changing Climate* (Lemmen et al., 2008) and its update *Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation* (Warren & Lemmen, 2014) discuss current and future risks and opportunities that climate change presents to Canada and its regions, with a focus on human and managed systems, including economic and industry sectors. It appears that mental health is largely absent from these reports. A more recent report, led by Environment and Climate Change Canada, was released as the first part of a series *Canada in a Changing Climate: Advancing our Knowledge for Action* (Bush & Lemmen, 2019); while this report also fails to examine the human health response to climate change, its stated intention is to lay a climate-science foundation for future reports and provides a synthesis of the most current research on changes in temperature, precipitation, snow, ice, permafrost and freshwater availability as well as in Canada's three oceans. In 2021, Health Canada is expected to issue the next report in the series, *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action,* which is to provide an assessment of the risks of climate change to the health of Canadians (Natural Resources Canada, 2021). This document's stated intention is to provide support for actions by health decision makers at local, provincial/territorial and national levels, as well as those who work in public health, health care, emergency management, research, and community organizations. It's stated that this report will include the most current information on climate change and health, focus on populations of higher concern, including children, provide an inventory of health-adaptation best practices, and focus on mental health and wellbeing. Such reports provide optimism that greater priority to research regarding mental health and climate change is beginning to be given. Still, at

present, in areas where the research is particularly nascent, both peer-reviewed and grey literature are yet needed to understand the breadth and depth of climate change risks and impacts upon mental wellbeing (Hayes et al., 2019). The current state of the literature is noted in each section discussed within this chapter.

Review of Research Literature

Mental Health Risks and Impacts of Climate Change

A wide range of climate-related mental health outcomes have already been documented as a result of both acute and longer term climate and environmental changes: elevated rates of anxiety and mood disorders, acute stress reactions and post-traumatic stress disorders, higher frequency of violence and conflicts, increased drug and alcohol abuse, strong emotional reactions such as despair, fear, helplessness and suicidal ideation, and decreased sense of self and identity from loss of place and grief reactions (Berry, 2009; Berry et al., 2010; Coyle & Susteren, 2012; Cunsolo Willox et al., 2012, 2013a, 2013b; Doherty & Clayton, 2011; Fritze et al., 2008; Page & Howard, 2010; Stanke et al., 2012; Swim et al., 2010, 2011). In addition to those impacts, of which the compounding or mitigating influences of the COVID-19 pandemic are yet unclear, people may suffer the emotional consequences associated with anticipated or actual environmental changes by reacting with powerlessness, helplessness, despair, grief or uncertainty (Comtesse et al., 2021). Over the past fifteen years, several terms have emerged to describe such emotional impacts of climate change, including solastalgia (Albrecht, 2006), ecoanxiety, and ecological grief which are now readily recognized in popular culture (Comtesse et al., 2021).

The evidence for mental health impacts of climate change is drawn from various populations in diverse geographical areas, from rural Australia to Northern Canada (Bourque &

Cunsolo Willox, 2014), and indicates that climate change has a high potential for inducing impacts upon the wellbeing of individuals, communities, and larger populations. Notably, some literature indicates that among the host of psychological responses and adaptations which people and communities can experience from climate-related extreme weather events and gradual climate change, is the potential rise in feelings of optimism and altruism, the fostering of compassion, generosity, a sense of meaning in a person's life, and support toward broader community resilience (Clayton et al., 2017). Further, emerging literature suggests the possibility of post-traumatic growth following natural disasters, reflected in greater resilience and transformation to more sustainable lifestyles (Clayton et al., 2017, p. 36; Clayton & Manning, 2018). This literature describes that such progress requires the developmental and psychological abilities to grieve and articulate feelings in a narrative format; in particular, prolonged reflective contemplation on climate in combination with hope and coping advice from supportive caregivers has demonstrated positive transformation and healing. The emergence of such literature offers promise in addressing the effects of climate change and is reflected in the recommendations offered in Chapter 3. Despite these examples of potential for positive effects and adaptations, the literature documenting positive mental health outcomes related to climate change is scant.

Overwhelmingly, the literature examining both acute and prolonged extreme weather events linked to climate change reveals that the related mental health outcomes are adverse and can include the aforementioned: post-traumatic stress disorder (PTSD), anxiety, depression, complicated grief and sense of loss, recovery fatigue, and suicidal ideation. Other psychological impacts may include weakened social ties, increased stress levels, substance misuse, aggression, and violence related to resource scarcity (Hayes et al., 2019). Also of concern are emotions that

arise related to the overarching awareness of climate change and the risks it poses to wellbeing, including worry, anxiety, and feelings of impending doom, hopelessness, and fatalism. Natural disasters and extreme weather events linked to climate change may result in the emergence of acute negative impacts, while longer-term changes in the climate bring about chronic impacts that can be difficult to link exclusively to climate change but which have profound implications for decline in mental health (Clayton et al., 2017; Hayes, et al., 2019). Though there is emerging literature on the continuing holistic impacts of the COVID-19 pandemic (Magson et al., 2021) including among adolescents (Pfefferbaum & North, 2021), it is yet to be determined what factor the pandemic may play on collective mental wellbeing, degrading it or providing protective adaptations and resilience that can be applied to the threats linked to a changing climate. In either case, schools and school counsellors figure to remain important in the lives of children and youth in British Columbia coping with a changing planet. The following subsections describe the various acute and chronic risks and outcomes of climate change upon different groups that influence the work of a school counsellor in British Columbia.

Impacts on Individuals.

These impacts include those which individuals experience through direct or indirect exposure to short-term or long-term climate change events, and which can be acute or chronic in nature. Acute impacts result from natural disasters or extreme weather events such as hurricanes, wildfire, or drought, while chronic impacts result from longer-term changes in climate, including sea-level rise, desertification, or changed weather patterns observed over multiple years. The discussion emphasizes the impacts experienced directly by individuals; however, it also touches on indirect impacts (witnessing others being impacted), which have profound implications for mental health. Understanding the connection between climate and mental health at the individual

level helps school counsellors understand the various effects that may be influencing the people within their own school community.

Trauma, shock and general anxiety.

Disasters connected to climate change have been linked to a high potential for immediate and severe psychological trauma from personal injury, injury or death of a loved one, damage to or loss of personal property and pets, and disruption in or loss of livelihood (Neria & Schultz, 2012; Simpson, et al., 2011; Terpstra, 2011). Rubonis and Bickman (1991) provided an early meta-analysis of studies on the relationship between disasters and mental health impacts and found that between 7% and 40% of all subjects in 36 studies presented some form of psychopathology. The type of psychopathology with the highest prevalence rate was general anxiety, followed by phobic, somatic, and alcohol impairment, and then depression and drug impairment, all of which were elevated relative to prevalence in the general population (Clayton et al., 2017). More recent reviews have concluded that acute traumatic stress is the most common mental health issue to follow a disaster (Fritze et al., 2008), while negative emotions of terror, anger, and shock, are likely to dominate people's initial response (Raphael, 2007). Victims of flooding used words such as "horrifying," "panic stricken," and "petrified" to describe their experience during the flood (Carroll et al., 2009; Tapsell & Tunstall, 2008), and these acute symptoms may later manifest as mood disorders such as PTSD or depression.

PTSD, depression and suicidality.

Following a natural disaster and initial symptoms of trauma, shock, or anxiety, many people continue to experience problems when security is restored, with PTSD, depression, and general anxiety manifesting as a chronic disorder along with increased suicidality. Several studies examining survivors from areas affected by Hurricane Katrina showed that suicide and

suicidal ideation more than doubled, one in six people met the diagnostic criteria for PTSD, and 49% of people living in an affected area developed an anxiety or mood disorder such as depression (Kessler et al., 2008; Lowe et al., 2013). Similarly, 14.5% showed symptoms of PTSD following Hurricane Sandy (Boscarino et al., 2014), and 15.6% of highly affected communities in Australia showed symptoms of PTSD several years after experiencing extreme bushfires (Bryant et al., 2014). PTSD is often linked to a host of other mental health problems, including higher levels of suicide, substance abuse, depression, anxiety, violence, aggression, interpersonal difficulties, and job-related difficulties (Simpson et al., 2011). Further increasing the likelihood of experiencing more severe trauma, and being more susceptible to PTSD and the other types of psychiatric symptoms, are instances where individuals experience multiple or long-lasting acute events—such as multiple disasters or consecutive years of drought (Edwards & Wiseman, 2011; Hobfoll, 2007). The likelihood of suicide is also higher among those who have been exposed to more severe disasters (Norris et al., 2002). School counsellors observing this wide-range of symptoms and impacts upon mental wellbeing health should consider the potential exposure to direct or indirect effects of climate change.

Compounded stress.

Climate change can generally be considered a source of additional stress upon everyday life and, while that stress may be tolerable for those with supports and sources of resilience, it could prove to be a catalyst for those with fewer resources or who are already experiencing other stressors. Stress can be described as “a subjective feeling and a physiological response that occurs when a person feels that he or she does not have the capacity to respond and adapt to a given situation” (Clayton et al., 2017, p. 23). Climate-related stress is therefore likely to lead to increases in stress-related problems, such as substance abuse, anxiety disorders, and depression,

and may also be accompanied by worry about future disasters and feelings of vulnerability, helplessness, mourning, grief, and despair (Neria & Schultz, 2012). Following disasters, increased stress can also make people more likely to engage in behavior that has a negative impact on their health, such as smoking, risky behavior, and unhealthy eating habits (Beaudoin, 2011; Bryant et al., 2014; Flory et al., 2009). Though not as acute a disaster event as others, drought is associated with psychological distress (O'Brien et al., 2014; Stanke et al., 2013), while several studies have found that many victims of a flood disaster can express psychological distress years after the flood (Alderman et al., 2012; Crabtree, 2012; Simpson et al., 2011). The impacts of compounded stress also have implications upon physical health, with chronic stress resulting in a lowered immune system response that leaves people more vulnerable to pathogens and at greater risk for a number of physical ailments (Alderman et al., 2012; Simpson et al., 2011). A host of potential physiological responses to the stress of climate change are described by Doppelt (2016) due to increased levels of the stress hormone cortisol, which, if prolonged, can affect digestion, lead to memory loss, and suppress the immune system.

Aggression, hostility, and decreases in self-regulation.

Psychological effects of warmer weather on aggression and violence have been extensively studied, and a causal relationship between heat and aggression has been demonstrated (Anderson, 2001; Simister & Cooper, 2005). A study by Anderson (2012) predicted a demonstrable increase in violence associated with increased average temperatures, and indicated that the relationship between heat and violence may be due to the impacts of heat on arousal, resulting in decreases in attention and self-regulation, as well as increases in the availability of negative and hostile thought (Anderson, 2001; Anderson et al., 1995). Though this

impact could also manifest as an acute impact, as result of a heat wave for example, the pervasive warming trend across bioclimatic regions makes this a chronic impact of note.

Social disruption and strain among families.

