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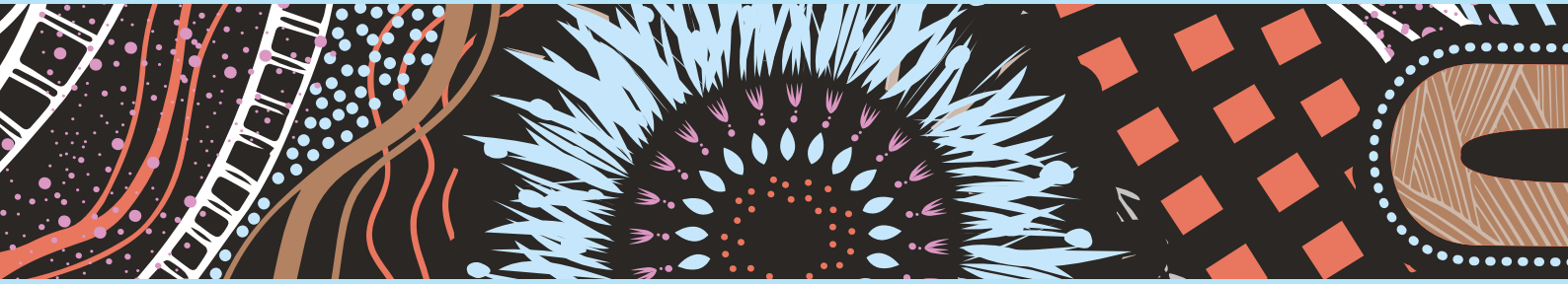

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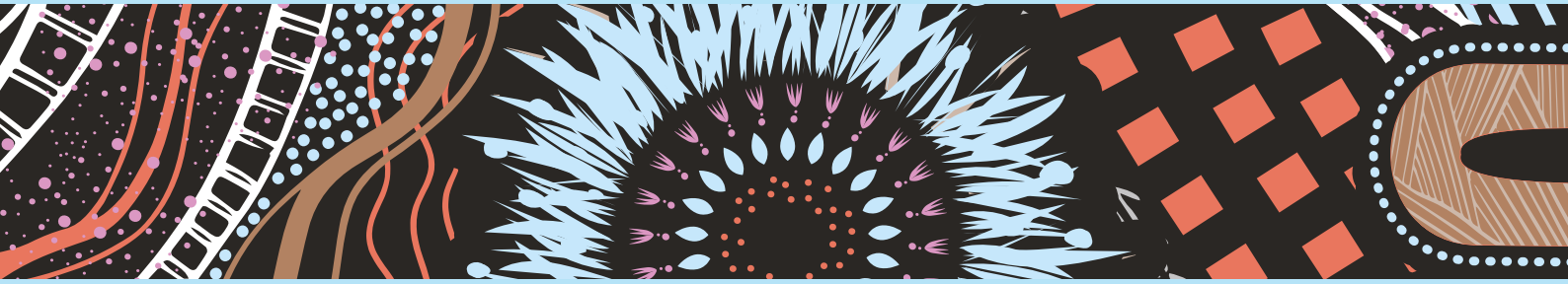

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Contents

Caution: Some people may find the content in this report confronting or distressing.

Please carefully consider your needs when reading the following information about First Nations mental health and suicide prevention. If you are looking for help or crisis support, please contact:

13YARN (13 92 76), Lifeline (13 11 14) or Beyond Blue (1300 22 4536).

The AIHW acknowledges the Aboriginal and Torres Strait Islander individuals, families and communities that are affected by suicide each year. If you or your community has been affected by suicide and need support, please contact the **Indigenous Suicide Postvention Services** on **1800 805 801**.

The AIHW supports the use of the Mindframe guidelines on responsible, accurate and safe suicide and self-harm reporting. Please consider these guidelines when reporting on these topics.

Summary

What we know

- Climate change is a profound threat to health and wellbeing and a determinant of mental health, wellbeing and suicide.
- Heat waves and extreme temperatures are linked to increased suicide and suicide related behaviours.
- Increased anxiety about climate change is impacting the mental health and wellbeing of First Nations people in Australia and of Indigenous peoples elsewhere.
- First Nations people recognise climate change as part of a continuum of colonisation which contributes to intergenerational trauma.
- Extreme weather events, loss of biodiversity, and destruction of Country and land adversely impact First Nations people's social and emotional wellbeing (SEWB).

What works

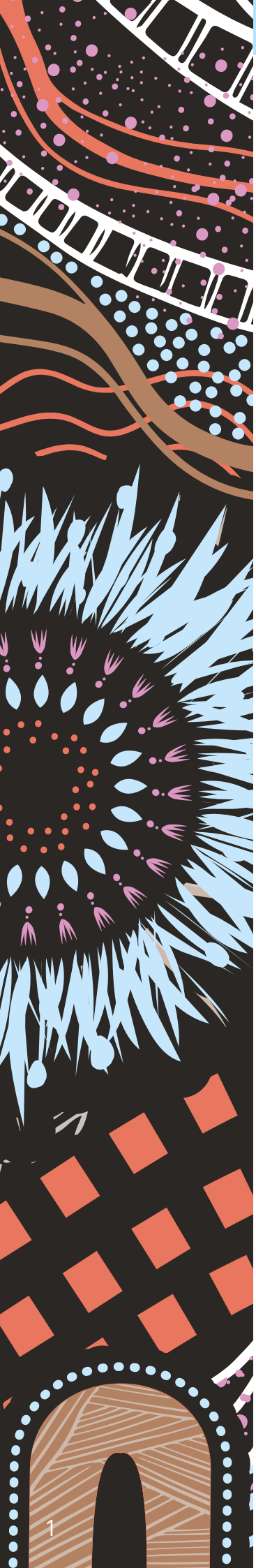
- There is a strong domestic and international evidence base that supports the SEWB benefits of holistic collective First Nations cultural practices. These centre on caring for Country (protection and stewardship) and implementing and developing Indigenous Knowledge Systems, communities and networks. Self-determination over land, and strengthening the implementation of place-based, environmental stewardship knowledges, are domestic and global solutions to the climate crisis.
- Evidence positively links collective pro-environmental activism and activities such as Caring for Country with increased SEWB.
- Embedding First Nations governance and human rights frameworks into climate change policy and practice would ensure stability of practice within environment management.
- Climate change adaptation and mitigation which support First Nations cultural continuity by implementing and developing First Nations knowledge systems, self-determination and stewardship of land works best.

What doesn't work

- Place-based climate change adaptation and mitigation programs have limited use if they are not designed and implemented with (or by) First Nations peoples and do not deploy their knowledge systems. Programs which are not guided by knowledge systems developed in the six different climate zones in Australia will also not work effectively.
- Disrespecting the need for cultural safety (and especially the complex place-based cultural connections to Country) thwarts effective interventions. Failing to adopt and implement First Nations-led environmental protection policies and sustainability practices and supporting corporate interests over First Nation people's rights over their own land and Country, risks a worsening of First Nations peoples SEWB.
- A lack of awareness of the complex impacts of climate change on First Nation peoples hinders holistic interventions.
- Data and evidence of the mental health and wellbeing impacts of climate change largely use Western mental health cultural frames and do not support a holistic understanding of SEWB and mental health for First Nations people.

What we don't know

- The relationship between climate change, loss of biodiversity, and destruction of Country and land, and SEWB and suicide and suicide-related behaviours, is under-researched and poorly understood by Western health sciences.
- There is a gap in the evidence base for the effectiveness of First Nations climate change mitigation and adaptation strategies.
- There are no culturally appropriate measures to quantify the extent of climate change related distress experienced by First Nation peoples.
- The SEWB impact of climate change on kinship with Country has not been adequately researched.
- More research is required to examine barriers to implementing long-term strategies to combat the impact of climate change on SEWB.
- There is a lack of longitudinal studies that are measuring links between climate change and SEWB and suicide and suicide related behaviour, for example, mapping the mental health and SEWB impact of heatwaves and high temperatures on access to health services.
- There is a substantial lack of suicide prevention strategies, domestically and internationally, which engage or address planet-level or land-based dimensions of suicide prevention.



1

Introduction

1 Introduction

This literature review recognises and respects that First Nations peoples have unique and complex cultural and spiritual relationships to land which have evolved over millennia; that First Nations peoples in Australia are the traditional guardians of the lands now called Australia; and that sovereignty was never ceded. Prior to colonisation, First Nations peoples lived in harmony with their environment and continue to recognise the land as the source of health, wellbeing, identity, spirituality, healing and culture. For First Nations peoples '[l]and is central to wellbeing' (Swan and Raphael 1995:19).

The purpose of this literature review is to examine research:

- on the impact of climate change on First Nations people's mental health, suicide, and social and emotional wellbeing (SEWB)
- on how to best protect First Nations people's mental health and SEWB from the adverse impacts of climate change through climate change adaptation and mitigation
- that contributes to understanding of the relationship between mental health and climate change from a First Nations, or 'Indigenous Standpoint' drawing on research by, and for, First Nations peoples both in Australia and internationally (Foley 2003).

