

# Ecological grief as a mental health response to climate change-related loss

Ashlee Cunsolo<sup>1\*</sup> and Neville R. Ellis<sup>2</sup>

**Climate change is increasingly understood to impact mental health through multiple pathways of risk, including intense feelings of grief as people suffer climate-related losses to valued species, ecosystems and landscapes. Despite growing research interest, ecologically driven grief, or 'ecological grief', remains an underdeveloped area of inquiry. We argue that grief is a natural and legitimate response to ecological loss, and one that may become more common as climate impacts worsen. Drawing upon our own research in Northern Canada and the Australian Wheatbelt, combined with a synthesis of the literature, we offer future research directions for the study of ecological grief.**

**A**ny reading of the ecological literature makes clear that ours is a time of significant ecological loss. Evidence accrues that the sixth mass extinction is well under way, that global ecosystem productivity is in steep decline, and that the biosphere as a whole is becoming irreparably damaged by human actions<sup>1–3</sup>. In addition to being the subject of intense scientific scrutiny, global environmental change and regional ecological decline are increasingly embedded within everyday experience<sup>4</sup>, evoking strong mental and emotional responses.

In response, the mental health implications of global environmental change are gaining increasing research attention. This is particularly the case over the last decade, which has seen growing efforts to understand the mental health implications of climate change. Climate-related weather events and environmental changes, for example, have been linked to a wide variety of acute and chronic mental health experiences, including: strong emotional responses, such as sadness, distress, despair, anger, fear, helplessness, hopelessness and stress; elevated rates of mood disorders, such as depression, anxiety, and pre- and post-traumatic stress; increased drug and alcohol usage; increased suicide ideation, attempts and death by suicide; threats and disruptions to sense of place and place attachment; and loss of personal or cultural identity and ways of knowing<sup>5–19</sup>.

An important concept emerging from peoples' lived experiences of climate change directly related to mental health, but not well represented in the current literature, is what we term 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. We contend that ecological grief is a natural response to ecological losses, particularly for people who retain close living, working and cultural relationships to the natural environment, and one that has the potential to be felt more strongly and by a growing number of people as we move deeper into the Anthropocene.

To date, very little research has considered ecological grief an area of formal scientific inquiry, although the terms 'grief' and 'mourning' are finding increased application in the description of people's lived experiences and personal responses to environmental change<sup>20</sup>. In this Perspective, we argue that ecological grief is an important emergent area for psychological and geographical inquiry that has potential to shed light on personal and collective responses to ecological loss. Further, a better understanding of ecological grief has the potential to enhance understanding of the emotional and psychological dimensions of climate change impacts; to

aid identification of what climate-related losses matter to people; and to identify opportunities to cope with or heal ecological grief and human suffering due to these ecological losses.

We begin by examining the application of ecological grief within scientific research exploring the mental health implications of climate change. We draw primarily (though not exclusively) upon our own multi-year research programmes around climate change-driven mental, emotional and grief responses in Northern Canada (by A. Cunsolo) and the Australian Wheatbelt (by N. Ellis) (see also Table 1). Building on this research, as well as a synthesis of available relevant literature, we then offer a broad research agenda for ecological grief that calls for an expansion of the geographic and cultural application of ecological grief concepts, deep engagement with place and land, and engagement with the emerging policy domain of climate change loss and damage. Throughout, we note that understanding the multitude of triggers for ecological grief, and the myriad ways in which people experience and express this grief, requires a pluralistic and interdisciplinary approach, bringing together at times differing and at times complementary research methods, disciplinary perspectives and lived experiences. We conclude by reflecting upon what ecological grief means for how we think about individual and collective mental well-being in the Anthropocene era<sup>20,21</sup>, and for supporting the resourcefulness of individuals and communities increasingly at risk from climate change impacts.

## Situating ecological grief

Grief is a natural human response to loss. To grieve the loss of a loved one is a common human experience, and one that all of us will encounter throughout the course of our lifetimes<sup>22</sup>. From a developmental perspective, grief is the internal physiological and emotional responses to loss, and mourning is the period of mental, emotional and personal transition as people learn to live again in the context of loss<sup>23</sup>. The processes of grieving and mourning can take many forms, differ across cultures, vary greatly among individuals, and even be experienced differently by the same individual each time a different loss is encountered. Although processes of grief and mourning are well understood in the psychological literature in response to the loss of a loved person, rarely are these concepts extended to losses encountered in the natural world<sup>20</sup>.