Disasters precipitate a set of stressors that place particular strain on interpersonal interactions in home environments (Simpson et al., 2011), and may result in unsafe or abusive home environments. A review of research on the impacts of natural disasters identified problems with family and interpersonal relations, as well as social disruption, and concerns about the wider community (Norris et al., 2001). Families experiencing flooding, storms, or wildfire may require evacuation and relocation before resettling permanently. Such situations lend to strain in which family relationships may suffer. Separation from established systems of support may occur, including children who may need to move schools or miss school altogether. Tapsell and Tunstall (2008) described how families who are able to remain in their home may lose a sense of their home's safety and security, and parents may describe themselves as less effective caregivers (Carroll et al., 2009). Strain within families, the addition of compounding stressors, and the potential for increased aggression and decreased self-regulation can also lead to domestic abuse, including child abuse. Increases in these abuses have been observed among families who have experienced disasters, such as Hurricane Katrina or the Exxon Valdez oil spill (Fritze et al., 2008; Harville et al., 2011; Keenan et al., 2004; Yun et al., 2010) and therefore should be a consideration of school counsellors working with families directly affected by climate change events.

Solastalgia.

A sense of loss may be one the best ways to characterize the impacts of climate change upon individual and community perceptions. As climate irrevocably alters both the more-than-

human environment and the built landscapes people are familiar with, large numbers of people may experience a sense of losing places that are important to them – a phenomenon termed 'solastalgia' (Clayton et al., 2017). Derived from nostalgia, the sole term in the English language which closely connects distress felt toward the places we live, our homes, solastalgia was introduced by Australian professor and philosopher Glenn Albrecht in 2006. Albrecht (2006) described 'solastalgia' as the felt sense of nostalgia (literally, homesickness: *nostos* = return to home or native land, and *algia* = pain or sickness) in combination with 'desolation' and its reference to a personal feeling of abandonment (isolation) and to a landscape that has been devastated, and 'solace' which refers to comfort in difficult times (consolation) as well that which provides comfort or strength. Albrecht described:

> Solastalgia is the lived experience of the loss of value of the present and is manifest in the feeling of dislocation, of being undermined by forces that destroy the potential for solace to be derived from the immediate and given. In brief, solastalgia is a form of homesickness one experiences when one is still at home. (Albrecht, 2006, p. 35)

This sense of loss is not a trivial experience; many individuals form strong attachments to the place where they live, finding it to provide a sense of stability, security, and personal identity (Bourque & Cunsolo Willox, 2014). People who are strongly attached to their local communities report greater happiness, life satisfaction, and optimism (Brehm et al., 2004) whereas work performance, interpersonal relationships, and physical health can all be negatively affected by disruption to place attachment (Fullilove, 2013). The research specific to solastalgia is mostly based on qualitative interviews or the use of the solastalgia subscale of the Environmental Distress Scale (EDS) in groups particularly exposed to changes in their home environment, including survivors of natural disasters and individuals affected by rapid industrial development

(Comtesse, 2021). The solastalgia subscale captures feelings of yearning, longing and sadness, along with worry regarding impending environmental and lifestyle changes. Hence, the scale seems to assess grief with regard to actual ecological loss but also anxiety in response to anticipated, future loss. (Comtesse et al., 2021). Moratis (2020) hypothesized that despite the decreases in light and air pollution observed in many places during the coronavirus pandemic, and the increased opportunity it has brought for some people to connect with Nature, the comfort these phenomena provide may be short-lived and vanish with post-pandemic economic and social recovery. He theorizes that this may lead to a new form of solastalgia*, anticipatory solastalgia*, wherein people experience the paradox of intensely experiencing a deeply felt connection with the immaculate or pristine, while simultaneously realizing its fragility and imminent loss. In this duality, sensations of pleasure, satisfaction, and comfort are intricately married with feelings of distress, grief, or fear for the future. As a concept, anticipatory solastalgia may be an additional factor affecting people's mental health during crises such as the current pandemic and beyond.

In their scoping review on solastalgia, Comtesse et al. (2021) described that quantitative studies are few at present, and no study has yet directly assessed the potential relation between solastalgia and mental health outcomes. Still, solastalgia is useful to understand as it represents many of the emotions represented in the following subsection and is comparable to the more recognized terms ecoanxiety and ecological grief.

Feelings of helplessness, despair and fear, ecoanxiety and ecological grief.

An area related to solastalgia with more established research, it has been well-observed that long-term gradual changes in climate can give rise to a number of different emotions, including fear, despair, and grief (Moser, 2007). Coyle and Van Susteren (2012) reviewed cases

of extreme weather where fear approached the level of phobia and "unrelenting day-by-day despair" (p. viii) was experienced. There is evidence that feelings of loss, helplessness, and frustration may arise due to an inability to feel like one is making a difference in stopping climate change, and these feelings deeply affect some people (Moser, 2013). Experiencing the slowly unfolding and seemingly irrevocable impacts of climate change, worry about the impending threats to oneself, children, and later generations, may be an additional source of stress (Searle & Gow, 2010). Albrecht (2011) and others have termed this anxiety *ecoanxiety*. Comtesse et al. (2021) contend that ecoanxiety is an adaptive response to the threat of climate change which has been shown to be associated with pro-environmental behavioral engagement. However, if ecoanxiety is characterized by severe and debilitating worrying, it can be maladaptive and there is possibility of the development of anxiety disorders, generalized anxiety disorder being a prime candidate (Comtesse et al., 2021). At present, research on ecoanxiety is mostly based on qualitative interviews that offer insight into the lived experience of people and/or communities suffering impacts due to climate change (Comtesse, 2021).

In a systematic review on climate related non-economic losses (Cunsolo Willox & Ellis, 2018), people are shown to be subject to intangible harm from climate change, including disappearance of fauna and flora, loss of cropland and living spaces for animals, loss of ways of life, and loss of personal identity constructed in relation to the physical environment. The emotional response to such losses is ecological grief, which Cunsolo Willox and Ellis define as "the grief felt in relation to experienced or anticipated ecological losses" (p. 275) and which Tschakert et al. (2019) further divide into three types:

- acute or past physical ecological loss, such as the disappearance, degradation or extinction of species, landscapes and ecosystems. For example, grief has been

identified as a response to both acute extreme weather events and gradual environmental changes.

- loss of environmental knowledge; referring to the disruption of personal and cultural identities that are constructed in relation to features and knowledge of the physical environment.
- anticipated future loss of species, landscapes, ecosystems, ways of life or livelihoods.

As with ecoanxiety, Comtesse (2021) reviewed evidence that the consequences of ecological grief could be adaptive and/or maladaptive. They described that the painful experience of ecological grief could pose a direct mental health risk or amplify risk factors for mental disorders; other evidence suggested that ecological grief is a normal and reasonable response to ecological loss and can lead to positive psychological coping or adaptation, and pro-environmental behavior. Cunsolo Willox and Ellis (2018) conducted a series of qualitative interviews with members of indigenous and farming communities in Canada and Australia to describe the phenomenology of ecological grief, however, empirical evidence on ecological grief is yet scarce (Comtesse, 2021). Further, in a systematic review of the mental health consequences of climate change-related events (Cianconi et al., 2020) could not find any study that directly assessed how people react to changes to or losses of landscapes (e.g., deglaciation). Despite this, there has been research conducted to confirm the effects of extreme weather events on mental distress or disorders (e.g., sleep disturbances, PTSD, anxiety disorders). Though the experience of ecological grief is already recognized in popular culture and is likely to increase, as with the related constructs of solastalgia and ecoanxiety there is mostly qualitative data on

case descriptions of ecological grief and currently there is a distinct lack of empirical studies relating it to mental health risks (Comtesse et al., 2021).

Loss of identity.

A further sense of loss involves the loss of personal identity due to climate change effects. Dittmar (2011) describes how the loss of treasured objects, damaged or destroyed through acute weather events such as flooding or wildfire or indirectly through events such as forced migration, can significantly impair an individual's sense of self and identity. In particular, objects that represent important moments in life (e.g., journals), relationships (e.g., gifts or photographs), or personal/family history (e.g., family heirlooms). The losses of these items are permanent, and thus the impacts are persistent and can become chronic. A loss of identity associated with climate change may also be attributable to its effect on place-bound occupations (Clayton et al., 2017). This is likely due to the close relationship between identity and place-based occupations, including agricultural farming, ranching, fishing, and eco-tourism (Devine-Wright, 2013). Because severe storms and high temperatures disrupt economic activity (Hsiang, 2010), climate change may have an effect on occupational identity in general. Loss of occupation has been associated with increased risk of depression following natural disasters (Wasini et al., 2014).

Loss of autonomy, control & self-efficacy.

Climate change will modify behaviours and intensify certain daily life inconveniences, which can have psychological impacts on individuals' sense of autonomy and control (Clayton & Manning, 2018). The desire to be able to accomplish basic tasks independently is a core psychological need, central to human wellbeing (Deci & Ryan, 2011), and basic services may be threatened due to dangerous conditions. The exposure to unwanted change in one's environment

can also reduce the sense of control over one's life (Fresque-Baxter & Armitage, 2012; Silver & Grek-Martin, 2015), which, in turn, has negative impacts on mental health (Schönfeld et al., 2016). As with solastalgia, ecoanxiety, or ecological grief, a decline in one's sense of identity, autonomy, control and self-efficacy would represent a deep-seated sense of loss in individuals. This sense of loss may be at least partially attributable to the mental health issues, including anxiety, depression, and PTSD, which have been empirically connected to the effects of climate change.

Societal & Community Impacts.

Impacts felt by individuals may extend throughout the larger community and naturally permeate into school communities as well. Therefore, though further research is needed to clearly connect them explicitly to climate change, the potential implications bear attention. At a school level, these impacts would require a whole-school or district approach to intervention. In other cases, such as large-scale climate events where community resources may be particularly stressed, school counsellors may serve as first responders for many youth. School counsellors with knowledge of the various impacts that may occur at the societal and community level will be better positioned to collaborate with and support those community resources.

Loss of social cohesion and continuity within community.

Though social cohesion and social capital can protect communities against psychological and physical health impacts that may arise from a climate-related disaster, such events also contribute to erosion of these protecting factors. Following a disaster, communities with high levels of social capital and community leadership have been found to experience the quickest recoveries, regardless of socioeconomic or cultural backgrounds, and experience the highest satisfaction with community rebuilding (Aldrich & Meyer, 2014). However, compounded stress

from climate change has been observed to negatively affect various communities. Cunsolo Willox et al. (2013), examining impacts of climate change on a small Inuit community, reported that community members who had noticed changes in the local climate and that these changes contributed to altered interactions with the environment and negative effects on themselves, including sadness, anger, increased family stress, and a belief that their sense of self-worth and community cohesion had decreased. In circumstances where local conditions shift beyond manageable or practical limits, people become displaced and the emergence of environmental refugees can result. In 2017, 22.5-24 million people worldwide were forcibly displaced by sudden onset weather events alone, and a 2018 report from the World Bank has estimated that three regions (Latin America, sub-Saharan Africa, and Southeast Asia) will generate 143 million more climate migrants by 2050 (Kumari et al., 2018). These forced migrations result in the dispersal of communities and erode social networks which provide important practical and emotional resources that are associated with health and well-being (Clayton et al., 2017). One such example is the ongoing conflict in Syria, which has resulted in mass migration (UNHCR, 2021). Though the impacts of the large-scale conflict are substantive, evidence suggests the climate change-driven prolonged drought and its effect on crop yields may also play a significant role in the unraveling of an already vulnerable political and ecological climate (Kelley et al., 2015). The erosion of social cohesion and continuity, both within the home community or elsewhere, and its implications for decline in resilience and overall mental health, suggest the need for understanding of and support for students at-risk of climate displacement or students arriving as environmental refugees.

Interpersonal and intergroup aggression.