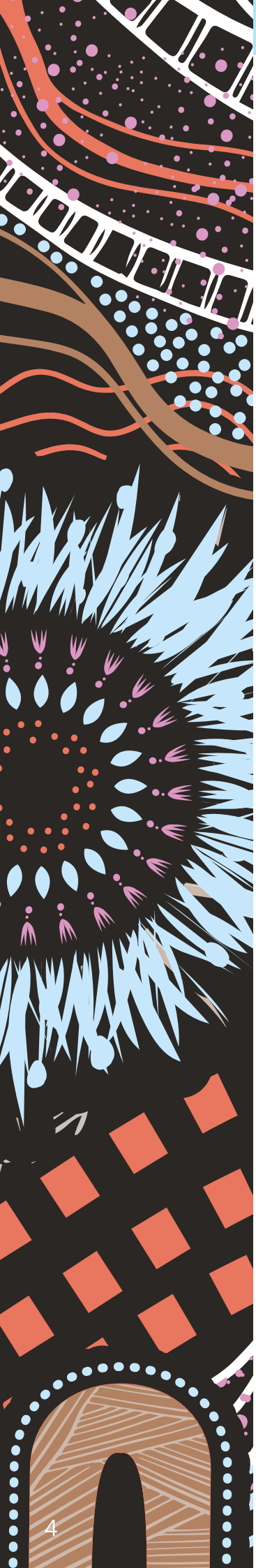
Research into the relationship between mental health and climate change is a relatively recent area of inquiry with many identified research gaps (Obradovich and Minor 2022). Yet there is convincing evidence that climate change and global warming are significant and growing determinants of mental health. The complex direct and indirect mechanisms or pathways for this require a robust evidence-based policy response (Cianconi et al. 2020; Lawrance et al. 2022). Indeed, the *Sixth Assessment Report of the Intergovernmental Panel on Climate Change* expresses 'very high confidence' that related mental health challenges will increase across the world (IPCC 2023:15).

The research reveals a relatively weak understanding of the relationship between climate change and First Nation people's mental health, suicide and SEWB in Australia. Research has found that First Nations peoples are more vulnerable to the direct and indirect mental health and SEWB impacts of climate change (HEAL Network and CRE-STRIDE 2021; Lansbury and Crosby 2022; Middleton et al. 2020; Vecchio et al. 2022). A systematic review found that First Nations people are vulnerable to climate change because (a) they have more climate-sensitive health conditions; (b) entrenched socioeconomic disadvantage puts communities at greater risk; and (c) disruption occurs to on-Country cultural practices vital to SEWB and to community resilience (Standen et al. 2022). The causal pathways and mechanisms linking increased risk from psychological distress, suicide and suicide-related behaviour with direct and indirect climate change stressors, are yet to be fully understood for First Nation Australians.

Colonisation subjected First Nations men, women and children to numerous human rights abuses, not the least of which was genocide. This has resulted in cascading intergenerational mental health and wellbeing impacts; entrenched socioeconomic disadvantage; and ongoing systemic racism (Dudgeon et al. 2016; Calma et al. 2017; Dudgeon et al. 2023). Despite efforts to improve First Nations people's health and wellbeing in Australia and to overcome entrenched disparities or gaps in health and other areas, the 2023 *Closing the Gap Annual Data Compilation Report* found that suicide has

increased in Remote and Very remote areas (Productivity Commission 2023). Analysis of the available data has also found that First Nation suicide deaths is approximately two and a half times higher than suicide deaths among non-indigenous Australians (AIHW 2023). Females between the ages of 5 and 17 years died from suicide at higher rates than First Nation males in that age range (Productivity Commission 2023:33). First Nations young people die from suicide at around twice the rate of other young people in Australia (AIHW 2023). Reducing the high levels of suicide in First Nations communities is addressed under Closing the Gap Target 14, which acknowledges that '[r]ates of suicide is a measure of whether Aboriginal and Torres Strait Islander people have high levels of social and emotional wellbeing' (Productivity Commission 2023:26).

An analysis of climate change as a determinant of First Nations suicides is taking shape. For example, impacts of climate change on an Inuit community had an interconnected cultural and socio-economic effect. This was linked to increased family stress, to the intensification of existing mental health stressors, and to an increased potential for substance misuse and suicidal ideation (Cunsolo, Willox et al. 2013). A recent Canadian study has synthesised some of the current evidence on the environmental dimensions of suicide, including food and water insecurity, changing temperatures, and impacts on housing, work and other social determinants of wellbeing. This approach offers promising new directions for First Nations suicide prevention research and policy (Ansloos and Cooper 2023). Finding connections between First Nations suicide and water insecurity, they postulate that 'water security is an important upstream avenue for suicide prevention', which requires further research. Ansloos and Cooper also propose that suicide prevention should include an analysis of suicide through 'environmental autopsy' — meaning that the relationship between mental health and wellbeing and the environment is examined as a determinant of suicide and suicide-related behaviour. This innovative First Nations approach aligns with growing international evidence that climate change is a risk factor for health, mental health and suicide.



2

Background

2 Background

Climate change is a determinant of health across all populations

Climate change is a naturally occurring process which has been grossly disrupted by human activity since mid-20th century industrialisation. In this paper, the term 'climate change' refers to changes in the climate that are caused, or exacerbated, by direct and indirect human activities that release greenhouse gasses into the atmosphere. Extractive and related industries are the most well-recognised contributors to this, due to the burning of fossil fuels (coal, oil, natural gas). Deforestation (for mining, logging, chemical-based mono-crop plantations) also increases the release of the greenhouse gas carbon dioxide into the air. The processes of animal agriculture and livestock farming (and any associated deforestation) produce greenhouse gasses such as methane, nitrous oxide and more carbon dioxide and are another significant driver of climate change into the atmosphere.

These human-driven emissions and activities cause a 'greenhouse effect' which results in global warming, rising sea levels and extreme weather events such as droughts and flooding. In fact, the Australian Bureau of Meteorology has found that climate change is linked to more frequent and more intense droughts, heat waves, floods and fires across Australia (Bureau of Meteorology 2022). A Commonwealth Scientific and Industrial Research Organisation (CSIRO) analysis of the environmental impacts of climate change has also predicted with 'very high confidence' that extreme rainfalls and high temperatures will intensify across Australia in the future (CSIRO 2023). Climate change is expected to result in a doubling of heat-related deaths over the next 40 years (CSIRO and Bureau of Meteorology 2018).

There is now an international consensus that climate change is a determinant of global health (Atwoli et al. 2021, Charlson et al. 2022; Corvalan et al. 2022; Watts et al. 2018a, 2018b). Moreover, there is widespread concern that climate change impacts may exacerbate existing population vulnerabilities and increase health inequities, including those experienced by First Nation populations (IPCC 2022, WHO 2021). Global warming and extreme weather events have a wide range of direct and indirect adverse impacts on health across all populations. These include lack of access to clean air, water and safe shelter; 'energy poverty'; food insecurity; the spread of infectious diseases; reduction in biodiversity; ecosystem disruption, damage, and pollution; the destruction and altering of sacred places; displacement, civil unrest and conflict; increase in zoonotic threats and insect-borne diseases; and increases in allergies and respiratory illness (IPCC 2021, IPCC 2022; Romanello et al. 2021; Standen et al. 2022). Indeed, the United Nations has stated that 'climate change is the single biggest health threat facing humanity' (UN 2023).

Climate change adaptation and mitigation are two interconnected ways of managing the adverse impact of climate change on people and the environment.

- 'Climate change adaptation' refers to efforts to adjust to the impacts of climate change now and in the future. (For example, building homes which protect inhabitants from extreme heat and improving access to health services during extreme weather events.)

- ‘Climate change mitigation’ refers to efforts to reduce the emission of carbon dioxide and other greenhouse gasses by (for example) transitioning away from the burning of fossil fuels towards more environmentally sustainable sources of energy such as wind and solar power.
- ‘Climate change mitigation’ includes ‘carbon sequestration’ — the absorption or capture and control of carbon dioxide. (An example of this is the expansion of forests, which can absorb carbon dioxide from the atmosphere and then store it.)

The impact of climate change on mental health, suicide and wellbeing across all populations

Climate change has been identified as a global priority for mental health research, services, practices and policy across all populations (Corvalan et al. 2022; Charlson et al. 2022; Massazza et al. 2022). The 2030 global mental health burden caused by climate change is estimated to be as high as US$16 trillion (Lawrance et al. 2022). Indeed, climate change is now recognised by the World Health Organisation (WHO) and other peak international and national health organisations as the leading determinant of global mental health and of harm to new and future generations (Corvalan et al. 2022; Newnham et al. 2020). Extreme weather events can stress pregnant women and therefore alter fetal biochemistry (Vergunst and Berry 2022). The impact of climate change-related temperature rises on pregnancy, for example, is an issue with some evidence of in-utero impacts on cognitive function (Shah and Steinberg 2017) or of harms to maternal and infant health (Bryson et al. 2021; Oslo and Metz 2020; Vergunst and Berry 2022). Extreme weather events also impact children’s psychological wellbeing (Hassan et al. 2018). The developing brain is vulnerable to stress and extreme weather events can be traumatic.

Significantly, systematic reviews have found strong evidence that higher temperatures (Corvetto et al. 2023; Thompson et al. 2018) and increases in humidity (Florido et al. 2021) are correlated with higher suicide rates across all populations. Studies in Australia have found that droughts in rural areas are linked to increased suicide rates among men aged between 30 and 49 (Hanigan et al. 2012). Empirical evidence not only supports a connection between higher temperatures and higher suicide rates but also with higher clinical and sub-clinical mental health challenges (Burke et al. 2018; Liu et al. 2021; Mullins and White 2019; Nori-Sarma et al. 2022; Obradovich et al. 2018). Rising temperatures and escalating extreme weather events have also been linked to anxiety, depression, post-traumatic stress disorder, homicide, substance misuse, mortality, child and spousal abuse and somatic disorders (Corvetto et al. 2023; Doherty and Clayton 2011; Koder et al. 2023; Lai et al. 2021; Lawrance et al. 2022; Mason et al. 2022; Padhy et al. 2015; Thompson 2021).