We consider ecological grief to be a form of "disenfranchised grief" or a grief that isn't publicly or openly acknowledged<sup>24</sup>. Indeed, ecological grief, and the associated work of mourning, experienced in response to ecological losses are often left unconsidered, or entirely absent, in climate change narratives, policy and research<sup>25,26</sup>.

<sup>1</sup>Labrador Institute of Memorial University, Happy Valley-Goose Bay, Labrador, Canada. <sup>2</sup>UWA School of Agriculture and Environment, The University of Western Australia, Perth, Western Australia, Australia. \*e-mail: [ashlee.cunsolo@mun.ca](mailto:ashlee.cunsolo@mun.ca)

Yet, acknowledging hitherto unacknowledged forms of grief brings to light values and objects that are often considered outside the scope of human care and, by association, ethical responsibility. As discussed by Butler<sup>27</sup>, for example, experiences of grief and mourning illuminate our relational ties and fundamental dependency upon complex ecological communities and, in turn, our ethical and political responsibilities to these systems. For Butler, and others<sup>28–30</sup>, grief and mourning have ‘we-creating’ capacities, exposing our known, unknown and unacknowledged connections to others, and allowing for opportunities to reach across differences to connect with others. In this light, grief and mourning can also question fundamental assumptions about what we choose to value — and what we choose to grieve and mourn — including climate change-induced ecological loss and degradation.

Among the first to describe the emotional pain of experienced ecological loss was ecologist and conservationist Aldo Leopold (1953)<sup>31</sup>, who noted that “one of the penalties of an ecological education is that one lives alone in a world of wounds”. Similar sentiments have been expressed more recently by eminent ecologists, social scientists and climate researchers<sup>32–34</sup>, who invoke concepts of grief and mourning to describe their personal distress (or distress in their colleagues) stemming from the disappearance, decline or death of loved species and ecosystems. Grief is also increasingly utilized to describe the human experience in the Anthropocene<sup>21</sup> — an era in which people the world over are confronted with the prospect of unyielding ecological decline and the loss of environmental futures.

Grief is also a common theme in our own research amongst Inuit communities in Northern Canada and farming communities in rural Australia. Although culturally, geographically, and climatologically distinct, both groups maintain close living and working relationships with landscapes significantly affected by, and at risk from, climate change. In our explorations of how climate change affects the mental health and well-being of these groups, grief and

mourning were prominent and recurring themes as people struggled to make sense of the environmental changes wrought upon their loved home environments<sup>10,11,13,35</sup>.

In a synthesis of our own research, the available literature, reports and the media, we highlight three climate-related contexts in which ecological grief has been reported: grief associated with physical ecological losses (land, ecosystems and species), grief associated with disruptions to environmental knowledge and loss of identity, and grief associated with anticipated future ecological losses (Table 1). These categories are ordered from most researched (or most reported) in the literature to the least. It is important to note that these categories overlap, and are unlikely to fully capture the entire range and complexity of ecological grief experiences; however, they provide a useful starting point for future deliberations and research inquiry.

**Grief associated with physical ecological losses.** This form of ecological grief is associated with the physical disappearance, degradation and/or death of species, ecosystems and landscapes, and is driven by climate change in several ways. First, ecological grief has been shown to emerge in the aftermath of acute weather-related disasters (that is, extreme weather events or natural disasters). Research conducted amongst Hurricane Katrina evacuees, for example, found many people experienced significant grief as a result of losing their homes and neighbourhoods<sup>15</sup>. Similar findings have also been reported in other post-hurricane and post-cyclone settings<sup>36</sup>. Feelings of grief and loss may also continue after affected residents move back home or adjust to a new place<sup>37</sup>. Second, research also indicates that ecological grief can emerge in response to slow, gradual and ongoing ecological changes, such as longer-term changes to weather patterns, landscapes or ecosystems<sup>10,13,35,38–43</sup>. These gradual and incremental changes — or ‘slow violence’<sup>44</sup> — are often not considered, or are entirely invisible, due to the temporal dispersion and the lack of any particular identifier of impact or emergency.