Heightened anxiety and uncertainty about the future can reduce one's ability to take perspective on the needs of others, negatively impacting social relationships with friends and co-workers (Palinkas et al., 1993), as well as attitudes toward other people in general. Beyond these individual effects, climate change is being shown to affect how people relate to one another and interact within community. Hsiang et al. (2013), in a meta-analysis, found evidence that climate change can contribute to the frequency of intergroup conflict and violence through several mechanisms, including increases in competition for declining resources, and changes in community demographics due to ecomigration. A further study by Ranson (2012) calculated that the rising levels of aggression and frustration consequent of a changing climate will lead to significant increases in interpersonal aggression, including domestic violence, assault, and rape. Intergroup attitudes can also be negatively impacted by climate change. In a survey by Cohen and Krueger (2016), the respondents were found to display more negative attitudes toward policies supporting minorities and immigrants when temperatures were high. Further, an experimental 2012 study showed that people who were thinking about climate change became more hostile to individuals outside their social group, and more likely to support the status quo and its existing social inequities (Fritsche et al., 2012). The author's described that hostility toward individuals outside one's social group can be a way of affirming one's own group identity in the face of a perceived threat. In a vicious cycle, lower levels of social cohesion and connectedness, greater social inequalities, lack of trust between community members and institutions, and other factors that inhibit community members from working together are shown to be associated with intergroup aggression (Norris et al., 2008).

Inequity and Climate Change

The impacts of climate change are and will not be not distributed equally. Some people, communities, and populations will experience natural disasters firsthand, others will be affected more gradually over time, and still others will experience only indirect impacts (Hayes et al., 2019). This section describes some of the populations that are more vulnerable to the psychological health impacts of climate change, who according to Clayton et al. (2017), includes people who live in risk-prone areas, indigenous communities, low-income groups, communities of color, women, children, older adults, and people with disabilities or chronic illness. Though children and youth exist as a vulnerable group in their own right, it is important to highlight each group that children and youth also occupy. In order to effectively support their communities, schools and school counsellors should be aware of the specific demographics of their school populations and the potential for increased vulnerabilities that may exist.

Risk-prone areas.

Due to their geography, some parts of the world are more vulnerable to storms, rising seas, wildfires, or drought (Clayton et al., 2017; Clayton & Manning, 2018). Moreover, communities in which people's livelihoods are directly tied to the natural environment, through agriculture, fishing, or tourism, are deemed at greater risk of climate change effects (Bourque & Cunsolo Willox, 2014), and Clayton et al. (2017) described that communities which lack resources, both physical and financial, can experience climate impacts more severely. In Canada, the Atlantic provinces are reported to be particularly vulnerable to increased storms and rising seas; meanwhile, Northern Canada, the region encompassing the Yukon, Northwest Territories, Nunavut, Northern Quebec and Northern Labrador has experienced, from 1948-2016, a rate of warming roughly three times that of the global mean temperature (Bush & Lemmen, 2019). The

report concluded that the reduction in sea and land ice cover, changes to the permafrost, increased precipitation and annual streamflow will threaten many facets of life in the region, including transportation, access to services and resources, and cultural practices.

British Columbia is relatively well positioned and is projected to experience less extreme effects of a changing climate than the aforementioned areas of Canada (Bush & Lemmen, 2019). Still, British Columbia is already experiencing the effects of climate change. Retooling for Climate Change (2021) provides in-depth regional projection reports for each of BC's regions, indicating that *all* regions are facing various degrees of projected impacts from increased flooding, increased risk of wildfire, increased heat stress, increased prevalence of extreme weather events, shifting ecosystems, and increased risk to vulnerable populations.
Climate change impacts, therefore, are a consideration for each school district across the province, regardless of geographic location. It is also a particular consideration for those schools and districts located in areas of historical vulnerability, such as floodplains or dry interior forest, that the populations and communities there will be at increased risk of flooding and wildfire respectively.

Vulnerable group and communities.

Some groups and communities, many of which comprise a significant proportion of British Columbia's population, are more prone to experiencing increased impacts (Retooling for Climate Change, 2021). Communities that lack resources, both physical and financial, can experience climate impacts more severely (Clayton et al., 2017). In disasters, socioeconomically disadvantaged communities often suffer most acutely, while also reporting weak or absent social support networks to support resilience and recovery (Abramson et al., 2015). Communities as a whole cope better with an acute event when economic disparity is reduced and the needs of the

economically vulnerable are attended to in advance (Iacoviello & Charney, 2014; Norris et al., 2008; Wickes et al., 2015).

For many Indigenous communities, climate change may threaten not only their physical home but also their lifestyle and cultural heritage, including access to traditional foods and natural resources, culturally meaningful practices (Cochran et al., 2013) and the transfer of traditional knowledge (Cunsolo Willox et al., 2013, 2014). The experience of solastalgia is thought to be particularly salient among people with stronger attachment to their land, such as farming communities and Indigenous peoples (Albrecht et al., 2007), and has been observed in northern Canada as a response to rapidly changing climate and environment (Cunsolo Willox et al., 2013). Bourque and Cunsolo (2014) also suggest that pre-existing mental health disparities, legacy of Canada's colonial policies, are likely to be further exacerbated by ongoing climate and environmental changes.

Certain areas of occupation are more directly exposed to the impact of climate change. These occupations may include but not be limited to first responders, construction workers, health care workers, farmers, farm workers, fishermen, transportation workers, and utility workers (Benedek et al., 2007). Inequitable health outcomes may arise directly through workers' exposure to increased temperatures, air pollution, and extreme weather, and indirectly through vector-borne diseases, increased use of pesticides, and many other elements which can bring both physiological and mental health impacts (U.S. Environmental Protection Agency, 2016). Outdoor workers, including agricultural workers, will be the first to endure the effects of climate change (U.S. Environmental Protection Agency, 2016).

Age, gender, and general health also exist as factors that influence vulnerability; due to increased health and mobility challenges, as well as higher rates of untreated depression (Clayton

& Manning, 2018), the elderly are very susceptible to the risks of climate impacts. Further, individuals of all ages with disabilities or chronic mental or physical health issues may experience climate-related impacts at a greater extent (Page et al., 2012). These factors will influence not only family members of students, but staff within school communities.

Stressors related to supporting a child makes women more affected by climate change. Often in the caregiver role, women may be more affected, in general, by the stress and trauma of natural disasters (Trumbo et al., 2011; Wasini et al., 2014). Epidemiological studies of post-disaster cohorts suggest that women are more likely to experience mental health challenges as a result of trauma (Clayton et al., 2017) and the prevalence of PTSD in the general population is reported to be approximately twofold greater in women than in men (Somasundaram & van de Put, 2006).

Effects on Children & Youth.

It is reported that several factors, including their small size, developing organs and nervous systems, and rapid metabolisms, predispose young people to being more physiologically vulnerable to the effects of climate change than older age groups (Clayton et al., 2017). Climate impacts may have long term and even permanent effects to alter the developmental potential and trajectory of a child; research from Kousky (2016) showed that pregnant women exposed to heat waves have babies of lower average birth weight, and, possibly, a greater incidence of premature birth. In a further example, Bartlett (2008) found that children who experience a flood or a drought during key developmental periods are shorter, on average, as adults. These physiological vulnerabilities of children are important to note as they may be compounded by a range of psychological effects. Numerous studies have concluded that children experience PTSD, depression, panic symptoms, and phobic behaviour following traumatic or stressful experiences

with more severity and prevalence than adults (Clayton et al., 2017, Fritze et al., 2008; Somasundaram & van de Put, 2006, Fernandez et al., 2015). In a specific example, some preschool children who lost their homes to Hurricane Sandy in 2012 developed a phobic avoidance of rain, waves, and thunder that generalized to panic about getting in bathtubs, going to school (which they feared might flood), and going to swimming lessons (Clayton et al., 2017, p. 36). During adverse events, it's been found that children are more likely to regress into a lack of articulating their emotions, or display somatic expressions such as stomach ache, headache, or other physical symptoms to express feelings of upset (Clayton et al., 2017, p. 36). Clayton also described how children are more dependent, and therefore are more vulnerable to separation reactions, and how they may develop fear of losing control over an unknown future that often results in obsessive-compulsive behaviors. Further, in Inuit and Indigenous cultures, as traditional nature-based activities become unavailable to them, a link has been made to youth reporting higher rates of suicidal thinking and depression (Hersher, 2016).

Similar to physical experiences, traumatic psychological experiences can have lifelong effects as early childhood is critical for brain development. Studies have documented that high levels of stress during childhood can affect the development of neural pathways, in ways that impair memory, executive function, and decision-making in later life (Shonkoff et al., 2012). While some young people may deny that climate change is happening or de-emphasize the seriousness of environmental problems, many were found to voice concern (Lawson et al., 2019) and more often than worry about consequences for themselves, children express concern about impacts on animals (Jonsson et al., 2012; Ojala, 2016; Wilson & Snell, 2010). In research primarily involving young people in elementary school through high school, even children as young as five years-old worry about 'the Earth getting too hot' (Davis, 2010). In research with

adults, these painful feelings are described as ecoanxiety and ecological grief (Cunsolo Willox & Ellis, 2018).

In light of these findings, it is apparent that climate change is present in the minds of children and youth, and that it impacts them at both physiological and psychological levels. Along with consideration of the potential for increased vulnerability posed due to geographic location and demographics of the school community, schools and school counsellors should be aware of the particular vulnerabilities of their students as they work toward implementing mitigation and prevention strategies.

Addressing Climate Change Effects on Mental Health

With growing amounts of research identifying the myriad of ways in which climate change effects mental health, the question then becomes, what can be done to prevent, mitigate or otherwise address those effects? Several comprehensive reposts are available detailing the current best practices in addressing climate change affects at a global, national, regional, societal levels (Edenhofer et al., 2014; Anderson et al, 2017, Clayton et al, 2017). These reports, published by the Intergovernmental Panel on Climate Change, the Centers for Disease Control and Prevention, and the American Psychological Association respectively, share several guidelines which are outlined below. In particular, these reports commonly identify the cultivation of psychological resilience and self-efficacy as protective factors during natural disaster events, both individually and on a community level.

Concerning school-based interventions specifically, literature is less abundant. The majority of interventions describe responses to natural disasters, and data on interventions regarding the effects of long-term climate change upon mental health, or interventions to promote resilience and protective factors to mitigate climate change impacts is lacking (Hayes et

al., 2019). A notable exception is the literature review published by Flom et al. (2011) which directly examined the research on the use of Nature in schools to promote mental health in school-aged youth. In their review, the authors state that research increasingly demonstrates that natural environments play an important role in healthy development. They highlight research documenting the positive link between time spent in connection with Nature and general physiological and cognitive health benefits, as well as increases in self-efficacy and prosocial behaviours. Additionally, they emphasize the role of school counsellors to optimize student learning and psychosocial development, while serving as frontline professionals promoting mental health among youth. At the post-secondary level of education, the University of British Columbia's Sustainability Initiative is a leader at the national level and has issued a student prepared report *Climate Change and Mental Health: A systemic approach to action in post-secondary education* (Kluttz, 2020). This report references the data available from various age groups and demographics and provides a framework from which other educational institutions could adapt and build (see Appendix E). The following section will examine most closely those practices most salient to BC school counsellors working with children and youth.

Individuals.

The current research commonly agrees on the importance of supporting individuals in becoming more resilient to climate change effects. Clayton et al. (2017) clearly outlines several guidelines to support individual resilience, including:

- fostering optimism;
- cultivating active coping and self-regulation;
- finding a source of personal meaning;
- boosting personal preparedness;

- supporting social networks;
- encouraging connection to parents, family, and other role models;
- upholding connection to place;
- maintaining connections to one's culture.