There is growing evidence that mental health services are used more often during extreme heat. This suggests an increase in adverse mental health during extreme heat. An analysis of 485,274 calls to mental-health help lines in Germany between November 2018 to March 2020 found that, during extremely hot days, there was a 7.0 % increase in calls (Janzen 2022). Furthermore, a significant systematic literature review on the impact of climate change (CC) on the global demand for psychiatric services (hospital admissions, emergency department visits, outpatient consultations, ambulance dispatch) found that:

> *... suicide (completed or attempted), substance misuse, schizophrenia, mood, organic and neurotic disorders, and mortality were strongly affected by CC [and] suicide behavior (attempted or completed suicide) showed the most consistent increase after CC-related extreme events among all studies* (Corvetto et al. 2023:1, 13).

The reasons for increases in suicide and suicide-related behaviour associated with heatwaves and extreme heat include heat-related neurological imbalances; increased sensitivity to heat in people with lived and living experience of suicide; heat intolerance caused by psychotropic medication; lack of insight about appropriate self-care; social isolation; and poverty (Corvetto et al. 2023).

Several new interconnected terms have emerged to represent the forms of psychological distress caused by climate change and crisis. These are 'ecological grief' (Cunsolo and Ellis 2018), 'climate change anxiety' (Clayton and Manning 2018), 'eco-anxiety' (Cordial et al. 2012) 'solastalgia' (Albrecht et al. 2007; Charlson et al. 2021; McNamara and Westoby 2011) and 'climate trauma' (Woodbury 2019).

Recent large-scale surveys have found that climate change anxiety is prevalent and increasing (Leiserowitz et al. 2021). The 2023 Deloitte Global Gen Z and Millennial survey (representing the views of over 22,856 respondents from 44 countries across North America, Latin America, Western Europe, Eastern Europe, the Middle East, Africa and the Asia-Pacific) found that climate change was the third most important societal concern across the cohort (Deloitte 2023). Another survey of 10,000 young people aged between 16 and 25 across ten countries found that 59% reported feeling 'very' or 'extremely' worried; 84% were 'moderately worried, powerless, helpless, and guilty'; and 45% reported that climate change 'negatively affected their daily life and functioning' (Hickman et al. 2021:e863).

In the context of the levels of climate change-related stress and anxiety reported above, it is worth noting that strong correlations between anxiety and substance misuse have been known for some time (Smith and Book 2008) and concerns have been raised that climate change-related stress and anxiety may increase harmful substance use and vulnerability to relapse (Vergunst et al. 2022).

A 2023 review of psychological practice and research that focused on climate change distress warned that climate change threatens to increase First Nations people's poverty, mortality and cultural erosion. The review also stresses the imperative for psychologists and the broader mental health system to be prepared for an increased burden because of climate change (Koder et al. 2023).

Connection to Country and the domains of social and emotional wellbeing

Many First Nations communities have spiritual and cultural connections to the land which are an integral part of collective identity, governance, community harmony, cultural continuity, inter-generational knowledge transfer, health and wellbeing. 'Country' is a term used by First Nations peoples to refer to their deep spiritual and cultural connections to the environment, which include kinship responsibilities for flora and fauna. This relationship to Country is based on an ethic of responsibility and respect and is the foundation of cultural governance systems and of place-based community resilience (Bawaka Country et al. 2022, 2023; Wright et al. 2012).

As Nyrell Pattel, a First Nations therapist, writes:

> *Aboriginal people are bound to their homelands, spiritually and practically as the wellbeing of their people, animals and plants are closely linked. Each tribe had a different totem, which was an identified by an animal, or plant. Totems are sacred and therefore must be protected they are not to be damaged, injured, killed or consumed by clan members who identify themselves as belonging to a particular totem. It is believed that the totem is an ancestral being which is part of their dreamtime. Totems are linked to scared sites and the Aboriginals' spiritual, emotional, physical, social and environmental wellbeing depended on the maintenance of scared sites. This ensured the maintenance, care and protection of Mother earth, who is the giver of all life as the land and its people are one* (Pattel 2007:2–3).

First Nations people have a holistic concept of health, generally referred to as 'social and emotional wellbeing' (SEWB). This comprises 7 interconnected domains of wellbeing: mind and emotions; body; family; community; culture; Country; and spirituality (Gee et al. 2014). Harmonious connections between the 7 domains strengthen individual and collective SEWB. The 7 SEWB domains are also influenced by social, cultural, historical and political determinants which are specific to the diversity of First Nations communities across Australia (Dudgeon et al. 2017).

The social determinants of SEWB include employment, housing, income, education, access to services and occupation (Zubrick et al. 2014). The cultural determinants of SEWB include cultural continuity; connection to land and Country; family; kinship and community; language, knowledge and beliefs; and self-determination (Arabena 2020).

The seven domains of SEWB include connection to:

- Body: physical strength, health and wellbeing, which enable full participation in life.
- Mind and emotions: this includes psychological, emotional and cognitive wellbeing.
- Family and kinship: harmonious and healthy relationships with family and kinship connections.
- Community: supportive and healthy relationships between individuals and families with the wider community strengthen cultural identity and resilience.
- Culture: strong connections to First Nations culture, supporting cultural continuity which strengthens resilient identities, healing and self-determination.
- Country: providing cultural, spiritual, physical, psychological, emotional harmony for individuals, families and communities, socio-economic security, as well as kinship obligations important to cultural continuity, land health, collective identity and Traditional Ecological Knowledge (TEK) and Indigenous Knowledge Systems (IKS).
- Spirituality and ancestors: supporting a sense of meaning and purpose in life, hope, resilience, collective cultural identity, and connection to Country.

Connection to Country is recognised as both an important domain of SEWB and as a cultural determinant of wellbeing (Arabena 2020; Salmon et al. 2018). There is increased evidence which validates the SEWB domain of Country as a cultural determinant (Dudgeon et al. 2017; Fatima et al. 2023; Gee et al. 2014; Sutherland and Adams 2019). Yet this connection to Country has been identified as 'very poor' in the recent national report on the state of the environment in Australia with First Nations access to Country to sustain SEWB cultural, spiritual and economic practices also assessed as 'very poor' (Janke et al. 2021:25, 27).

Connecting people to Country is continually advocated for by Elders in *The Elders' report into preventing Indigenous self-harm and youth suicide* (Gooda and Dudgeon 2014). As these Elders point out, connection to, being on, and caring for Country and land involve learning about traditional ecological knowledge, spiritual and cultural healing, and strengthening of connections to family and community.

Connection to Country is recognised as a protective factor across a wide range of health and well-being strategies, plans and policies (Dudgeon et al. 2022a, 2022b) which are explained in detail later in this article.

Indigenous knowledge systems and environmental wellbeing

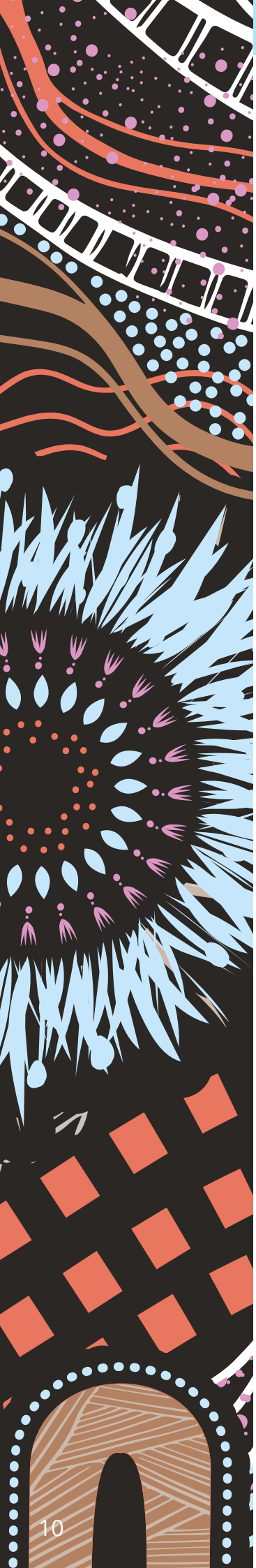
First Nations peoples have developed complex holistic knowledge systems across millennia, which are founded on a custodial kinship or stewardship relationship to the land, plants and animals: to Country. These knowledge systems — often referred to as Indigenous Knowledge Systems (IKS), Indigenous Knowledge (IK), or Traditional Ecological Knowledge (TEK) — encompass all aspects of life and the environment. They are interconnected systems of knowledge, including forms of health and medicine; botany; geology; astronomy; spirituality; philosophy; and ecology. Examples of TEK include holistic plant-based medicine and healing; precision land management developed across millennia through the careful observation of the environment; complex understandings of the seasons and weather events; astronomy; and deep, historical place-based knowledges. The health and wellbeing connections between Country and people are the foundation of many IKS and are central to wellbeing (Hartwig et al. 2022; Lansbury and Crosby 2022).

As First Nations people in Australia have so clearly stated, '[w]hen Country is healthy, we are healthy. Our knowledge systems are interconnected with our environment and it relies on the health of Country' (First Nation Peoples Statement on Climate Change 2021).