**Table 1 | Identified pathways of ecological grief, with supporting quotations highlighting the lived experiences of ecological grief from Inuit in Nunatsiavut, Labrador, Canada, and family farmers from the Australian Wheatbelt**

Identified pathways of ecological grief <sup>a</sup>	Inuit from Nunatsiavut (Canada) <sup>b</sup>	Farmers from the Australian Wheatbelt <sup>c</sup>
Grief associated with physical ecological losses and attendant ways of life and culture	I think that [the changes] will have the impact maybe on mental health, because it's a depressing feeling when you're stuck. I mean for us to go off [on the land] is just a part of life. If you don't have it, then that part of your life is gone, and I think that's very depressing <sup>10</sup>  It's challenging when you're living a different lifestyle then, but still living in the same area <sup>35</sup>	There's nothing [that] makes me more depressed than to see the place — dust lifting off the place. It's really terrible [...] I can't stand the place blowing away. Dust! I get in bed and pull the rugs over my head so I can't see it <sup>3</sup>
Grief associated with disruptions to environmental knowledge systems and resulting feelings of loss of identity	I live here because it's my home, but I mean [people live] here too knowing that you're going to live this type of lifestyle. And it brings comfort and peace to your family, I think, just living this lifestyle. To not have it I think would be very stressful, hard <sup>10</sup>  It's who they are, it's what they've been grown up doing. And their parents have been doing it forever, so I mean they're kind of losing a sense of who they are <sup>35</sup>  You really don't know what is safe and what isn't out there [anymore] <sup>34</sup>	If you put it in physical terms, to see a paddock that's been overgrazed and is blowing away, I can almost — it sounds a bit funny — it almost physically hurts to see someone's topsoil... it might be belong to someone else, it might be a neighbour, I look at it and I cringe <sup>84</sup>  There's probably nothing worse than seeing your farm go in a dust storm. I reckon it's probably one of the worst feelings [...] I find that one of the most depressing things of the lot, seeing the farm blow away in a dust storm. That really gets up my nose, and a long way up too. If its blowing dust I come inside I just come inside here. I can't stand to watch it <sup>84</sup>  No I don't think I'm nearly as confident now about what's going to happen next year, you just have to hope for the best <sup>84</sup>
		Yeah I suppose we've all completely lost confidence [in the weather]. And this year hopefully will increase confidence a little bit <sup>84</sup>

Continued

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	I just keeps thinking, man, what did he [elderly father] think about these changes? He must feel like he just got picked about at one place and put right and somewhere like on a different planet <sup>85</sup>	Farmers just hate seeing their farm lift; it somehow says to them "I'm a bad farmer". And I think all farmers are good farmers. They all try their hardest to be. They all love their land <sup>13</sup>
	It's hurting in a way. It's hurting in a lot of ways. Because I kinda thinks I'm not going to show my grandkids the way we used to do it. It's hurting me. It's hurting me big time. And I just keep that to myself (Attutauniujut Nunami/Lament for the Land; <a href="http://www.lamentfortheland.ca">www.lamentfortheland.ca</a> )	It's terrible to know that the soil has been there forever, since the beginning of the Earth, and your greed and mismanagement makes it blow. It's a really horrible thing to see, and I hate seeing it on other people's farm <sup>86</sup>
Grief associated with anticipated future losses of place, land, species, and culture	Inuit are people of the sea ice. If there is no more sea ice, how can we be people of the sea ice? (Attutauniujut Nunami/Lament for the Land)	[Losing the farm] would be like a death. Yeah, there would be a grieving process because the farm embodies everything that the family farm is [...] And I think if we were to lose it, it would be like losing a person ... but it would be sadder than losing a person ... I don't know, it would be hard definitely. So you took the family out I don't think the family would make sense, you know? It's like it's lost its context, it's lost its niche, it's lost its power. Because we're fighting for our farm and we're not giving up and we know this is where we're meant to be, I think if you took us out of that it would be like [...] It's like making sense of a whole new map <sup>84</sup>
	There is nothing else [we can do], we can't dwell on it. Then we would be all suicidal. You just have to do the best you can with what change is coming <sup>11</sup>	If it carries on the way it has been in the last, say, five years, I think really that Newdegate is probably is probably going to be a, well, I don't know [...] if things don't come good it's going to be looking like it might not be an area that is just not viable [...] That's why I can't believe the environmental changes are just here and this is how it's going to be because I don't think, I don't think it is <sup>84</sup>