Build self-efficacy and belief in one's own resilience.

It is concluded that people who feel positive about their ability to overcome a source of stress and trauma do better than people with lower self-efficacy, and belief in one's own resilience has been correlated with fewer symptoms of PTSD and depression after disasters (Shenesey & Langhirichsen-Rohling, 2015). Further, Li and Monroe (2019) found that when young people feel concern about environmental problems and believe that they and others can address problems effectively, they are more likely to feel hope. Both hope and concern motivate action, whereas despair and feelings of helplessness are negatively related to action (Ojala, 2012, 2013; Stevenson et al., 2019; Stevenson & Peterson, 2016).

Foster optimism, active coping and self-regulation.

People who are able to reframe and find something positive in their circumstances tend to do better than people who are less able to regulate their thinking, emotions, and actions (Bonanno & Diminich, 2013; Hanbury et al., 2013; Harper & Pergament, 2015; Iacoviello & Charney, 2014; Petrasek MacDonald et al., 2013; Prince-Embury, 2013). Positively reappraising one's circumstances helps in moving forward rather than becoming stuck in a cycle of negative emotions. Additionally, optimism likely contributes to a person's ability to feel positive emotions during a hard time, which may help people better recover and cope (Terpstra, 2011). Lowe et al. (2013) describe how a study of low-income mothers who survived Hurricane Katrina found that optimism helped the mothers adjust and grow after a disaster.

A further protective factor outlined by Clayton (2017) is active coping, which involves cognitive dimensions, such as maintaining an awareness of one's own thoughts and appraisals, and behavioral dimensions, such as continuously seeking solutions and support (Iacoviello & Charney, 2014). Self-regulation, which functions to control one's immediate impulses in favor of more considered, long-term strategies, is another characteristic of resilient individuals (National Scientific Council on the Developing Child, 2015).

Find a source of personal meaning.

Viktor Frankl, psychiatrist, author, and founder of logotherapy, chronicled his experiences as a prisoner surviving in concentration camps during World War II in his novel *Man's Search for Meaning: An introduction to logotherapy* (1992). He described that life is not made unbearable by circumstance, but only by lack of meaning and purpose. Frankl suggested that meaning is derived from three possible sources: purposeful work, love, and courage in the face of difficulty; however, regardless of the source, the key point is that an individual derives meaning in *something*.

To support Frankl's conclusions, Marks (2015) found that people who find meaning in a spiritual practice tend to experience a boost to their individual well-being and find their practice can be an important coping resource which provides a sense of peace during difficulty. Further, involvement in a faith community has been cited as a protective factor for mental health in several interview studies with people experiencing trauma (e.g., Cline et al., 2015; Fernando, 2012; Harper & Pargament, 2015; Weine et al., 2014). Contemplative practices, including mindfulness and yoga, have been shown to be another type of practice that provide people a greater sense of purpose and meaning (Garland et al., 2015). In each case, the cultivation of awareness and the ability to flexibly reappraise and reframe adverse events in a way that

enhances a sense of meaning is key for promoting personal well-being (Clayton et al., 2017, p. 42).

Boost personal preparedness.

Mental health can be incorporated into existing disaster preparation efforts. Recommendations for short-term disaster or emergency kits often include things like food, water, supplies, and medication, yet items that can preserve mental health are also equally important to include (Missouri Department of Mental Health, 2006). These items, such as spiritual objects, pictures and sentimental items, blankets and toys for small children, favorite foods or treats, recreational items such as books, games, musical instrument, art supplies and writing instruments, are included to provide a sense of comfort, help increase confidence and feeling of safety, and reduce fear. (Centers for Disease Control and Prevention, 2016; American Red Cross, 2017). Moreover, preservation of mental well-being during the natural disaster event is found to also lessen long-term mental health effects linked to the event (Clayton, et al., 2017).

Support social connection.

Connectedness to others is a core psychological need and an essential foundation for well-being and it is cited that an individuals' personal capacity to withstand trauma is increased when they are connected to their social networks (Deci & Ryan, 2011). One strategy frequently noted in resilience studies is cultivating and maintaining strong social connections (Iacoviello & Charney, 2014). Participation within a faith community, or other tight-knit social network, has been cited to provide significant emotional and material support (Cain & Barthelemy, 2008; Marks et al., 2015). Research on resilience also notes that social support is a critical protective resource during times of adversity (Kaniasty, 2012). Researchers have found that higher levels of social support during and in the aftermath of a disaster are associated with lower rates of

psychological distress (Greene et al., 2015; Self-Brown et al., 2013) and the positive mental health impacts of a strong social support system, or the negative impacts of a lack of social support, have been shown to persist for years following a disaster (Banks & Weems, 2014).

The support of family and close connections is particularly important for fostering resilience in children and youth (Clayton et al., 2017). Parents and caregivers are typically the central source of support for children during trauma and adversity, and children are at higher risk of long-term physiological and mental health stress-burdens when the parents themselves suffer acute levels of distress (Simpson et al., 2011; Weine et al., 2014). Parents and caregivers also serve as a buffer against trauma by providing necessities, such as shelter and food (Kousky, 2016). A further study by Petrasek MacDonald et al. (2015) concluded that spending time with family as well as friends is helpful in protecting the mental health of youth who are experiencing the impacts of climate change on their environment. Perhaps most salient to schools and school counsellors, non-caregiving role models can also provide support to children; in fact, the resilience of children and youth during adverse events is optimized if they are connected to non-caregiver role models, such as teachers and coaches (National Scientific Council on the Developing Child, 2015).

Uphold connection to place.

As climate change alters the environment and lands we live upon, so it imposes forces of change upon those cultures tied to the land. As noted, some indigenous communities are experiencing rapid cultural change as the climate warms and makes traditional cultural practices difficult. Research in affected communities indicates that people do not wish to leave their homes, despite the changes they may experience (Cunsolo Willox et al., 2012). Moreover, staying in a place to which one feels connected can increase resilience because people are more

likely to take adaptive actions (Adger et al., 2013) and forms of coping and maintaining wellbeing may be observed. MacDonald et al. (2015) interviewed Inuit youth ages 15-25 who said that (a) staying busy took their mind off these troubles (emotion-focused coping), (b) they often found solace in getting out on the land, connecting with their culture and community and seeking support from family and friends, (c) they learned to adapt when and how they did land-based activities (problem-focused coping), and prided themselves that adaptability to change is part of Inuit culture (meaning-focused coping). In working to uphold connection to place, it is notable to include the theory of social psychologists Erich Fromm (1955) and Paul Shepard (2011) that Western society has experienced a cultural 'forgetting' of an earlier, evolutionarily preferred, relationship with Nature. With approximately 80% of Canadians now living in urban settings, and the average North American spending 90% of their days indoors, and 5% in their cars, it is clear that the typical lifestyle severely limits contact with Nature (Harper & Dobud, 2021). A growing body of evidence shows that time outdoors positively affects physical health and wellbeing (Brussoni et al., 2015), and more interaction with natural environments provides an overall benefit to mental health, including a reduction in anxiety and boost in psychological wellbeing (Lawton, et al., 2017). A separate section on ecopsychological approaches further explores the use of nature-based interventions as a therapeutic modality to address climate change effects on mental health.

Communities.

In contrast to the depth of research available on cultivating individual resilience, there is comparatively little research which has explored psychosocial resilience at the community level (Bonanno et al., 2015). In the comprehensive report published by the American Psychological Association, however, Clayton et al. (2017) concluded that building resilience for disasters and

confronting the gradual changes due to climate change will help communities alleviate adverse health outcomes. They described that a resilient and healthy community is not just the sum of many resilient individuals; it multiplies individual capacity by bringing people together for joint action and mutual support. Their further conclusion was that, for a community to be resilient in the face of climate change, it must have the flexibility to respond to the entire unpredictable array of potential climate impacts. Communities must be ready for crisis response to sudden traumatic events, such as extreme storms, heat waves, and floods, while also planning for the slower alterations of climate change, such as increasingly warmer winters and changes in local wildlife and plant communities. Through experience preparing for and responding to natural disasters, community planners and policymakers are relatively well-equipped in preparing for the physical impacts of climate change. However, it is also important to be well-equipped for the potential mental health impacts (Clayton et al., 2017). Clayton et al. (2017) described actions to help communities prepare and respond to acute and gradual psychological effects as:

- assessing and expanding the community mental health infrastructure;
- facilitating social cohesion through community design;
- training the people who will serve the community during a disaster;
- providing clear and frequent information;
- reducing disparities;
- paying special attention to vulnerable populations;
- developing trusted and action-focused warning systems;
- providing a fast response;
- having a post-disaster plan;
- ensuring equitable and transparent distribution of resources;

- engaging community members;
- increasing cooperation and social cohesion;
- providing opportunities for meaningful action.

Mental health professionals.

As experts working directly with individuals and communities, mental health professionals are well-positioned to support public health policies and practices implemented in community, as well as provide education and treatment for mental health and the effects of climate change. Clayton et al. (2017) outlines several strategies for mental health professionals including:

- becoming a climate-literate professional and staying up-to-date with current climate change news and communications on best practices;
- engaging other mental health professionals by facilitating conversations and workshops that allow your colleagues to be more effective in inspiring action;
- being vocal, model leaders within your community by getting involved locally to create support for climate solutions;
- support national and international solutions by publicly sharing your expertise to influence the media, health leaders, and policymakers.

Increasing awareness and education of mental health professionals on climate change and its effects on mental health is further recommended in a number of studies, including call for mental health professional curricula to further highlight the relevance of the environment to human health, and that the health impacts of climate change be incorporated into the training and continuing education of the mental health workforce, with priority to those serving the most vulnerable population groups (Coyle & Susteren, 2012; Hamel Green et al., 2009; CMA, 2010;

Doha, 2012). In a recent interview with The Guardian (2021), psychologist and climate change researcher Susan Clayton expressed that, while many therapists recognize the clinical relevance climate change and mental health, hardly anybody has received training specifically in addressing it. Further highlighting this issue, a 2016 study of 160 American therapists found that although most respondents recognized the importance of climate change in the mental health profession, more than half of those interviewed felt their training had not adequately prepared them to deal with the mental health impacts of the climate crisis (Seaman, 2016). Despite this, Sibbald (2013) argued that physicians and health professionals will be among the first responders to the effects of climate change, and Bourque and Cunsolo (2014) ascribed the need in preparing the mental health workforce, through further training, guidance, and comprehensive guideline, to intervene in climate-related emergencies and to deal with their ensuing psychological impacts. Some researchers have reasoned that all mental health professionals have the professional duty to protect the wellbeing of current and future generations, and are positioned to raise public awareness and advocate for urgent responses to mitigate climate change at the societal and political level (CMA, 2010; Sibbald, 2013). That said, climate change is an evolving global phenomenon, with diffuse responsibility and complex social justice issues; responding to the increasing threats posed to human health and wellbeing clearly represents an unprecedented challenge to the medical and public health communities (Bourque & Cunsolo Willox, 2014). Given these considerations, the role of school counsellors and discussion of their specific professional obligations are discussed in Chapter 3.

School-based interventions.