Changes to land and Country due to colonisation, climate change related activities, and climate change itself threaten the continuation of IKS and TEK, which are place-based knowledge systems. From a First Nations standpoint, climate change threatens culture, knowledge systems and spirituality — all of which are embedded in, and expressed through, a connection to land and Country and all of which support SEWB.

First Nations knowledges are central to land management practices and healing, which are described as 'caring for Country' (Dudgeon et al. 2023b). TEK is used in First Nations ranger and land management programs across the country, which promote harmonious and thriving relationships between people and the environment. These programs support cultural continuity and cultural revival by using and teaching TEK and by supporting the health of people and the environment. Cultural continuity through self-determination is upheld by the United Nations Declaration of the Rights of Indigenous People (UNDRIP), and also understood as a political right by First Nations people since at least 1993 (Dodson 1994).

As well as contributing to climate change mitigation and adaptation by reducing carbon emissions and controlling fires, these 'caring for Country' practices have numerous SEWB co-benefits for First Nations peoples (Barber and Jackson 2017; da Veiga and Nikolakis 2022; Jarvis et al. 2021; Larson et al. 2019a). Increasing SEWB is recognised as a protective factor across the literature on First Nations suicide prevention (Dudgeon et al. 2016).



3

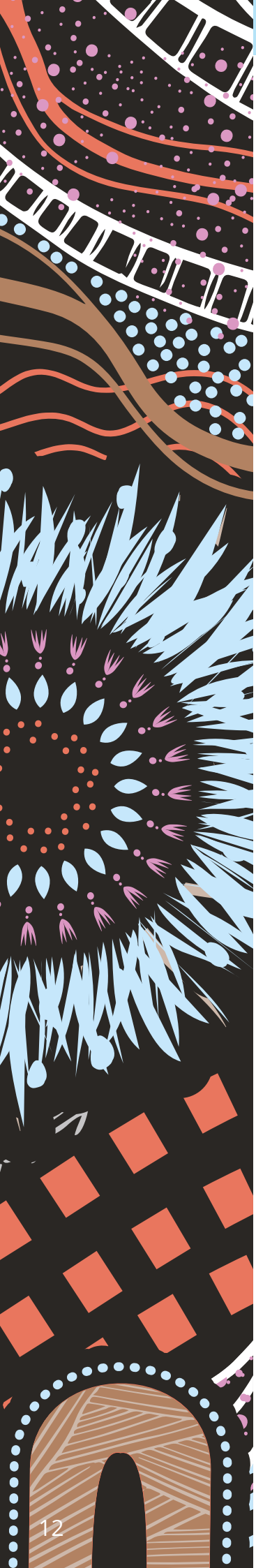
Methods

3 Methods

The literature review focused on literature published between 2013 and 2023 and cited on several large online data bases: PMC (PubMed Central, a full-text archive of the US National Institutes of Health's National Library of Medicine); the National Library of Australia; the Aboriginal and Torres Strait Islander Health Bibliography (ATSIHealth); the Australian Indigenous Health*InfoNet*; LltSearch (via PubMed); Web of Science and ProQuest; Google Scholar and Scopus. The literature was classified in terms of having low, moderate or high-quality evidence in accordance with a version of the Agency of Health Research and Quality Framework (AHRQ). The inclusion criteria applied an Indigenous Standpoint Theory approach which privileged Indigenous governance throughout the research process. Overall, this has been an iterative, purposive literature search, followed by a synthesis of the evidence.

The research field of climate change and mental health is a new and rapidly growing interdisciplinary and cross-disciplinary area, covering extensive domestic and international research and policy, with the majority of the work in this field focused on non-Indigenous people. To contextualise the potential gaps in the research which relate to First Nations people, a broad understanding of the central issues in the wider research was needed and general systematic reviews and research articles were consulted. These were found using terms such as 'climate change comorbidities', 'climate change mental health', 'climate change suicide', 'climate change adaptation mitigation' from 2013–2023.

This contextual research supported a broader understanding of the research and policy gaps in relation to First Nation Australians. Although increasingly sophisticated scales for measuring psychological and emotional responses to climate change are being validated across cultures and countries, it was found that there are none specific to First Nations peoples in Australia or elsewhere (Marczak et al. 2023).



4

Key Issues

4 Key Issues

Colonisation and climate change

The violent disruption of cultural, spiritual, physical and emotional connections to land and Country has long been recognised by First Nations peoples as a determinant of impaired SEWB and intergenerational trauma and grief (Morgan et al. 2010; Janke et al. 2021). The colonisation of Australia involved the forced removal of First Nations peoples from their lands and homes; the destruction of sacred cultural sites; the loss of culture; the disruption of culturally important kinship and stewardship responsibilities to land and Country; the loss of community, and family, and livelihoods; as well as food insecurity and exposure to disease, settler violence and poison.

From a First Nations standpoint, climate change is understood as a continuum of the colonial destruction of Country and land which has had cascading downstream effects impacting every aspect of life across generations and into the future (HEAL Network and CRE-STRIDE 2021; Janke et al. 2021; Nursey-Bray et al. 2020; Whyte 2017). The impacts of climate change on Country and land are recognised by First Nations people as a determinant of wellbeing (Ansloos and Cooper 2023; Ansloos and Peltier 2022; HEAL Network and CRE-STRIDE 2021; Janke et al. 2021; Mandaluyong Declaration 2011; Matthews et al. 2023).

Land dispossession from colonial resource manipulation and exploitation has been found to have adverse effects on the mental health of First Nations people (Ninomiya et al. 2023). Work camps associated with the extractive industries have been found to have adverse impacts on First Nations communities. Increased sexual violence against women, sex trafficking, substance misuse and domestic violence have been linked to these male dominated camps (Pasternak and King 2019).

The impact of extractive and industrial drivers of climate change (that is, mining, fracking, land clearing, hydro development, animal agriculture, livestock farming) on Country also compound the adverse impact of climate change on SEWB (Janke et al. 2021). These activities have disrupted the protective SEWB connections to land and Country while also contributing to climate change. First Nations communities continue to express concerns about the impacts of the 'extractive' industries (mining and fracking) on SEWB in vulnerable communities living in Remote areas (Aboriginal Medical Services Alliance of the Northern Territory 2018; Haswell et al. 2023). As a participant in the Australia State of the Environment report puts it, '[m]ining, fracking and digging up of Country is killing us physically and spiritually' (Janke, 2021 30). However, there is still little peer-reviewed research into the SEWB impact of the extractive industries (Haswell et al. 2023).

Australia's lack of action in mitigating and adapting to climate change is recognised as infringement of the rights of First Nations peoples. The United Nations Human Rights Committee found that Australia's lack of action to protect Torres Strait Islanders from the adverse impact of climate change on their right to life, wellbeing, health and culture is a breach of the International Covenant on Civil and Political Rights (Daniel Billy and Others v. Australia 2022).

Impact of climate change on First Nations social and emotional wellbeing

This section synthesises those studies which link climate change to First Nations wellbeing by describing adverse impacts on the social and cultural determinants, and the seven domains, of SEWB. The weakening of SEWB is widely recognised as a risk factor for First Nations suicide and the importance of strengthening SEWB is central to many First Nations suicide prevention strategies.

Climate change impacts on every aspect of First Nations wellbeing, including the interconnected wellbeing of Country (see Appendix A: Climate change and Aboriginal and Torres Strait Islander health). As Rhonda Clarke explains, from a First Nations standpoint, climate change:

> *… affects and impacts on every living thing, from the individual, their family, the infant within the womb, the wildlife, their offspring, their eggs, the fish in the ocean or the waterways, the plants, the trees, the bush, the bush tucker, our traditional medicines and the landscape on which one lives, works and plays* (AHCWA 2019a:2).

Climate change is increasingly recognised as a determinant of First Nations mental health and wellbeing across the world. A recognition that First Nations peoples experience climate change distress differently because of cultural and spiritual connections to Country, and because of the ongoing traumatic impact of the colonisation of their lands, is now starting to guide some of the international research (Gougsa et al. 2023). The adverse impact of climate change on First Nations' cultural, environmental, social and economic determinants of mental health is understood as part of a continuum of historical or intergenerational trauma and environmental violence (Vecchio et al. 2022). Climate change impacts on First Nations peoples include poor water quality; food insecurity; air pollution and allergies; bushfires and smoke; drought; extreme heat; severe weather and floods; and changes in vector ecology (Matthews et al. 2023). Extreme heat is impacting the ability of First Nations rangers ability to work; drought disrupts kinship connections to fauna and flora and sacred places; floods are disproportionally displacing First Nations peoples from their homes and causing anxiety, mental health distress and depression; and neglect of the needs of First Nations people during extreme weather events is intensifying socio-economic disadvantage (Janke et al. 2021).

These impacts undermine the social and cultural determinants and domains of SEWB. All of these climate change stressors are compounded by grief and distress over the loss of important SEWB connections to Country, which are fundamental to collective wellbeing and cultural survival.

Heat waves and extreme weather events are escalating in Australia and impacting disadvantaged First Nations communities in rural and remote areas (Addison 2013; Lansbury and Crosby 2022). The medical community in Australia recognises that housing that is not equipped to protect First Nations people living in remote areas from extreme heat exposes them to cascading health problems and increased mortality (Quilty et al. 2022). Indeed, over a 14-year period (2006–2019) First Nations peoples died from weather-related incidents — especially from extreme heat — at a rate of 0.44 / 100,000 population, which is double that of non-Indigenous Australians (Peden et al. 2023).