<sup>a</sup>Quotations are drawn from multi-year research conducted in Northern Canada and Australia. Research was conducted using qualitative methods, including in-depth conversational interviews, participant observation, focus groups, and digital media, including documentary film and digital storytelling. Quotations in each section are not meant to indicate they belong only in one area, as many of them are representative of one or more pathways; rather, it is to provide illustrative examples from peoples' lived experiences of some of the ways in which ecological grief is already expressed. <sup>b</sup>Quotations are drawn from research (interviews, focus groups, and digital media) with over 120 Inuit from five communities in Nunatsiavut, Labrador, representing almost equal numbers of men and women, ranging in age from 9 years old to over 90 years old. <sup>c</sup>Quotations are drawn from a three-part interview series conducted with 22 family farmers located in a small rural town in the central Western Australian Wheatbelt. An equal number of male and female farmers participated and ranged in age from 27 to 68 years old.

Gradual and cumulative losses in the physical environment can also invoke complex grief responses due to the various personal and collective meanings attached to them. For example, research with the five Inuit communities of Nunatsiavut, Labrador, Canada, identified that many Inuit experienced ecological grief related to changes witnessed on the land. This grief emerged from the loss of the ability to travel on the land and ice for food and for participating in health-sustaining land-based activities such as hunting and fishing, and deep concern around how to feed one's family and continue to live a traditional Inuit life. This grief also emerged from the disruption to sense of place and connection to the land, and was often accompanied by strong emotional reactions, such as anger, sadness, frustration, anxiety, distress, hopelessness, depression and despair<sup>10,11,35</sup>. Research in the Australian Wheatbelt has also shown that exposure to chronic dryness can elicit similar experiences of environmental distress amongst family farmers<sup>13</sup>. Wind erosion, a consequence of persistent dryness, was found to be a particularly salient driver of farmers' ecological grief, with many reporting feelings of depression, anger and physical pain. In both locations, such experiences resonate strongly with Albrecht's concept of 'solastalgia', described as the homesickness one feels whilst still at home<sup>5</sup> and, more recently, as grieving related to the loss of a healthy place and a thriving ecosystem<sup>45</sup>.

**Grief associated with loss of environmental knowledge.** Another way climate change can manifest ecological grief is through per-

sonal responses to loss of environmental knowledge and identity. For people who retain close living and working relationships with the natural world, personal and collective understandings of self-identity are often constructed in relation to the land, including its physical features, uses and knowledge of it<sup>10,13,46,47</sup>. Consequently, climate change can disrupt a coherent sense of self via its physical impacts upon landscapes, seasonal weather patterns and ecosystems.

The loss of local knowledge, or traditional ecological knowledge, may be a key trigger for ecological grief. Various Australian farming groups have reported having lost confidence in the seasonal rhythms of the weather and in their ability to 'know it'. Such experiences are often associated with anxieties related to the long-term future and viability of their family farm and their broader agriculture region<sup>13,40,48–50</sup>. Similarly, many Inuit in Nunatsiavut, particularly the middle-aged and senior generations, identified feeling deep sadness and distress that much of their environmental knowledge gained from generations of knowledge sharing and on-the-land observation and learning were suddenly shifting and eroding<sup>10,11,35</sup>. Many elders expressed worry about giving advice around travel routes and weather conditions, as parameters for prediction and risk had shifted so much in recent years that they no longer had confidence in their knowledge. This caused grief at the loss not only of their own knowledge and identity associated with 'knowing the land', but also with the loss of a cultural system of land-based knowledge that was passed on through generations<sup>10,11,35,46</sup>.