Naturally, the community in which school counsellors generally have the greatest influence upon is their school community, and, in light of the literature previously outlined, it is logical that

schools would be well-positioned and well-equipped to introduce interventions and programming to support youth and their families in the areas Clayton et al. (2017) outlined:

- fostering optimism;
- cultivating active coping and self-regulation
- finding a source of personal meaning;
- boosting personal preparedness;
- supporting social networks;
- encouraging connection to parents, family, and other role models;
- upholding connection to place;
- maintaining connections to one's culture
- cultivating resilience

However, the literature is rather scant in breadth when examining school communities, climate change, and mental health in combination. An American report by Anderson et al. (2017) issued through collaboration between the Centers for Disease Control and Prevention (CDC) and the Building Resilience Against Climate Effects Collaborative (BRACE) is comprehensive in its evaluation, though mental health effects are still minimally examined compared to the direct physical threats posed by climate. A further study of note (Cohen et al., 2009) used the Cognitive Behavioral for Trauma in Schools (CBITS) intervention to treat children experiencing trauma symptoms after Hurricane Katrina. This controlled community field study aimed to evaluate the efficacy of a public health intervention to treat children after a disaster. The study showed reductions in children's reports of trauma-related symptoms following treatment, including decreases in nightmares, clinginess to caregivers, and irritability, though the authors also concluded that further evaluation is merited. Studies by Weems et al. (2009) and Goldman et al.

(2015), both examined anxiety interventions following Hurricane Katrina and offer further support for school-based interventions as a means to significantly reduce trauma symptoms in children after a major natural disaster.

A related stream of literature focuses on evaluating therapeutic interventions designed to reduce the impact of major disasters such as flooding or hurricanes on school-aged children. These interventions include strategies such as massage therapy and play therapy. Massage therapy has been found to be an effective intervention; however, further studies are needed to determine if the positive effects last once the therapy has concluded (Field et al., 2009). Evidence-based research has found play therapy to be effective in reducing traumatic symptoms in children after a hurricane (Dugan et al., 2010); however additional quantitative studies need to be conducted to determine the true value of this intervention (Anderson et al., 2017). Though becoming dated, the literature review by Flom et al. (2011), stands out as a resource directly examining the use of Nature, including intentional therapeutic Nature connection, to promote mental health in schools. In their conclusions, the authors outlined several opportunities for infusing nature into all aspects of the school counseling program, including: professional development for counsellors to develop competence outdoors, the development of curriculum to promote outdoor learning and connection, collaboration with school administrators to implement initiatives, and individual and small-group counselling services outdoors. The following section further explores the background of nature-based approaches to therapy, and its potential use in work with children and youth.

Ecopsychological and nature-based approaches.

In their seminal work on ecotherapy, *Healing with Nature in Mind* (2009), authors Buzzell and Chalquist described that many therapy clients don't realize the grief and fear they are

struggling with may be a natural response to the death of so many living beings, and the ongoing distress of Earth, air, and ocean life all around us. However, they contended because most individuals are not informed about links between mental health symptoms caused by the way we live and the accelerating inner and outer devastation, we remain mystified about why we feel so much pain.

Beyond this poignant sentiment, there is a plethora of literature which shows that when children have Nature around their homes, schools, and neighbourhoods that they can connect with, it promotes their physical and mental health and cognitive performance (Chawla, 2015; Kuo et al., 2019; McCormick, 2017; Norwood et al., 2019; Tillman et al., 2018; Vanaken & Kanckaerts, 2018; Grinde & Patil, 2009; Health Council of the Netherlands, 2008; Mitchell & Popham, 2008), as well as happiness (Berman et al., 2008, 2012; Mayer et al., 2009; White et al., 2013). Several reviews (Restall & Conrad, 2015; Tam, 2013; Zylstra et al., 2014) identified experiences that define Nature connection, and how it is associated with facets of life like happiness in the face of difficult experiences and support for environmental protection. However, these reviews primarily cover research with adults, with only a few references to young people below the age of 18 or none at all. However, a recent review by environmental psychologist Louise Chawla (2020), marked the first such study to focus on nature connection in children and adolescents. It described a number of studies which indicate that a sense of connection with Nature has similar benefits for younger populations as it does for adults. In a study of Japanese children, place attachment was also found to be a factor in nature connection and its mediating role in mental well-being (Basu et al., 2020). Studies with very young children are scant; however, a 2018 study, the first of its kind, found that nature connectedness in preschool children was positively associated with enhanced psychological functioning (Sobko, et al., 2018). The

study, which used a parental report measure, found increased connectedness to Nature to positively correlate with improved prosocial behaviour, fewer behaviour and emotional difficulties. An ancillary benefit of human-and-nature connection is that studies are showing a link between nature connectedness, pro-environmental thinking, and sustainability (White et al. 2013). Clayton et al. (2017) also described research in which youth identified climate change as negatively impacting their personal resilience and access to Nature as supporting resilience.

Despite the considerable and growing body of knowledge, the gap in Nature exposure between our early evolutionary environments and modern life is clear, and appears to be increasing. Children are spending significantly less time playing in natural environments compared to previous generations (Clements, 2004; Louv, 2005; England Marketing, 2009) and, in general, individuals from developed nations are spending the vast majority of their time indoors (Evans & McCoy, 1998; MacKerron & Mourato, 2013). On a broader scale, greater than half more of the world's population now lives in urban areas instead of rural areas (United Nations Population Division, 2002) and that is projected to increase to 68% by 2050 (United Nations, 2018). This physical disconnection from the environments in which we evolved may be having a detrimental impact on our overall emotional well-being (Berman et al., 2008, 2012; Mayer et al., 2009; MacKerron & Mourato, 2013; White et al., 2013).

Ecopsychology as an approach to therapy has roots in the biophilia hypothesis (Wilson, 1984) which suggested that humans affiliate with other living things and the natural world for survival and mental and physical stability. Theodore Roszak (1992) stated "the needs of the planet are the needs of the person; the rights of the person are the rights of the planet" (p. 321). As the person credited with coining the term *ecopsychology* he stated its goal is to "bridge human culture's long-standing, historical gulf between the psychological and the ecological, to

see the needs of the planet and the person as a continuum" (p. 14). Important for its relevance to schools, one of the core tenets of ecopsychology is that the developmental period of childhood is held as a critical space to experience the harmonious relationship of Nature within their emerging sense of self. (Roszak et al., 1995). At the same time that Roszak and his colleagues were publishing their work on ecopsychology, Clinebell (1996) introduced the term *ecotherapy* and conceptualized it as a form of deeper connection to Nature in which persons expanded their relationship of reciprocity with Nature and were benefited with Nature's capacity to heal. A critique of ecotherapy and the therapeutic benefits of reconnecting and deepening the human-nature relationship (Doherty and Clayton, 2011) centers around the concept that, as knowledge, awareness, and certainty concerning the negative impacts that climate change will have on the environment and life on Earth increases, being more connected to Nature could conceivably hamper happiness instead of promoting it. This finds support in statistics that show a quarter of Americans feel depressed or guilty about the issue of climate change and those who are most alarmed are more likely to feel afraid, angry, sad, and disgusted (Maibach et al., 2009). Still, while limited studies show that some aspects of the human-nature relationship have the potential to detract from our happiness, the World Health Organization (2001) views that other aspects, such as a subjective connection to contact with Nature, may not only compensate but result in a net increase in positive emotional functioning.

Closely aligned with ecotherapy, and sharing an ecopsychological approach, is nature-based therapy. Nature-based therapy is an approach which engages conventional therapy in natural settings and holds the primary concern of repairing disconnection that has transpired between humans and their larger ecological self (Harper, et al., 2019). In this approach, the client is engaged in a therapeutic relationship with both counselor and with Nature; Nature is viewed as

a co-therapist, and within the relational work of reconnecting humans and Nature, cross-cultural and traditional ways of knowing are valued, including awareness of interconnection and respect for the earth and her creatures (Harper et al., 2019). Speaking on human-nature kinship, Robin Wall Kimmerer, biology professor and citizen of the Potawatomi Nation described that, rather than viewing organisms as 'its' or objects, they are instead seen as relatives, embedded in the same web of life as humans and all beings, including the birds, the mountains, and sky. This sense of reciprocity and respect toward Nature, recognition of our inextricable embeddedness, and sensitivity to the ways dominant colonial narratives and practices may be operating, are essential in collaboration with Nature (Jones & Segal, 2018). Clients working in nature-based therapy are engaged in experiences with Nature appropriate for their present level of connection to Nature, otherwise known as their ecological identity (see Appendix A) (Harper, 2019; Cornell 1989). Sensory integration, through play, risk, and full-body engagement are viewed as important elements which allow for clients to access a range of psychological and nervous system states in a safe manner (Harper et al., 2019). Play involves the combination of social engagement and sympathetic arousal systems, and is a healing state (Stanley, 2016) which allows a person to learn to regulate their level of arousal, benefit from coregulation, and practice further social and emotional skills (Kain & Terrell, 2018). Learning to navigate risk affords a state of being that is present-moment focused and develops resilience (Harper et al., 2019). Research has also been conducted on the powerful effect Nature has as a co-regulator to restore attention and aid in relaxation of a hyper-aroused nervous system (Mygind et al., 2019) as well its potential to spark curiosity, movement, and exploration to up-regulate a hypo-aroused nervous system (Kain & Terrell, 2018). It is described that through contact with and intentional connective experience in natural spaces, a sense of bonding and belonging can be developed between client and Nature

(Harper et al., 2019) and Nature can become what John Bowlby (1973), pioneer of attachment theory, described as ‘a stronger, wiser, other’, setting the seeds for a consistent, available, non-judgmental resource in life.

Regarding the efficacy of nature-based therapy, it is notable that the differing terms for the similar work that has emerged from ecopsychology, ecotherapy, eco-counselling, green therapy and nature-based therapy included, has made the sharing of theory, research, and outcomes difficult. In 2011, Annerstedt and Währborg conducted a systematic analysis of what they defined as nature-assisted therapies. Finding 38 sources of controlled and observational studies they concluded that a “small but reliable evidence base supports the effectiveness and appropriateness of these approaches as a relevant resource for public health” (p. 371). More specifically, findings from rigorous studies, though generally favorable, were somewhat ambiguous as to positive outcomes; less rigorous studies overwhelmingly showed positive outcomes and the researchers called for further research to support human-nature therapy (Annerstedt & Währborg, 2011). Nevertheless, when one looks into history and traditional ways of knowing from cultures around the world, the healing and restorative potential of Nature is well-recognized. Hospitals, monasteries, and treatment centers have been purposefully built in beautiful natural settings. As Stigsdotter et al. (2011) described:

> There are therefore long held beliefs that human health and wellbeing are influenced positively by spending time in natural settings. Gardens, pastoral landscapes, and natural environments with small lakes and meadows are depicted as places where people can be restored both mentally and physically. Beneficial properties are attributed to activities in nature, where one experiences natural daylight, fresh air, and greenery (p. 312).

Furthermore, literature continues to emerge indicating therapeutic intervention in Nature as a promising treatment for various mental health issues, including stress, depression, anxiety, grief, and pain management (Berger & McLeod, 2006; Corazon, et al., 2010; Grahn & Stigsdotter, 2010). Further, the nature-base therapeutic approach is increasingly credited as being helpful in cultivating relationships, emotional attachment, self-efficacy, and resilience (Harper et al., 2019; Segal et al., 2021), all of which are currently emphasized as practices in mitigating and treating climate change impacts.