First Nations people living in the area now called Western Australia have been identified as vulnerable to climate change stressors for a number of reasons. Higher suicide rates, disability, unemployment, poverty, lower life expectancy, unsafe housing, interpersonal conflict caused by socioeconomic stress, exposure to racism and intergenerational trauma, represent additional vulnerabilities to climate change stressors for this population (Godden et al. 2022).

First Nations peoples living in areas far from cities lack accessible mental and other health services, which places them at increased risk from the adverse mental health risks caused by climate change. These include increased exposure to extreme heat and other extreme weather events, and disruption to cultural wellbeing connections to Country (Haswell et al. 2023). First Nations people have identified other adverse impacts of climate change, including increased health inequalities and burden of illness and disease; adverse mental health impacts such as suicidal behaviour, anxiety, stress, grief and loss, and reduced SEWB; the destruction of cultural land-based knowledge and practices, community and family homes; and forced relocation to precarious and stressful urban homes (Arabena and Kingsley 2015; AHCWA 2019b; Hunter 2009; Pearce et al. 2015; McNamara et al. 2010; Rigby et al. 2011; Zander et al. 2013).

The cultural continuity of communities living in remote areas is threatened by climate change through the disruption of traditional food gathering practices; by disrupted connection to Country, community and culture; and by increased socio-economic disadvantage that places additional stress on communities (Low Choy and Jones 2013; Leonard et al. 2013a,b). Sacred places — which are used for cultural and spiritual activities and are vital to cultural continuity — can also be damaged or destroyed by climate change (Low Choy and Jones 2013).

In the literature, the key adverse SEWB climate change related stressors impacting First Nations people include disrupted place-attachment; disrupted cultural continuity and loss of culture; grief and distress from harms to Country; loss of sacred cultural places; loss of food security and clean water and air; compounding distress and trauma from colonisation; loss of hunting grounds and cultural food gathering practices; lack of access to medicinal plants; increased anxiety and substance abuse; family conflict and stress; displacement from home and loss of livelihoods; increased mortality; and reduced access to health services and employment (Breth-Petersen et al. 2023; Dwyer 2017; Green and Martin 2017; HEAL Network and CRE-STRIDE 2021; Janke et al. 2021; Matthews et al. 2023; Peden et al. 2023; Teo et al. 2023; Weeramanthri et al. 2020). Loss of access to employment due to drought has been linked to low self-esteem, which in turn leads to substance misuse, despair and increased family stress and conflict (Pearce et al. 2015); it exacerbates 'underlying grief and trauma; undermining livelihoods and participation; aggravating socioeconomic disadvantage; and creating a context for behaviour that brings shame to culture' (Rigby et al. 2011:252).

A significant First Nations scoping review (a synthesis of studies linking climate change to First Nations people's health in Australia) found that climate change will increase ill health. The social and cultural determinants of health will be threatened by climate change, which will reduce access to Country and traditional foods gathered on land; risk food, water and housing insecurity; and threaten access to health services — which will itself have a reduced workforce and increased demands because of extreme weather events. Climate change will '[c]ompound historical injustices, extending colonial process that disrupted cultural and spiritual connections to Country that are central to health and wellbeing' (HEAL Network and CRE-STRIDE 2021 39).

Adverse impacts of climate change on the determinants and domains of SEWB

Social determinants

Exposure to extreme weather events can lead to an exacerbation of socioeconomic disadvantage from: unsafe housing; loss of homes and displacement from home; decreased access to health services; relocation to stressful urban environments; reduced access to employment and education; and decreased workforce productivity.

Cultural determinants

These include: disruption of cultural continuity through loss of cultural connections to Country and land and cultural obligations; loss of and damage to sacred places that have been used to strengthen cultural activities and to exchange knowledge across generations; loss of place-based TEK; and loss of access to cultural practices to do with healing, medicine, nutrition, cultural laws; and language.

Mind and emotions

Impacts include: psychological distress from loss or destruction of Country and land; loss of custodial kinship relationships and ability to practice cultural activities; grief and trauma from deaths; the potential for increased grief and trauma including intergenerational trauma, depression and despair; injuries and increased illness and disease; worsening mental health due to extreme heat and weather events; diminished self-esteem from lack of employment and access to traditional livelihoods; loss of control over social and cultural determinants; and increased suicidal behaviour.

Body

Risks to physical health include: malnutrition and health problems linked to food, water and energy insecurity; heat-related disorders; food and water-borne diseases; exacerbation of chronic diseases and allergies; and the potential for increased substance misuse due to increased stress, grief and trauma.

Family and kin

Increased family stress and conflict due to loss or reduction of income, employment and livelihoods; loss of culturally important kinship connections to Country; housing insecurity and displacement can undermine wellbeing, increase the incidence of illness and disease and the potential for substance misuse within families.

Community

Disharmony and fracture in communities through loss of land and Country; an increase in adverse social determinants; and the displacement and dispersal of communities due to extreme weather events, and lack of access to place-based cultural and community events, can lead to increased community-level trauma, distress and grief.

Culture

The loss of cultural connections to significant and sacred places and loss of opportunity to practice culture on Country and land is experienced as grief. The loss of place-based cultural connections which support mental health and spiritual wellbeing through the cultural activities of food gathering, ceremonial and spiritual activities, and the continuation and sharing of IKS and TEK across generations are all significant.

Country

Loss of connection to Country and of the protective SEWB benefits of those connections is significant. Displacement and destruction of Country, distress and grief caused by loss of custodial kinship relations with Country, loss of access to traditional medicine and foods, and loss of livelihoods connected to land and Country all impair SEWB.

Spirituality and ancestors

Interruption of place-based spiritual connections to Country, ancestors and spirits, including spiritual custodial kinship relationships with flora and fauna, sky, water and earth and damage and destruction of sacred places important to spiritual wellbeing also impair SEWB.

Although there is substantial international research into the adverse impact of climate change on First Nations peoples, the research in Australia is limited and has many gaps. The intergenerational trauma caused by climate change impacts to land and Country — loss of sacred place-based attachment; loss of intangible cultural heritage; loss of kinship connections with flora and fauna and spirits and with family, community, culture, language, spirituality, identity and knowledge — has not been adequately analysed. Nor has the relationship between intergenerational trauma and environmental trauma, or the complex cultural grief over the ongoing loss of Country and kin been fully examined using First Nations research methods (Breth-Petersen et al. 2023).

Lack of First Nations self-determination in climate change policy and research

There appears to be a lack of inclusion of First Nations peoples across a range of policy related to climate change in Australia. A qualitative study of Australian energy policy found that First Nations people are rarely mentioned and, when they are, they are often listed as one of many vulnerable consumer groups, while the culturally and spiritually important SEWB connections First Nations people have to land and Country are not emphasised either (Baum et al. 2023). The culturally important First Nations relationship between land and Country and wellbeing and health is also marginalised in the climate change research and policy field. First Nations place-based knowledge of the environment, along with an understanding of complex cultural relationships to land and Country, and their right to self-determination is often marginalised (Low Choy and Jones 2013; Leonard et al. 2013; Nursey-Bray and Palmer 2018; Petheram et al. 2010).

Responding to widespread concerns from First Nations people that climate change adaptation and mitigation (such as nuclear power plants and hydro-power dams) were harming their health, livelihoods and cultures, the United Nations Permanent Forum on Indigenous Issues reaffirmed that the principle of Indigenous self-determination must be upheld across all climate change

mitigation and adaptation activities impacting First Nations peoples (Garcia-Alix 2008). However, almost 15 years later little progress has been made. A systematic review of policy relating to climate change adaptation with First Nations groups in Australia, Pacific Islands, Canada and the United States found that most policies had 'mediocre processes of inclusion that resulted in average responses and modest influence in decision-making forums' (Masters-Awatere et al. 2022). Findings from a national report on the state of the Australian environment also emphasise the lack of self-determination in the area (Janke et al. 2021). Moreover, a study of research and policy impacting First Nations' access to water in Canada, Australia, Aotearoa New Zealand and the United States found the need for stronger self-determination so that IK, cultures and histories inform adaptation activities (Leonard et al. 2023).

A 2023 systematic review of empirical evidence across two decades of First Nations climate change adaptation trends found that the lack of Indigenous governance or self-determination was a significant barrier to adaptation (Taylor et al. 2023). The authors found that the strongest adaptation drivers were First Nations knowledge and traditions, and thus advocated for stronger First Nations participatory processes. Moreover, they recognised that, in the climate change adaptation research field, research into health and cultural adaptation is an area which needs expansion.

Indigenous governance continues to be missing from the influential International Panel on Climate Change. A critical analysis of the Panel's third Working Group report for the Sixth Assessment Report re-affirmed the importance of First Nations engagement in climate change policy which affects their communities.

This report found that, in Australia, there were a number of key issues confronting First Nations people because of escalating climate change harms:

- Increased risks reinforce vulnerability and inequality affecting Indigenous Peoples.
- Decisions based on perverse incentives, underpinned by financial gain and profit, increase vulnerability and promote maladaptation.
- Lack of understanding of Indigenous knowledge limits adaptation.
- Social justice is associated with territorial management [self-determination over land].
- Considering Indigenous Peoples wellbeing, and supporting self-determination and knowledge transfer, help to overcome colonial legacies and strengthening adaptation.
- Indigenous Peoples should have a central role — based on their governance regimes and cultural practices — in decision-making (Carmona et al. 2023:10).

All of these issues potentially relate to the social and cultural determinants of SEWB. Implementing self-determination over climate change research policy and practice has the potential to strengthen SEWB.