An inability to prevent the degradation or loss of land can also negatively affect notions of personal identity and generate experiences of ecological grief. Amongst Australian family farmers, wind erosion and chronic dryness have been shown to undermine 'responsible land steward' and 'good farmer' identities. In turn, feelings of guilt accompany experiences of ecological grief as farmers blame themselves for the desolation of their land<sup>13</sup>. Similarly, Inuit expressed distress and grief over not being able to protect or save the land from the impacts of a changing climate, often expressing feeling helpless as they bear witness to the changes but are unable to stop them<sup>10,11,35</sup>.

**Grief associated with anticipated future losses.** In both Northern Canada and Australia, our research indicates that many individuals identified feeling anticipatory grief for ecological changes that had not yet happened. In these cases, grief for anticipated future ecological losses is also tied to grief over future losses to culture, livelihoods and ways of life<sup>10,11,13</sup> (see also the film *Attutauniujut Nunami*/Lament for the Land). A similar form of anticipatory grieving has also been documented amongst Sami reindeer herders in Northern Sweden fearful of the disappearance of their valued way of life<sup>51</sup>.

While less is known about this area of ecological grief, our research in Canada and Australia, as well as a report from ecoAmerica and the American Psychological Association<sup>19</sup> indicates that this is grief emergent from anxiety of, or preparation for, future losses and mourning for an anticipated future that will likely cease to be. This grief is both acute and chronic, carried psychologically and emotionally, but is not linked to any one event or break moment, and develops over time, with knowledge of what could come based both on already-experienced changes (for example, declining sea ice in the North and on-going drought conditions in Australia) and projected changes. The report further indicates that grief and associated anxiety and strong emotions linked to the anticipation of future losses will likely increase in prevalence, and may particularly impact children and youth who are currently growing up with 'doom and gloom' narratives<sup>19</sup>. In this sense, anticipatory ecological grief may also constitute a form of 'ambiguous grief'<sup>52</sup>, as it is likely to be particularly difficult to articulate a sense of grief felt over the loss of the future.

### Areas for future inquiry

We find it remarkable how similar Inuit and Australian farmers' experiences of ecological grief are across all three categories. Although from very different cultural and geographical contexts, and despite enduring different climatological stressors, our research highlights the ways in which both groups express a profound sense of grief and mourning for losses to land, ecological knowledge, identity and the future. Yet, despite the similarities among people in these two research studies, ecological grief remains in a nascent state of conceptual development, and empirical case studies documenting its development remain extremely sparse. Nevertheless, as our review has shown, notions of grief and mourning are certainly applicable in contexts where people are experiencing losses to valued species, ecosystems and landscapes and attendant losses to culture, identities and desirable futures.

Understanding that ecological grief is already experienced by individuals and communities, we outline possible areas of future inquiry into ecological grief, which we believe to be of particular importance and urgency. The areas outlined here are not intended to be comprehensive or prescriptive; rather, they represent directions of inquiry we argue have potential to: enhance our understanding of the conceptual and theoretical foundations of ecological grief; enhance understanding of potential risk factors and who is likely to be at risk of ecological grief; and enhance the development of interventions that reduce human suffering and aid coping in the

context of further climate change and ecological loss. We highlight these areas on the basis of identified gaps in the literature, as well as our own perspectives of where the application of ecological grief may yield greatest benefit to our understanding of this emerging concept and its potential applications to reduce human suffering.

**Conceptual and theoretical foundations.** The conceptual and theoretical foundations of ecological grief remain underdeveloped and require further research attention. For instance, it is not clear what risk factors underpin experiences of ecological grief (see next section); whether ecological grief follows a similar trajectory to other forms of grief (for example, Kubler-Ross's<sup>53</sup> five-stage model); how ecological grief relates to similar concepts (for example, solastalgia); or to what extent ecological grief is personally, culturally, or environmentally determined. These are questions without easy answer, and that relate to fundamental questions concerning human–nature relationships.