Summary

A large and growing base of literature supports the theory that climate change is causal, either directly or indirectly, of many human health consequences **(**Edenhofer et al., 2014**).** Though often less obvious and readily apparent relative to physical impacts, research is demonstrating the significance of the acute and chronic psychological impacts and mental health outcomes (Clayton et al., 2017; Clayton & Manning 2018; Obradovich et a., 2018). While numerous gaps in knowledge remain regarding the consequences of climate change upon mental health (Watts et al, 2018), it is nevertheless reaching the level of public health in Canada, as indicated by a focused report on the topic being published by Health Canada later in 2021. Further research is emerging from a systems-thinking approach which details the components of a research agenda for climate change and mental health (Berry et al., 2018) and attempts to provide a road map for other researchers to follow.

The research examining inequality and disadvantaged groups and communities suggests that the effects of climate change will not be felt equally by all individuals or communities. Those from more vulnerable groups and risk-prone geographic area are more likely to experience detrimental effects upon their mental health, and have fewer resources available for support and

treatment. Increased resilience and connection to the natural world, fostered through ecotherapy or nature-based therapy, offer hope as protective factors as well as therapeutic outcomes to treat the varied psychological effects of climate change. Given their position and expertise, mental health practitioners are poised to play an important role in both education and treatment. Though research in schools is largely limited to physical effects, school counsellors who are themselves educated on the climate change and mental health literature are well-positioned to engage with individuals and their larger community. Within their school communities they can function not only as supports and therapists for students, families, and colleagues, they can act as advocates and educators of the larger community and public health policies –policies required to help our societies adapt and thrive in the face of our planet's changing climate

Chapter 3: Summary, Recommendations and Conclusions

Summary

The effects of climate change are evident in many parts of Canada and are projected to intensify in the future (Bush & Lemmen, 2019). While these effects will be experienced at a societal level, many groups face greater vulnerability based upon their physical and social environments, as well as culture. One such vulnerable group is youth, and in the context of this paper, school-aged youth.

The literature discussed in Chapter 2 indicates that knowledge of the effects which climate change has on mental health is emerging, and there is evidence that ecopsychology and the practices of ecotherapy and nature-based therapy positively addresses those mental health challenges, including anxiety, depression, lack of self-efficacy, and feelings of hopelessness.

Schools are an appropriate environment to apply this growing knowledge of climate change effects, as well as to implement nature-based principles and interventions (Flom et al., 2011). Education, advocacy and intervention could be applied at different levels, as well as the introduction of programming that aligns with the needs of the families, the larger school community, and is specific to the physical environment and particular changes to climate it faces. The position of school counsellor in British Columbia aligns with this path forward, with the BC School Counsellor's Association (BCSCA) (2021) stating that school counsellors are obliged to act in several capacities, including as:

- Counsellor, providing intervention and prevention service for developmental, personal, social, educational, and career-related issues.

- Consultant, working with school-based teams, subject teachers, resource teachers, administrators, professionals, and para-professionals to develop programs across the curriculum to assist students in meeting their needs.
- Coordinator, assisting in the coordination of services to students from within schools from an inter-ministerial approach, and links the school with the community, business, industry, social service agencies, and other educational institutions, to ensure that student needs are net and to enhance the smooth transition of students from one environment to another.
- Curriculum Specialist, teaching curriculum from within the social/emotional and the social responsibility areas for the Primary, Intermediate and Graduation programs.
- Catalyst, identifying students at risk and in conjunction with school-based teams, ensures that programs are in place to meet their needs, modifies programs, trains teacher/mentors and peer helpers, and initiates liaison with parents/guardians, social workers, and other support staff.

Further, BC school counsellors are obliged to uphold their primary responsibility to act in the best interest of the student(s), and are ethically and legally bound to the following professional standards:

- Teacher-counsellors are expected to seek opportunities to continue their own professional growth and to work towards the improvement of their profession.
- Teacher-counsellors expect ethical behavior from their professional associates; teacher-counsellors will attempt to rectify unethical behavior on the part of their

colleagues and will assist colleagues in observing ethical practices related to the work of the teacher-counsellor.

- Teacher-counsellors, as employees of a school or other institution, accept policies and principles of the institution as a condition of employment unless they conflict with professional standards and ethics.

Given these stated roles and responsibilities, it's the position of this paper that it is unquestionable that school counsellors in BC are professionally obligated to respond to the impacts which climate change has on mental health, professionally obligated to develop their climate literacy, and professionally obligated to inform and educate their colleagues and advocate institutional change where necessary to protect the interest of their student-clients, in this case their physical and psychological health. Based upon this position, and following from the literature reviewed in Chapter 2 concerning the benefits of human-nature connection and nature-based interventions to increase self-efficacy and resilience, and otherwise treat mental health challenges associated with the effects of climate change, the following section will provide recommendation for an introduction to nature-based therapy workshop. This workshop is outlined specifically for school counsellors who want to deepen their personal relationship with the more than human world and introduce tenets of ecopsychology and ecotherapy into their school community and its counselling program. Coupled with the base of knowledge regarding climate change and climate change effects referenced with this paper, the aim of this chapter is to equip school counsellors with the tools of direct experience, connection, and knowledge necessary for them to integrate nature-based therapeutic approaches into their existing practice.

Recommendations

Professional development.

Successful implementation of the subsequent recommendation, or any other intervention, would require intentional and effective professional training of school counsellors, and preferably of all educational staff. As discussed in Chapter 2, the importance of mental health professionals being 'climate literate', that is, grounded in current research and issues around climate change, is routinely brought forward in the literature. Further, Chapter 2 discusses how a connecting relationship between youth and Nature is more effectively cultivated when the educators involved have themselves a deep connection with Nature. Unfortunately, in reviewing the current status of counsellor education, only a handful of articles document Nature being applied to counsellor education. In 2017, the list of institutions offering ecopsychology and ecotherapy related programs numbered just 41 in the Western World, and, while two are located in British Columbia, one is a small individualized program focusing on environmental psychology while the other focuses on environmental education and communication (Mindful Ecotherapy Center, 2021). Examining the literature, Duffy et al., (2020) and Davis and Atkins (2004, 2009) reported that the counsellors in training that they co-taught in natural settings described feeling more connection to each other and greater appreciation of their connection with Nature, and the students themselves found that the nature-based activities benefited them interpersonally and intrapersonally and promoted their development as counselors. Though the healthful effects of time spent in and connection with Nature continues to be recognized in literature, even becoming mainstream through the course of the COVID-19 pandemic, trained ecotherapists still represent a very small segment of therapists (Whitcomb, 2021). It is essential that practicing school counsellors actively voice the need for professional development

opportunities be made available for themselves and educational staff at all levels, including administrators, teaching staff, and educational assistants. Again, it is the interpretation of this paper that school counsellors have the professional obligation, as outlined in the BC School Counsellors Association's professional standards (BCSCA 2021), to advocate in this regard.

Introductory workshop on nature-based therapy.

The workshop presented here aims to introduce school counselling practitioners to the key components of nature-based practice with three outcomes: (1) that school counsellors feel more comfortable and competent in beginning to integrate nature-based therapies into their direct counselling support, (2) school counsellors are inspired to further their learning in the field of nature-based therapy and integrating Nature into their counselling practice, and (3) school counsellors are inspired to serve as champions within their school communities in educating and encouraging their colleagues to deepen their own connection with the more than human world and bring elements of Nature connection into their own roles.

Borrowing from the works of notable ecologists, ecotherapists and nature-based practitioners, Harper et al. (2019), Cornell (1979), Young, Haas, & McCown, 2010), and Macy, (1991, 2012), an introductory workshop would present several key components of nature-based therapy that are viewed as fundamental to understanding in both a cognitive and embodied way: ecological identity assessment, Nature as co-therapist, bonding & belonging, experiential learning (risk, challenge, adventure, play), flow learning model, and zones of development. While it is not feasible to examine these fundamental pieces comprehensively in an introductory workshop, rather this workshop would aim to provide a solid understanding of *why* nature-based therapies may be successful in the school setting to address the mental health effects of climate change. Further training would be recommended to deepen professional competence in *how* to

integrate these fundamental tenets of nature-based therapeutic work into the school setting. Ideally, the material of this introductory workshop would be presented in a hybrid learning model, comprised of a theory session along with a separate experiential session in which workshop participants could practice and embody each of the concepts. Given the barriers and challenges present with gathering, even in outdoor spaces, during the COVID-19 pandemic, the material is also conducive to presenting via online video chat. In this case, participants could be issued at-home in-nature activities to do and subsequently debrief online in order to achieve a level of embodied experiential learning. Below is a brief description of each component, literature to explore further, and the specific rationale for its inclusion in an introductory workshop.

Ecological identity assessment

A fundamental component of nature-based therapy is assessing the client's ecological identity. Norwegian philosopher Arne Næss (1987) first described the concept of an *ecological self:* a self not restricted by ones physical and mental processes but instead connected and inextricably linked to all of life. This idea of the self being larger than one's physical body and individual mind has been articulated in numerous worldviews and philosophies, including recently in the West through the fields of system theory and ecology (Wilber, 1997). Harper et al. (2019) explained that assessing the ecological identity, the manner and depth in which one degree in which one connects to and engages with the natural environment, can assist in determining whether nature-based therapy is a fit for an individual and what activities may be most impactful. Currently, there is no formal assessment tool or standardized questionnaire with clinical validity measuring ecological identity (Harper et al., 2019). Rather, the practitioners have adopted a series of questions (see Appendix A), influenced by the pioneering ecopsychology

book, *Ecotherapy* (Clinebell, 2006), to tell the client's ecological story (Harper et al., 2019). The answers to these questions paint a picture for the therapist of how open, present, and aware the client will be to conditions and rhythms of the natural world. It is the position of Harper, Rose, and Segal (2019), building upon the work of ecopsychologist John Scull (2008), that if people can move from an adverse state regarding their relationship with Nature into a state of safety and connection, that over time their ecological self will emerge and grow stronger. Concurrently, as they grow to feel more present and connected to the more-than-human world, they will become more receptive to receiving its' gifts. A wide variety of Nature experiencing activities have been designed to complement the different categories of ecological identity and the preferential manner in which a client experiences Nature (see Appendix A).

Nature as co-therapist

Across cultures, long-standing traditions of collaborative relationships with Nature have been drawn on to promote health and wellness. Harper, Rose, and Segal (2019) discuss how practitioners learning to incorporate Nature into their work need guidance on how to partner with Nature in an impactful way while maintaining the perspective that humans are inextricably connected and co-dependent. Much attention is given to mitigate the potential of simply 'using' Nature as a backdrop for conventional therapies. "Like other co-facilitation arrangements, the strength of the relationship between facilitators is a key part of effective learning and a therapeutic process. To facilitate with Nature, a therapist has first to establish a significant appreciation for, and relationship with Nature herself" (Harper et al. 2019, p. 127). Shifting into alignment and resonance with the language, speed, and felt sense of the more-than-human world is an essential component of partnering with Nature, and how to assist people to tune in, become

aware, share an experience, and amplify its benefits are critical tasks for a nature-based therapist (Harper et al., 2019).