Lack of First Nations climate change adaptation and mitigation strategies that target mental health and wellbeing

Although the National Climate Change Adaptation Research Plan for Indigenous Communities (Langton et al. 2012) did not identify mental health, SEWB and suicide as a research priority, the Plan did prioritise the need for research that explores how 'interactions between social, cultural, institutional, economic and biophysical processes' increase risk and how to identify and evaluate strategies to reduce this risk. These interactions can be understood as underpinning SEWB.

The National Climate Change Adaptation Research Facility (NCCARF) conducted a range of research projects exploring First Nations' capacities to adapt to climate change (Bird et al. 2013; Griggs et al. 2013; Haynes et al. 2011; Leonard et al. 2013b; Low Choy and Jones 2013; Memmott et al. 2013; Nursey-Bray et al. 2013; Petheram et al. 2013; Tran et al. 2013). While none of this research was focused on adapting or mitigating the mental health, suicide or SEWB impacts of climate change, the importance of protecting culture and maintaining cultural continuity was stressed in a number of studies. Cultural continuity has been identified across First Nations mental health and suicide research as an evidence-based path to increased SEWB and as a protection against suicide (Dudgeon et al. 2016). Self-determination over land is also central to cultural continuity.

Responding to a call from NCCARF for the development of First Nations adaptation projects, the Arabana climate adaptation project was initiated in South Australia, in partnership with communities and university researchers. A community-based participatory project, it involved interviews with 120 members of the Arabana community and the engagement of 25 members in community-based adaptation workshops (Nursey-Bray et al. 2020).

The Arabana Climate Adaptation Strategy is founded on the principle that adaptation should:

- be holistic in nature
- build on the connection between economies and livelihoods and the environment/Country
- redress old wrongs (derived from colonisation)
- recognises all forms of Indigenous knowledge
- build adaptive capacity
- address wider governance challenges (not just climate, but other issues like mining)
- respect cultural and local forms of governance (Nursey-Bray et al. (2020:143).

The research project found that 'Arabana discourse around adaptation heralds it as a mode of healing, cultural revitalisation and a moving forward from the impact colonisation has had on their people' (Nursey-Bray et al. 2020:147). The holistic, collective focus of this adaptation strategy supports 'cultural revival' which facilitates 'cross-generational healing' (Nursey-Bray et al. 2020:143, 148). Although mental health, SEWB and suicide are not mentioned, it is important to note that (across the literature on First Nations suicide prevention) cultural revitalisation has been identified as a protective factor (Gibson et al. 2021; Dudgeon et al. 2016; Dudgeon et al. 2022a; Dudgeon et al. 2022b). While a direct focus on mitigating and adapting to the mental health or SEWB impacts of climate change is not highlighted in the Arabana strategy, it should be noted that, from a First Nations standpoint, holistic collective healing through the strengthening of culture is highlighted as a co-benefit.

There is a lack of recognition of the mental health impacts of climate change on First Nations people, and on mental health in general, in the Department of Agriculture, Water and the Environment's National Climate Resilience and Adaptation Strategy 2021 to 2025 (DAWE 2020). Outcomes from the 2018 National Indigenous Dialogue on Climate Change and the National First Peoples Gathering on Climate Change held in Cairns in 2021 expressed the need to:

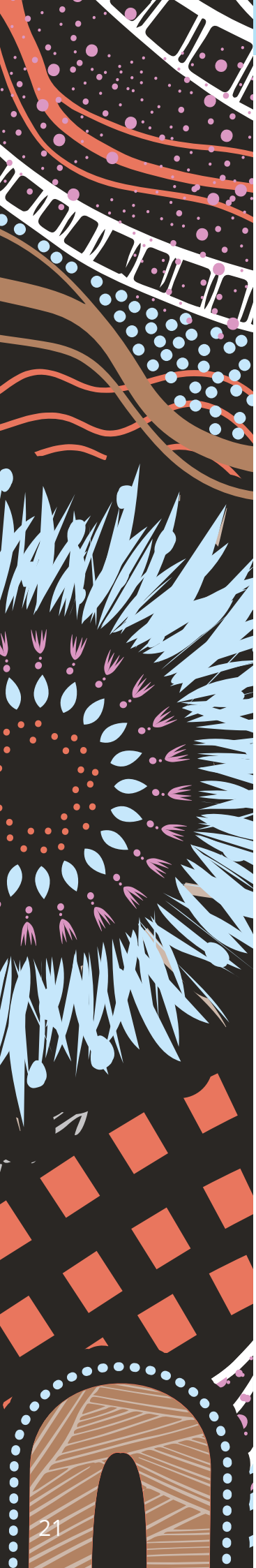
- continue the dialogue between scientific and traditional ('two way') knowledge of climate change
- support Indigenous-led projects based on two-way knowledge about climate risks
- create opportunities for peer-to-peer learning between Traditional Owners as the best means of strengthening the application of their traditional knowledge
- provide Traditional Owners with the opportunity to shape the forms of communication and engagement that represent the best value for their communities (DAWE 2020:25).

Other climate change adaption strategies include the First Nations Clean Energy Network which was launched in November 2021. In 2023, the Australian Renewable Energy Agency (ARENA) announced First Nations climate change adaptation and mitigation programs. Funding for solar infrastructure for communities under the First Nations Community Microgrids Stream was announced in August 2023 for projects which are developed with First Nations peoples (Australian Government 2023). So far these initiatives have not linked adaptation and mitigation strategies to mental health, SEWB and suicide prevention.

Given that many First Nations cultures across the world are impacted in similar ways by climate change, it is worth considering what can be learned from international models and plans. A promising example of a First Nations climate adaptation plan, which includes a focus on mental health, can be found in the 2019 Northern Californian Karuk plan. The Karuk Climate Adaptation Plan (Karuk Tribe 2019) recognises the pervasive and holistic impact of climate change on mental health because of the sacred and cultural connections to land. Climate change related chronic mental health stressors are identified under four categories:

- cultural and spiritual impacts of ecosystem decline and species loss
- stress and anxiety related to wildfires, smoke and emergency events
- individual role strain
- community stress (Karuk Tribe 2019:157).

Australian initiatives in this area are currently not foregrounding the importance of adapting to, and mitigating the impacts of, climate change on mental health, SEWB, and by extension, suicide. The Karuk Plan's attention to mental health has the potential to enhance our understanding and practice.



5

Overarching strategies, approaches and best practice

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The social and emotional wellbeing co-benefits of caring for Country

A systematic review of the effectiveness of interventions to reduce climate anxiety noted the need for a holistic approach that moves beyond the treatment of individuals and considers wider holistic social and environmental wellbeing and identified this as a gap in intervention research (Bingley et al. 2022). There is also evidence in the literature that collective pro-environmental behaviour mitigates the deleterious effects of climate change distress by providing social connections and community support (Latkin et al. 2022). Similar holistic approaches and collective behaviours have long underpinned First Nations practices, which nurture the interconnected health of people and the environment.

Aboriginal people looking after Country is critical, as it is both necessary and important for the ongoing healing of people and country (NIAA 2019; Country Needs People 2016; Daniels et al. 2022). '"Caring for Country" means participation in interrelated activities on Aboriginal lands and seas with the objective of promoting ecological, spiritual and human health' (Berry et al. 2010:140). Many First Nations cultural practices are focused on caring for Country: practices which are aligned with cultural duties to protect, nurture and love Country.

First Nations experts recognise that:

> *Caring for Country refers to more than the physical management of a geographical area—it encompasses looking after all of the values, places, resources, stories, and cultural obligations associated with that area, as well as associated processes of spiritual renewal, connecting with ancestors, food provision, and maintaining kin relations* (Altman et al. 2007:37)

There is evidence that caring for Country has holistic SEWB co-benefits (Bourke et al. 2018; Butler et al. 2019; Berry et al. 2010; Burgess et al. 2009; Daniels et al. 2022; David et al. 2018; Davy et al. 2016; Fatima et al. 2023; Jarvis et al. 2021; Kingsley et al. 2009, 2013; Matthews et al. 2023; Salmon et al. 2018; Schultz and Cairney 2017; Weir et al. 2011; Sutherland and Adams 2019; Wright et al. 2021).

Increased research into the 'co-benefits, for human health and wellbeing of climate change adaptation and mitigation practices have highlighted the wellbeing benefits of using TEK adaptation and mitigation land and sea management practices for First Nations peoples. As the final report of the Climate Health WA Inquiry notes, 'Aboriginal-initiated natural resource management or "caring for country" programs, aimed at climate adaptation, may also lead to social and emotional wellbeing co-benefits in remote communities' (Weeramanthri et al. 2020:90). Indeed, there is increased recognition of these SEWB co-benefits in First Nations-led research, and that caring for Country has 'a multitude of social, cultural, economic and health co-benefits beyond positive environmental outcomes' (HEAL Network and CRE-STRIDE 2021).

Although there are few specific climate change adaptation and mitigation programs for First Nations peoples in Australia that report health outcomes, there are a number of programs which support a connection to, and caring for, Country (Matthews et al. 2023). These programs involve cultural land management practices. Indigenous land and sea management programs are expressions of caring for Country and have been found to improve holistic wellbeing and quality of life (Larson et al. 2019a, b; Larson et al. 2020). Such activities are linked to a range of SEWB co-benefits and cultural revival and community revitalisation (HEAL Network and CRE-STRIDE 2021). Cultural revival has a holistic protective effect and strengthens SEWB (Sivak et al. 2019).