We argue that the growing conceptual and theoretical work regarding people–place relationships may provide a useful starting point for addressing some of these questions. There is a long scholarly history documenting the importance of people–place relationships for psychological health and well-being, as well as the psychological harms associated with place disruptions<sup>54–59</sup>, though notions of grief and mourning rarely feature (see refs<sup>55,56,60</sup> for exceptions). Places are broadly defined as spaces that have acquired meaning for those associated with them<sup>57</sup>, and increasingly feature in research examining the psychological impacts of and responses to climate change<sup>61–63</sup>. Although rife with definitional disputes and conceptual inconsistencies<sup>64</sup>, the existing work on people–place relationships provides a conceptual architecture that brings together aspects of the physical environment, culture and identity that may be useful for teasing out specific hypotheses regarding key drivers and risk factors underpinning ecological grief<sup>65</sup>.

For example, the place attachment literature shows that people have the potential to form emotional and psychological relationships to a wide range of places (urban, natural, personal and communal) across various geographical scales<sup>66</sup>, but that some of these relationships tend to be more significant for psychological well-being than others (for instance, relationships with the 'home', however it is defined for individuals or communities)<sup>59,67,68</sup>. This would suggest that, from a mental health perspective, not all ecological losses are equal, and that the grief experienced from losing a beloved home environment may be different to losing environments of a different type and scale, or places with different meanings (for example, public spaces versus private homes). Similarly, it may be possible to identify certain types of people–place bonds as being more susceptible to climate-driven disruption<sup>69</sup>. Furthermore, theoretical models of place disruption may aid identification of discreet stages of ecological grief as they manifest over time, as well as the psychological processes underpinning it<sup>70–73</sup>.

Caution is required, however, when applying people–place concepts to the investigation of ecological grief. It is not clear the extent to which ecosystems and landscapes constitute 'places'<sup>74</sup>, and existing definitional and conceptual ambiguities in key place-related concepts — such as place attachment, place identity and solastalgia — heighten the risk that ecological grief may become conflated with related concepts. Furthermore, and similar to place<sup>75</sup>, ecological grief is emerging as a complex concept open to a wide range of epistemological, methodological and conceptual interpretations. Place therefore represents but one potential conceptual avenue through which to investigate ecological grief.

**Risk factors.** Various risk factors are likely to underpin experiences of ecological grief, although further research is required to identify vulnerable populations under climate-changed futures. Some initial observations can be made, however, in relation to the existing lit-

erature. First, ecological grief is likely to be more common amongst peoples that retain close living and working relationships to natural environments than those who do not<sup>10,11,13,19,35,76</sup>. Second, different types of climate hazards may elicit different experiences of ecological grief, with the effects of gradual and cumulative climate change less discernible than those associated with acute weather-related disasters<sup>20</sup>. Third, people living in areas where high climate risk maps onto existing and entrenched vulnerabilities are more likely to experience ecological grief than people living in areas of low climate risk and low vulnerability<sup>10,41</sup>. Finally, personal and cultural notions of value are likely to underpin grief responses, so that the intensity of ecological grief experienced is proportional to the value attributed to the ecological loss<sup>77</sup>. Given the paucity of literature investigating ecological grief, it is premature to rank the aforementioned risk factors in terms of their relative importance, and such an exercise may not even be useful given that ecological grief is likely to be felt most strongly by people living in contexts characterised by multiple and overlapping risk factors.

**Applications.** At the level of climate policy, ecological grief has potential to contribute significantly to the emerging policy domain of 'loss and damage' established by the Warsaw International Mechanism (WIM) under the United Nations Framework Convention on Climate Change (UNFCCC). The WIM was established to assess how present and future climate change losses could be conceptualised and addressed. Recent work<sup>77,78</sup> has laid initial groundwork for understanding 'non-market' loss and damage. These are intangible losses that are not easily captured in standard environmental assessment metrics relating to (amongst others) loss of knowledge, culture, sense of place, identity and social cohesion<sup>77</sup>. Since grief is an acknowledged component of loss and damage<sup>78</sup>, we envision ecological grief to be of particular significance to this emerging area of policy development. Ecological grief draws attention to the attendant emotional and psychological losses suffered as a result of losses in the natural world. This, in turn, serves to illuminate land, ecosystems and species as valued objects that contribute to mental health and well-being, community flourishing, and culture. This is important for the assessment of climate change-related risks and their associated costs, as the symbolic and psychological aspects of places and land, and the risks to them, tend to be under-emphasised or overlooked entirely within climate policy<sup>79</sup>. Thus, the total 'cost' of climate change impacts tend to be undervalued, particularly for peoples whose sense of wealth is derived from the intangible — rather than the economic — value of nature. Making explicit the grief experienced as a result of ecological losses may serve to address this inequity and lead to the development of mechanisms that more fully compensate affected people for endured climate-related losses.