Bonding & belonging

Backed by statistics indicating how our time spent in Nature has dramatically decreased over the past few generations, it is clear that our attachment and attunement with the cycles of the Earth are now in an ailing state. Connection and reciprocity with the living Earth is often severed early on in Western society, replaced by a sense of using it for our benefit and satisfaction (Harper et al., 2019). A great potential of nature-based approaches is to discover one's essential belonging to the Earth, healing the attachment wounds between humans and Earth. As psychologist Anita Barrows (1995) wrote:

> It is indeed the illusion of bodily separateness that is the genuine sorrow, that accounts for our loneliness, and isolates us and leads us to exploit and violate one another, the world we live in, and, ultimately, ourselves. (p. 109)

Weaving Nature into the process of healing and development for children and youth may allow not only an increase in self-awareness and a new supportive connection in the world, it can be crafted to also have a positive connecting experience with a supporting adult. Louise Chawla (2007), from the Children, Youth and Environments Center in Colorado, has asserted that one of the most significant factors that predicts future pro-environmental behaviour is when children have had positive experiences outdoors with a caring adult. The potential for the development of a deep connection with the natural world, while also experiencing a safe and supportive social connection, is a feature of nature-based therapy that would serve to both foster resilience and mitigate and treat several of the direct and indirect impacts of climate change on individual's mental health (Harper, et al., 2019).

Outdoor play and risk

Central to nature-based therapy is the belief that, because we humans are embedded and inextricably linked to Nature, engaging in practices that awaken and align with our mammalian nervous systems will have the most profound impact (Harper et al. 2019). We are designed to be in natural environments more so than built ones and Nature is filled with an abundance of sensations, flora, and fauna that help engage people in the present moment an in embodied exploration. Interacting with the natural world, particularly through play that involves sneaking, seeking, hiding, chasing, and exploring allows people to drop into their bodies and senses and allow for experiences and receptivity to therapy that is hard to come by in other settings (Harper et al., 2019). Viewed from an evolutionary perspective, outdoor play, including its inherent risks, is a primary development experience for children that is increasingly rare and restricted in our modern Western society (Harper, 2017). Therefore, in nature-based therapy, being in Nature, exposed to its gifts, challenges, risks, and potential setbacks, is a necessary factor in child and youth development, and further, is a valuable means to engage in therapeutic practice (Harper et al., 2019). Far from just an idea within nature-based therapy, the title of the 2015 *Report Card on Physical Activity for Children and Youth in Canada* was, “the biggest risk is keeping kids indoors” (Barnes, 2016, p. 1), and the authors promoted outdoor play as an essential ingredient for healthy child development. This argument for outdoor risky play is reinforced by evidence of a range of positive benefits, including: increased physical activity, social activity, vitality, positive affect, reduced anxiety, depression, cortisol levels, sympathetic tone, systemic inflammation, and improved blood pressure (Mantler & Logan, 2015). When compared with the effects of climate change on mental wellbeing, it is apparent that outdoor play, particularly risky

play, has great potential as a protective factor to increase resilience and adaptability, as well as forming part of therapeutic treatment.

Zones of development

One of the great benefits of integrating Nature into the therapeutic process is the capacity of the natural world to assist in regulation, awareness, and understanding of the human nervous system and one's bodily stress responses (Harper et al., 2019). Tuning into and building awareness of one's the outer landscape, particularly rich in sensation when in natural settings, can assist children and youth to build the foundational skills needed to observe their inner landscape of thoughts, feelings, and bodily sensations (Lyons, 2018 in Harper et al., 2019 p.89-90). Adapting the *zones of regulation* framework (Kuypers, 2011) often used in schools to teach self-regulation, Harper, Rose, and Segal (2019) layer the neural states described in polyvagal theory (Porges, 1995) over the *zones of development* model (Vygotsky, 1978) popular in experiential and outdoor education. The result is an accessible and effective model for teaching polyvagal theory that these practitioners describe as being effective for children as young as 6 years old (see Appendix B).

In practice this model can be applied when a practitioner is first able to notice their own emotional state, then notice their client's neural state and assist them in attuning to their embodied experience; this enhanced mindful awareness holds the possibility for more conscious choices regarding emotional states and the potential for effective change (Harper et al., 2019). For children and youth who have been directly or indirectly impacted by climate change, working with the zones of development and polyvagal theory in Nature can be very supporting. In a nature setting, the attuned counsellor can seek to guide the client to up-regulate or down-regulate, using Nature as co-therapist. Scanning the environment, for example, could be a

soothing experience to help engage the ventral vagal circuit and calm a client experiencing agitation or anxiety. Conversely, the same environment could allow for safe exploration of risk, such as walking along a fallen log, that may help a disengaged client experiencing PTSD to up-regulate in a manageable way. Further training, beyond an introductory workshop, would explore counselling beyond the state of increased awareness and coregulation, moving into the expansion of one's window of tolerance via nature-based activities and play.

Flow learning model

Joseph Cornell, environmental educator and author of the *Sharing Nature with Children* books, through years of work educating and training outdoor leaders, noticed patterns emerging from the different sequences of Nature-connection activities he was teaching. These observations led to his description of *flow learning* (Cornell, 1989), a simple and elegant four-stage approach to connecting with Nature which Segal, Harper, and Rose (2021) have adopted; (1) awakening enthusiasm, (2) focusing attention, (3) direct experience, and (4) sharing inspiration (see Appendix C). At the beginning of a nature-based session, nature is present to assist in "awakening a sense of vitality, aliveness, and present moment awareness" (Segal et al., 2021, p. 98). For persons who have a strong ecological identity, this stage of flow learning may provide opportunity for connection through silence or gratitude; for those less connected, awakening enthusiasm may include playful experiences that ground and cultivate presence. Either way, this first stage sets the tone for the receptivity required in the following stages. Focusing attention (stage 2) offers opportunity for clients to engage in sensory awareness experiences that precipitate various psychological and emotional benefits. By focusing attention on the outer landscape and the innumerable ways Nature expresses herself, clients practice being in their 'observing self' and develop observation, self-awareness, and mindfulness skills that are the

underpinnings of mindfulness and cognitive behavioural therapy models such as acceptance and commitment therapy (Segal et al., 2021). It is in this stage that clients may be guided toward activities associated with polyvagal theory and treatment of mood disorders such as anxiety, depression, and PTSD which may be connected to climate change. The third stage offers clients direct experience with Nature, enhanced by the presence of awe, wonder, and sensory awareness. A client-centered approach and allowance for Nature to act as co-therapist allows for unstructured exploration and experience to unfold. During this time, the therapist can flow in and out when needed, offering questions and metaphor to encourage further engagement and reflection. Teaching of outdoor skills, including fire-making, shelter building, plant identification and foraging, is another opportunity in this stage which allows clients to interact with Nature while developing a sense of self-efficacy. In stage 4, sharing inspiration, clients are offered the social experience of sharing meaningful reflections they experienced in connecting with Nature. These stories of connection reinforce the sense of interbeing with the more than human world, practice sharing within a caring community (either with the therapist, or in group or family sessions), and share the processes from narrative therapy of re-authoring, witnessing, and challenging dominant discourses Madigan, 2019). Combined, the four stages afford opportunity for clients to flow through connecting experiences in Nature and have the potential to engage them in therapeutic activity and play while cultivating positive qualities, including mindful self-awareness, resilience and self-efficacy, to help address the impacts climate change has had on their mental wellbeing. Another feature which makes the Flow Learning framework useful in the context of school is that, as practitioners Harper et al. (2019) contend, the stages of learning Cornell described are appropriate and effective for all school-ages and groups. Furthermore, this framework offers a structure to guide the flow of the nature-based practitioner, while also being

open to accommodating different levels of practitioner experience and expertise, including moving beyond Nature connecting activities in a recreational setting and into more intentional therapeutic intent and integration of Nature as co-therapist. This facet, which considers the therapeutic and outdoor training of the practitioner, is further represented in Britain's Outdoor Mental Health Interventions Model. wherein the most ideal zone of practice, Zone 3 – Integrated Outdoor Therapy, is described as "unique and dynamic integrated experiences which draw on professional competence in both outdoor learning and psychological therapy" (Richards et al., 2020, p.5). Examples of nature-based activities to include in the practical portion of the workshop, intended for practitioners to deepen their own ecological relationship and experience the activities that may be useful to integrate into work with clients, are found in Appendix D.

Conclusions

It is clear that the changes occurring to the climate of Earth, our collective home, impact the health of our species, and have the potential to affect a myriad of mental health effects (Edenhofer, 2014; Clayton et al., 2017; Hayes et al., 2018; Obradovich et al., 2018). The Canadian scientific community presents certainty that all regions in Canada will experience alterations to its climate (Lemmen et al., 2008; Bush & Lemmen, 2019), including British Columbia which is home to various risk prone areas (Retooling for Climate Change, 2021) as well as vulnerable communities and groups (Hayes et al., 2019; Retooling for Climate Change, 2021). Children and youth, represented across the various groups and communities, face particular vulnerability as their own group; not only do the effects of climate change, both acute and chronic, affect their physical and psychological well-being (Fritze et al, 2008; Somasundaram & van de Put, 2006; Fernandez, 2015; Cunsolo Willox & Ellis, 2018, Clayton et al, 2017; Clayton & Manning, 2018), but also the very trajectory of their development can be

negatively influenced (Clayton et al., 2017; Bartlett, 2008; Kousky, 2016). Fortunately, research into ecopsychology and nature-based approaches to therapy are reconnecting us to traditional knowledge that Nature is healing (Chavaly & Naachimuth, 2020; Chawla, 2020; Chaudhury & Banerjee, 2020) and holds potential as a therapeutic response to many of the declines in mental health linked to climate change, including anxiety, depression, PTSD, and grief (Berger & McLeod, 2006; Corazon, et al., 2010; Grahn & Stigsdotter, 2010). In particular, time spent connecting to the more-than-human world within a nature-based therapeutic approach is shown to be beneficial to resiliency and self-efficacy (Harper et al, 2019; Harper & Dobud, 2021; Segal et al, 2021), which research indicates to be a key protective factor in improved mental wellbeing, and cultivation of is important to treatment (Clayton et al, 2017; Clayton & Manning, 2018; Comtesse, 2021).

Despite growing research to reinforce those findings which indicate the profound importance and effect of Nature on human health, outside of a few exceptions (Hoyland & Elliot, 2013, Cowichan Valley School District, 2021), nature-based education in British Columbia largely remains in the domain of private independent schools and early childhood education (MacEachren, 2013). Moreover, mental health professionals, including school counsellors, are not adequately trained or knowledgeable of climate change effects on mental health, (Seaman, 2016), nor are they trained in nature-based therapeutic approaches (Whitcomb, 2021). It is clear that further research is needed to explore the shifting picture of climate change and its effects (Clayton, et al, 2017; Clayton & Manning, 2018) as well as the potential best practices in addressing it, including nature-based therapy (Chawla, 2020). However, by becoming aware of and recognizing the severity of the climate crisis and its impact on the mental health of students, youth, their families, school communities, and humanity at large, school counsellors are

professionally obligated to respond (BC School Counsellors Association, 2021). In connecting all the research, the integration of elements of a Nature-based therapeutic approach into schools would afford more opportunity to foster individual children and youth's connection with the natural environment, improve mental wellbeing, and develop further resilience and self-efficacy as a protective factor (Flom et al., 2011; Harper et al, 2019; Harper & Dobud 2021; Chawla, 2020; Chaudhury & & Banerjee, 2020). Further potential exists in bringing socials elements into the nature-based therapy, building bonds between peers, non-caregiving role models, or family members, (National Scientific Council on the Developing Child, 2015; Clayton et al, 2017, p. 36) and addressing climate change related increases in hostility and aggression as well as breakdowns in social cohesion.