Ranger programs which use and pass on TEK are vital to cultural revival, SEWB and climate adaptation and mitigation. Ranger programs include the cultural practice of managing the land with 'firestick burning', which prevents dangerous large-scale fires and supports eco-system health (Daniels et al. 2022; Ens et al. 2016; McKemey et al. 2020; Robinson et al. 2016; Schultz et al. 2018). The Western Arnhem Land Fire Abatement (WALFA) project reduced bushfires and increased access to socio-economic advancement (Green and Minchin 2014). A systemic review and case study analysis found that the First Nations 'caring for Country' practice of fire management has been found to have multiple co-benefits (da Veiga and Nikolakis 2022). These include increased employment opportunities, intergenerational knowledge exchange, reduced food insecurity; stronger physical and mental health, and stronger community self-determination and cultural identity (Nikolakis and Roberts 2020).

The Aboriginal and Torres Strait Islander Suicide Prevention Evaluation Project, *Solutions That Work* report found that connecting young people to Country through the guidance of Elders is suicide prevention best practice (Dudgeon et al. 2016). *Closing the Gap*, the Australian national strategy to improve the health outcomes of First Nations peoples, also recognises the importance of adopting a strengths-based SEWB approach to the health benefits of connections to Country (CoATSIPO and Australian governments 2020). A number of First Nations people's health plans and strategies recognise the protective benefits of connection to Country. The *National Aboriginal and Torres Strait Islander Health Plan 2021–2031* takes a strengths-based cultural determinant approach to health and wellbeing, recognising the protective benefits of connection to Country in enhancing resilience, identity, health and wellbeing (Department of Health 2021:8). Connection to Country is supported by a range of First Nations SEWB programs and is recognised as a protective factor across a wide range of health and wellbeing strategies, plans, and policies (Dudgeon et al. 2022a, 2022b).

Across the literature, the SEWB benefits of caring for Country and/or Indigenous land and sea management programs or Australian Indigenous cultural and natural resource management include the following.

Social determinants

Improved health centres, schools (Larson et al. 2019a), increased engagement of children with education (Gilligan 2006, Hunt 2010, Ryan et al. 2012; Social Ventures Australia 2016; Robinson et al. 2016), increased employment through knowledge exchange (Jarvis et al. 2021), increased access to employment in remote areas (Green and Minchin 2014; Greiner and Stanley 2013; Robinson et al. 2016), income diversification (Campbell et al. 2011; Robinson et al. 2016), stronger local governance structures (Campbell et al. 2011), numerous economic benefits such as increased First Nations business (food, arts and crafts, carbon market products, eco-tourism, marketing of TEK) which

enhance economic wellbeing (Barber and Jackson 2017; Petina et al. 2020); education, training and skills development (Hunt et al. 2009; Greiner et al. 2007; Ryan et al. 2012, Robinson et al. 2016); increased access to housing and employment (Hunt et al. 2009); increased availability of social services (Gilligan 2006, Hunt 2010, Social Ventures Australia 2016); and more resilient socio-cultural systems (Burgess et al. 2005; Campbell et al. 2011; Garnett et al. 2009; Nikolakis et al. 2022).

Cultural determinants

Increased use of language, improved Country and culture (Larson et al. 2019a), cultural revival through knowledge exchange (Jarvis et al. 2021; Gilligan 2006; Morrison 2007; Sithole et al. 2008), cultural knowledge sharing across generations and stronger relationships with Elders (Green and Minchin 2014; Greiner et al. 2005; Robinson et al. 2016; Ryan et al. 2012), and cultural continuity (Greiner et al. 2007; Johnston et al. 2007; Sithole et al. 2008; Hunt et al. 2009; Griffiths and Kinnane 2010; Ryan et al. 2012; Russell-Smith et al. 2013; Robinson et al. 2016).

Connection to Mind and emotions

Health centers (Larson et al. 2019a); self-respect and empowerment through knowledge exchange (Jarvis et al. 2021); improved mental health and wellbeing (Burgess et al. 2005; Campbell et al. 2011; Garnett et al. 2009; Nikolakis et al. 2022); stronger cultural identity (Corbera and Brown 2010; Garnett et al. 2009; Robinson et al. 2016); reduction in substance misuse (Hunt et al. 2009; Greiner et al. 2007; Johnston et al. 2007; Sithole et al. 2008; Hunt et al. 2009; Griffiths and Kinnane 2010; Ryan et al. 2012; Russell-Smith et al. 2013; Robinson et al. 2016); skills and training (Fogarty and Schwab 2012; Marika and Roeger 2012; Marika et al. 2012); improved self-esteem (Daniels et al. 2022) and self-worth (Gilligan 2006; Sithole et al. 2008; Hunt 2010).

Connection to Body

Health centres (Larson et al. 2019a); improved physical health and food security (Burgess et al. 2005; Garnett et al. 2009; Nikolakis et al. 2022), reduction in substance misuse (Gilligan 2006; Sithole et al. 2008; Hunt 2010; Green and Martin 2016; Hunt et al. 2009); and caring for Country activities on Arnhem Land found increased fitness, diet, lower obesity, diabetes, cardiovascular and renal disease and psychological distress (Altman 2003; Burgess et al. 2005; Garnett and Sithole 2007; Garnett et al. 2009).

Connection to Family

Stronger family connections through knowledge exchange (Jarvis et al. 2021); reduced anti-social behaviour of young people (Hunt et al. 2009); increased family and community cohesion (Gilligan 2006; Greiner et al. 2007; Hunt 2010; Ryan et al. 2012; Green and Martin 2017; Social Ventures Australia 2016); and increased family wellbeing (Kingsley et al. 2009, 2013).

Connection to Community

Improved schools, safer community (Larson et al. 2019a), less violence and crime (Greiner et al. 2007; Sithole et al. 2008; Ryan et al. 2012; Social Ventures Australia 2016), stronger community through knowledge exchange (Jarvis et al. 2021), strengthening of social cohesion (Berry et al. 2010; Burgess et al. 2005; Gilligan 2006; Hunt 2010; Ryan et al. 2012; Robinson et al. 2016), stronger community decision-making authority (Corbera and Brown 2010; Garnett et al. 2009; Robinson et al. 2016); increased self-determination in the community (Addison et al. 2019); and strengthened capacity for self-determination over land and sea (Hunt et al. 2009).

Connection to Culture

Increased cultural continuity and cultural strength (Bourke et al. 2018; Butler et al. 2019; Schultz and Cairney 2017; Weir et al. 2011); partnership with non-Indigenous people and pride in culture through knowledge exchange (Jarvis et al. 2021; Wright et al. 2023); increased cultural resilience (Green and Martin 2017); and cultural autonomy (Morrison 2007; Yanner 2008).

Connection to Country

Increased connection to Country (Marika et al. 2012; Pew Charitable Trusts 2015; Green and Martin 2017) is noted as an explicit co-benefit but can also be recognised as an implicit wellbeing co-benefit across the literature.

Connection to Spirituality

Increased connection to spirituality can be understood as part of the increase in cultural continuity and stronger connections to culture across the literature on the co-benefits of caring for Country activities (Burgess et al. 2005, 2009; Barber and Jackson 2017).

The strengthening of cultural connectedness through caring for Country is worth noting as there is evidence that, conversely, lower levels of connectedness - community participation in cultural events, activities and organisations - is linked to higher suicide rates (Gibson et al. 2021). Significantly, a systematic review of the impact of climate change on Indigenous mental health globally found that, in Australia, mental health and wellbeing adaptation and coping strategies preferred by First Nations peoples included practicing TEK and cultural activities which support cultural continuity and community resilience (Vecchio et al. 2022).

Self-determination over climate change research and policy impacting First Nations people

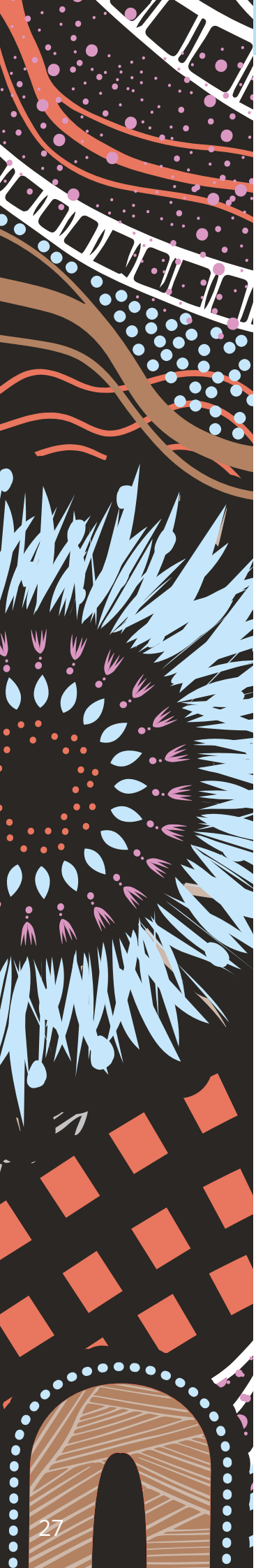
The vital importance of First Nations leadership in strengthening the social and cultural determinants of SEWB to mitigate the impact of climate change is stressed in the literature (Chatwood et al. 2017; Rasmussen 2023). Climate change disruption of spiritual and cultural relationships to land and Country which nurture and support individual and collective mental health and wellbeing are a culturally unique risk factor for First Nations peoples, making socio-economic and health impacts more complex and potentially harder to adapt to and mitigate without place-based, participatory self-determination from impacted communities (Arabena 2020; Arabena and Kingsley 2015; Green and Minchin 2014; HEAL Network and CRE-STRIDE 2021; Nursey-Bray and Palmer 2018; Zander et al. 2013).