At the level of psychological practice, better understanding of ecological grief may yield strategies to help individuals cope with, or heal from, environmental losses. For instance, Neimeyer and Cacciato's (2016)<sup>23</sup> developmental model of grief suggests that grief moves through three, though not necessarily linear, phases: reacting, reconstructing and reorienting. Individuals require different psychosocial needs as they move in and out of the three phases of grief, thus necessitating different therapeutic methods during each phase. Such understandings may have application for emerging 'ecotherapies' which seek to help people cope with experienced and anticipated climate change impacts<sup>80</sup>, and climate communication approaches that seek to legitimise diverse emotional responses to climate impacts<sup>81</sup>. Going further, while scholars have long suggested that it is possible to return to, or enter into, a new point of relative stability after experiencing a significant loss<sup>23,82</sup>, this may not apply within the context of unending or ongoing environmental losses. In this context, ecological grief may also expose new understandings of 'ambiguous loss', or loss that goes on without answers

or closure and leads to feelings of being frozen, halted, or stuck in the grief process, living with both the presence and the absence of what was lost<sup>53,83</sup>.

## Conclusion

Throughout this Perspective, we seek to present ecological grief as a legitimate form of grief felt in response to experienced or anticipated losses in the natural world and outlined what we believe are both important and urgent areas for future research. Given that we are living in a time of extraordinary ecological loss, and that these losses will not end any time soon, we anticipate, along with a small but growing number of scholars, that ecological grief will become an increasingly common human response to the losses encountered in the Anthropocene. To bear witness to ecological losses personally, or to the suffering encountered by others as they bear their own losses, is to be reminded that climate change is not just an abstract scientific concept. Rather, it is the source of much hitherto unacknowledged emotional and psychological pain, particularly for people who remain deeply connected to, and observant of, the natural world. And while there are still many questions surrounding the concept of ecological grief, we contend that it is a powerful and useful concept, which allows people to articulate for themselves how this period of extraordinary ecological decline is affecting themselves and their communities.

Confronting ecological grief will be difficult and challenging work, both professionally and affectively. Indeed, to seriously engage with the concept of ecological grief is to become open, in a personal sense, to the magnitude of the ecological challenges facing our global society. There is much (grief) work to be done, and we need to do this work individually and collectively, publicly and privately, ethically and politically, in order to enhance our understanding of climate change impacts, and to expand discussions on what is to be done. Here we find solace in the words of Parkes and Prigerson<sup>22</sup> who remind us that to grieve is to find strength and maturity, and that ultimately grief might just be the "price we pay for love".

"In many respects, then, grief can be regarded as an illness. But it can also bring strength. Just as broken bones may end up stronger than unbroken ones, so the experience of grieving can strengthen and bring maturity to those who have previously been protected from misfortune. The pain of grief is just as much a part of life as the joy of love; it is, perhaps, the price we pay for love, the cost of commitment. To ignore this fact, or to pretend it is not so, is to put on emotional blinkers, which leave us unprepared for the losses that will inevitably occur in our lives and unprepared to help others to cope with the losses in theirs." (p.6 in Parkes and Prigerson<sup>22</sup>).

Received: 18 July 2017; Accepted: 26 January 2018;

Published online: 3 April 2018

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## Acknowledgements

Thank you to S. Harper (University of Guelph) and J. Snook (Torngat Wildlife, Plants, and Fisheries Secretariat and the University of Guelph) for providing feedback and helpful suggestions on this manuscript.

## Author contributions

A.C. led the writing of the article, with N.E. contributing heavily to the writing at all stages. Both authors contributed to the overall conceptualization of the article, the content within and the editing process.

## Competing interests

The authors declare no competing interests.

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