Considering all the evidence that points out the immense prospects of nature-based therapy to counter and prevent the psychological turmoil effected by climate change, this pragmatic and integrative, therapeutic approach holds unique promise for school counsellors to integrate into their practice and school communities in the days to come. Nature is speaking and it is up to us to walk alongside her and listen.

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Appendix A

Ecological Identity Assessment

Questions useful for a practitioner to ask in interviewing a client to understand their ecological biography:

- What's your favorite way to connect with Nature?
- What were your favorite places to visit in Nature as a child, youth, and adult?
- Where do you currently enjoy going in Nature?
- How do you feel when you are in Nature?
- What activities do you enjoy doing in the outdoors?
- What natural places and beings do you feel most connected with?
- How do you show your love and care for Nature?
- (when appropriate) What pains you the most about the current environmental predicament?

Ecological Identity Assessment

	AVERSE	RECEPTIVE	CONNECTED
Direct	**Direct-adverse** Not recommended until a safe and trusting relationship has been formed between client and counsellor; and client shows interest	**Direct-receptive** Activities that involve exploring motivating species and terrain in order to build up positive experiences	**Direct-Connected** Activities that emphasize, explore, and deepen the transpersonal and ecological self, e.g., exchanging breaths with a tree, land based tasks, blindfolded sensory exercises
Indirect	**Indirect-adverse** Activities that start to expose a person to nature in a controlled but not direct manner, e.g., walks on trails, having plants in the office, nature objects, therapy animal	**Indirect-receptive** Activities that start to explore their connection with nature by utilizing games and crafts that enhances positive affinity and connection	**Indirect-connected** Activities that utilize metaphor, mindfulness, and other practices to deepen their connection in an intentional way
Vicarious	**Vicarious-adverse** Starting with stories, visualizations, and inquiry for early memories with places, animals, activities in nature. May access counsellor's relationship with natural world as access point	**Vicarious-receptive** Activities introducing nature metaphors, pictures and stories to support the client in strengthening their connection	**Vicarious-connected** Activities recounting and deepening personal experiences with nature and exploring one's relationship with nature as well as how one's own body is a gateway into deep nature connection

From: *Nature-based therapy: A practitioner's guide to working outdoors with children, youth, and families* (p.78)

Figure A1. This figure illustrates ways a practitioner can match the ecological identity of a client with their ideal mode of experiencing Nature.

Appendix B

Zones of Development Model

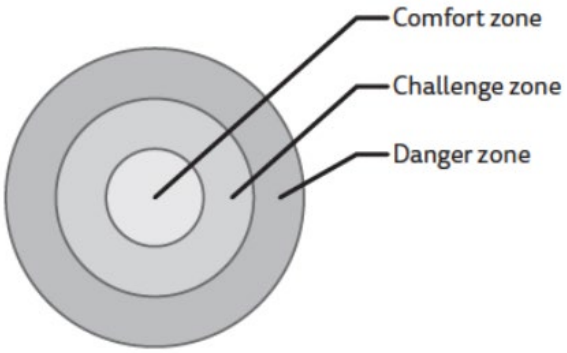

Figure B1. Concentric circles for the zones of development activity

Zones of Regulation	Zones of Development	Nervous System States	Polyvagal Theory	Common Behaviors
Upper **RED** Lower	Danger zone Challenge zone	Hyper arousal High arousal	Sympathetic Sympathetic + Ventral Vagal	Aggressive towards others, overwhelmed Hesitant/tearful
YELLOW	Challenge zone	High arousal	Sympathetic + Ventral Vagal	Hyper-vigilant/playful/ excited/silly
GREEN	Comfort zone	Optimal arousal	Ventral Vagal	Calm/ connected/ ready to learn/ present, feeling safe
Lower **BLUE** Upper	Challenge zone Danger zone	Low arousal Hypo arousal	Dorsal Vagal Dorsal Vagal + Sympathetic	Bored/disengaged/tired Unable to think or respond/shut down

Table B1. Zones of regulation, zones of development, polyvagal theory, and associated behaviours (adapted from the work of Stanley, Kuypers, Vygotsky, and Porges).

Appendix C

Flow Learning Model

Stage 1: Awaken Enthusiasm. Focus: Invitation to connect and be present Quality: Playfulness and alertness
Stage 2: Focus Attention Focus: Sharpen awareness and receptivity of nature Quality: Receptivity
Stage 3: Direct Experience Focus: Allowing people to experience for themselves Quality: Calm and Absorption
Stage 4: Share Inspiration Focus: Passing along meaningful stories of nature connection Quality: Reflection and Idealism

Table C1. The Flow Learning model stages, primary focus, and quality it manifests.

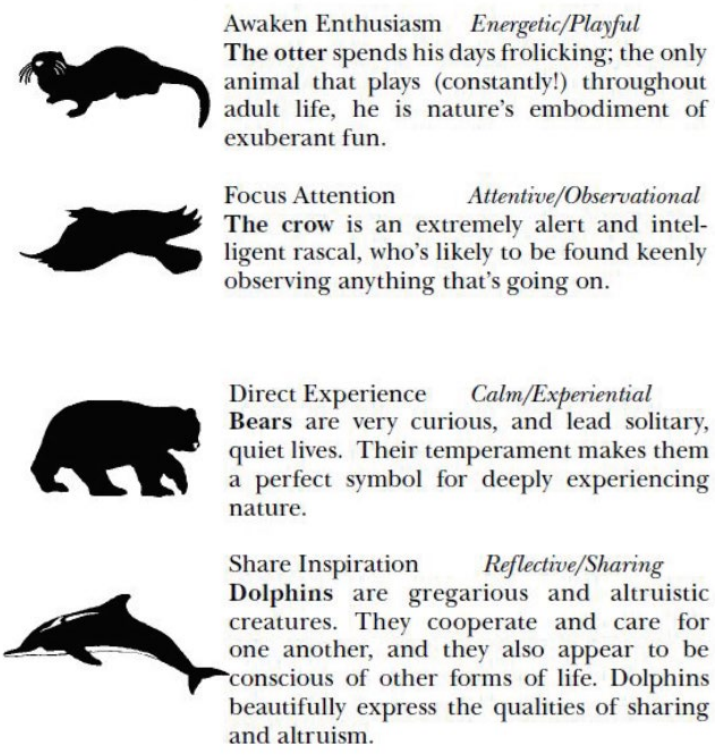

Figure C1. The animal representative of each flow learning stage, and the qualities each stage and animal represents.

Appendix D

Nature-Based Activities

1) **Gratitude walk to your sit spot**
   a. Start by noticing your inner landscape and get a general sense of how you are doing in that particular moment. See if you can commit to only focusing on the present moment until you reach your spot. If you start to think about the past or future, thank your mind and bring yourself back to your senses (what can you hear now, feel now, see now, etc.). As you walk, experiment with slowing down your pace, changing the length of your gait, and moving in a way that feels more intentional. As you walk, take time to appreciate all the more than human natural beings and thank them by offering gratitude. Share genuinely what you appreciate. If you feel comfortable, try and share some of this out loud. Notice how you feel after you arrive at your sit spot.

2) **Family Nature Sculpture**
   a. Find a private location (perhaps at your sit spot), preferably outdoors where there are natural elements you can find to collect and build a sculpture. Ensure you are practicing ethical harvesting if you chose to include living materials (**see note below).
   b. Think of either your own family (biological or chosen), or a family you are working with and see which natural elements you are drawn to that can represent the 'cast of characters' in your family ecosystem. Be sure to include yourself. As you are well aware, exploring one's family of origin can bring with it uncomfortable memories and strong emotions. The purpose of the activity is to give you an experience of nature as mirror, so stay within you comfort zone.
   c. Once you have collected your items, see what location feels right to arrange them into a visual representation of your family. Think about the qualities of the items you found (e.g., heavy, strong, sharp, soft, comforting, bright) and see if you can match those to people. Further, the proximity at which you place the items can be representative as well. Distant relationships versus close bonds can be placed accordingly. Finally, see if you want to add some strengths or challenges of your family to the sculpture. Make sure you take your time, notice your thoughts, feelings and sensations and your impressions when you can step back and look at the sculpture from different angles. Also pay attention to what is happening in your surroundings as you build. Synchronicities can be powerful experiences.
   d. What questions would you ask a client as they built their sculpture? How would you ensure this was done in a safe and strength-based fashion? How might this activity be adjusted for different clients and different stages of therapy?
   e. Take a picture to share and you can decide if it's appropriate to leave the sculpture or to put the natural materials back.

3) **Nature as Mentor**
   a. Go for a walk with no set destination. Preferably in a quiet nearby nature setting. Give yourself some time to just follow your own inner compass and go where you are feeling drawn to go. Along the way, hold the question ***"what is resilience"*** and pay attention to what answers you get. Take some photographs of some of those answers to share with the group.

4) **Collect one natural item that you feel particularly drawn to and/or makes your heart smile. Bring it with you to the next session.** *Please remember ethical harvesting guidelines or take a photo

Tips for honourable Harvest from Robin Wall Kimmerer:

Ask permission before taking. Abide by the answer.
Never take the first. Never take the last.
Take only what you need.
Take only which is given.
Never take more than half. Leave some for others.
Harvest in a way that minimizes harm.
Use it respectfully. Never waste what you have taken.
Share.
Give thanks for what you have been given.
Give a gift, in reciprocity for what you have taken.
Sustain the ones who sustain you and the earth will last forever.
—From *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants* by Robin Wall Kimmerer (page 183).

Nature as mirror wander

a. Walking in nature with no set destination in mind, go on a wander with curiosity and openness. Take yourself on a feeling adventure and see what you find in nature that reminds you of various emotions/states, such as: joyful, anxious, angry, sad, loved, comfort, fearful, etc. Think about questions and ways you could invite clients to expand and amplify their experience. (E.g., movements, noticing details, inner tracking, questions about the meaning of their experience).

Children's passions wander

This activity is intended to spark the inner vitality that emerges when children are playing and following their innate passions. Think of the things you did as a child that were really fun and exciting. Hiding, sneaking, seeking, chasing. Make belief. Building, climbing, exploring. Being curious. You may need help from some motivating species such as a really amazing climbing tree or some song birds and a pair of binoculars. Take some time to explore a place and imagine seeing through a child's eyes. How do you work with the resistance that often arises when we are asked as adults to play? What helps you enter into a state of curiosity and wonder?

Barefoot walk : Take some time to orient to your surroundings. Stand solidly with your bare feet shoulder width apart, firmly planted, and scan your environment. With your shoes removed you will be able to feel the soles of your feet sinking into the earth. You can choose to close your eyes at some point in the exercise to enhance and further explore the sensations of your feet. See how slowly you take in the 180 degree view from right to left. Start on the far right side and as slowly as possible turn your head and track with your senses taking in the different sights and sounds, noting your felt experience along the way. Once you have completed the scan, explore what it's like to walk in different ways and on different terrain. How does the terrain impact how fast you can walk and how much noise you make. Could you walk quietly enough to sneak up on someone if they were blindfolded? Try moving like different animals from your bioregion. What did you notice about walking without shoes on? What movements did you find comfortable and which ones were uncomfortable? Did you notice any differences in your thinking patterns or your felt sense as you did this exercise? What games could be created to encourage younger clients to engage and experience some of the different states you noticed?

Appendix D. Examples of Nature connection activities

Appendix E

A Framework for Understanding Climate Change and Mental Health in Post-Secondary Settings

Appendix E. A systematic approach to understanding climate change and mental health in post-secondary settings.