The importance of IKS and self-determination is also stressed in the conclusion of an evidence review which noted, in order to improve evidence about the health impacts and uphold health equity, research should be guided by First Nations peoples and based on their knowledges, priorities, and values, including in the research process and across all stages of climate policy and interventions (Sahu et al. 2022 32).

A 'systematic scoping review of Indigenous governance concepts in the climate governance literature' (Wilson et al. 2022) found that Indigenous governance is underrepresented and although IKS are referenced, Indigenous governance is marginalised. The authors recommend three ways forward for the climate governance literature:

- Follow Indigenous research protocols.
- Move beyond a narrow focus on the "supplemental value" of Indigenous Knowledge Systems to acknowledge the "governance value".
- Engage with transformational climate responses that address the systemic inequalities created by historical and ongoing colonialism. (Wilson et al. 2022:32).

The protective role of IK is also stressed in the climate change mitigation literature: '[f]uture weather-related deaths mitigation should consider Indigenous knowledge and ensure culturally appropriate and locally relevant approaches' (Peden et al. 2023:8). First Nations water scholars have also emphasised the importance of engaging with IK in environmental policy concerning the relationship between peoples and water (Moggridge et al. 2022).



6

Conclusions and recommendations for further research

6 Conclusions and recommendations for further research

Climate change is recognised as a determinant of First Nations mental health. There is evidence linking extreme heat to increased suicide and suicide related behaviour, along with a range of clinical and sub-clinical mental health challenges across all populations. Evidence about adaptation to the mental health impact of climate change is weak globally (Berrang-Ford et al. 2021). There is a significant gap in evidence-based adaptation strategies and although research into the impact of climate change on mental health and wellbeing is growing, there is much that is not known (Charlson et al. 2022; Alford et al. 2023).

First Nations peoples are at increased risk from the adverse socio-economic, health, mental health and SEWB effects of climate change (Weeramanthri et al. 2020) and are potentially more at risk from climate change related suicide due to culturally and spiritually important connections to land and Country and existing psychosocial vulnerabilities due to colonisation. Caring for Country, however, is linked to numerous SEWB co-benefits, including cultural continuity and community connectedness which have been found to reduce suicide. Indeed, caring for Country is recognised as a promising practice which can reduce the adverse impacts of climate change on First Nation people's mental health and wellbeing (Lawrance et al. 2022).

Averting the detrimental impact of climate change on First Nations wellbeing, mental health and suicide requires strengthening self-determination over Country and land, empowering stewardship practices and cultures, and supporting First Nations ways of knowing being and doing or place-based environmental IKS and TEK. Indigenous governance over climate change mental health policy is also vital.

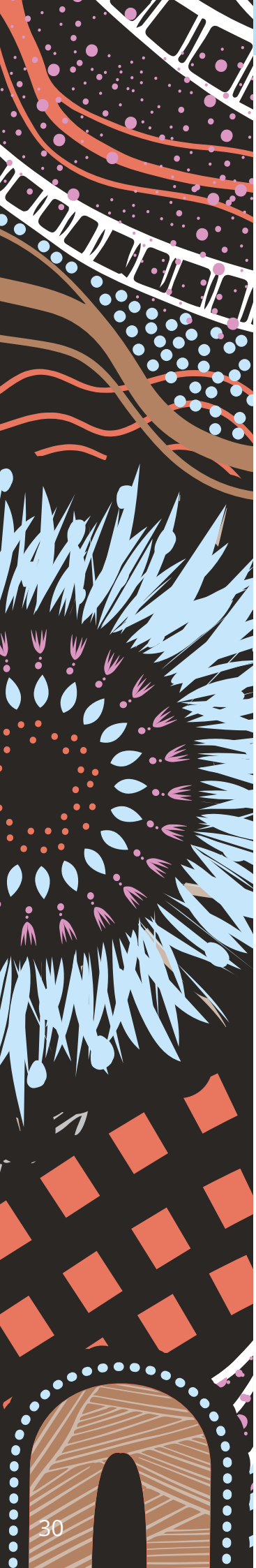
> *There is an identified need to strengthen the evidence-based around the public health systems ability to mitigate the impacts on First Nations people of heatwaves and other extreme weather events caused by climate change and a recognition that for First Nations Australians health system resilience depends on implementing culturally safe practices and overcoming barriers to accessing health services* (Mason et al. 2022; Pendrey et al. 2021).
>
> *The relationship between policies which impact the environment and Indigenous SEWB is under researched and could help refine future policies which acknowledge the evidence-based link between climate change and SEWB. A similar research agenda has been proposed for First Nations communities in Canada* (Chan et al. 2021).
>
> *Although scales for measuring eco-anxiety have been developed and validated (Clayton and Karazsia 2020; Hogg et al. 2021, 2023), including measures for a spectrum of climate change related emotions (Marczak et al. 2022), none have been developed for First Nations people. There is a need to develop and validate a culturally appropriate measure which reflects First Nations understandings of climate change and SEWB and recognises the importance of Country*.

An 'environmental autopsy' (Ansloos and Cooper 2023) approach to First Nations suicides would explore the relationship between, for example, high rates of suicide in rural and remote areas and exposure to extreme heat and other extreme weather events, place-based intergenerational trauma over the destruction of Country, and the adverse SEWB impacts of climate change related activities.

There is, as yet, no rigorous longitudinal nation-wide cohort study of the relationship between First Nations people's suicide and suicide related behaviour (such as self-harm), extreme weather events such as heat waves, and rates of visits to emergency department. Such studies would provide data to guide policy interventions.

In relation to evidence about the correlation between climate change anxiety and psychological distress and negative future outlook among young First Nations people, in the findings from the 2022 Mission Australia Youth Survey it has been asserted that '[i]mmediate attention from research and policy sectors to support climate change education, communication strategies and targeted interventions is urgently required' (Teo et al. 2023:1). It is vital that such research, education, strategies and targeted interventions are conducted by, for, and with First Nations people, apply Indigenous Knowledges, are implemented and evaluated using First Nations methods and practices. In relation to First Nations peoples, such activities are best conducted under the guidance of the Aboriginal community-controlled health sector. Elder-led research into holistic SEWB interventions might be a more culturally appropriate way forward and Elders are knowledge holders and responsible for the intergenerational transmission of IKS which support caring for Country (Scrine et al. 2020).

First Nations governance over the design and implementation of climate change adaptation and mitigation policies and practices aimed at strengthening SEWB is also needed, along with the implementation of the *United Nations Declaration of the Rights of Indigenous Peoples* (UN 2007) into all activities. There is a lack of research on the cultural impacts of climate change, mental health, SEWB and suicide and there is also a lack of research into First Nations climate change adaptation and mitigation practices which support SEWB. 'Further Aboriginal-led research is required to identify the cultural impacts of CC [climate change] on SEWB, including adaptive responses based on Aboriginal knowledges' (Standen et al. 2022:1). This recommendation is also supported by recent First Nations advice to the Australian Government on the IPCC Assessment Report 7 (Lansbury et al. 2023).



Appendixes

Appendix A: Climate change and Aboriginal and Torres Strait Islander health

Climate change and Aboriginal and Torres Strait Islander health. Matthews V, Vine K, Atkinson AR, Longman J, Lee, GW, Vardoulakis S and Mohamed J (2023:637). 'Justice, culture, and relationships: Australian Indigenous prescription for planetary health', Science 381(6658):636–641.

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Water quality impacts
Harmful algae blooms
Saltwater intrusion
Waterborne diseases

Bushfires and smoke
Injury and fatalities
Loss of homes
Cardiovascular and respiratory disease

Food security
Malnutrition
Food insecurity
Higher food prices
Foodborne illnesses

Extreme heat
Heat-related illness and death
Cardiovascular failure

Drought
Water supply impacts
Dust storms
Bushfire risk

Sever weather and floods
Injuries and fatalities
Loss of homes
Indoor mold

Air pollution and allergies
Asthma and allergies
Cardiovascular and respiratory issues

Changes in vector ecology
Ross River virus
Japanese Encephalitis virus
Dengue fever

Fig. 1. Climate change and Aboriginal and Torres Strait Islander health. Summarized here are the connections between climate change and Aboriginal and Torres Strait Islander health and well-being. Existing health disparities and the close spiritual bond that Indigenous people hold with Country exacerbate adversity from climate change for Aboriginal and Torres Strait Islander people. Along with direct impacts—deaths, injuries, and worsening health from excessive heat, bushfires, floods, and sea level rise—there are indirect "cascading consequences" for communities resulting from altered natural systems (air quality, water and food security, and vector-borne and infectious diseases) and from altered social systems (employment and workforce productivity, housing comfort, and health service delivery) (*26*). Adverse health effects from climate change include poor social and emotional well-being, heat-related disorders, vector-borne diseases, food and waterborne diseases, respiratory disorders, and exacerbation of chronic diseases, including heart and kidney disease (*26*).

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Abbreviations

AHCWA	Aboriginal Health Council of Western Australia
AMSANT	Aboriginal Medical Services Alliance of the Northern Territory
ARENA	Australian Renewable Energy Agency
CoATSIPO	Coalition of Aboriginal and Torres Strait Islander Peak Organisations
CRE-STRIDE	Centre for Research Excellence — Strengthening systems for Indigenous health care equity
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAWE	Department of Agriculture, Water and the Environment
HEAL	Healthy Environments and Lives
ICE	Inventory of Climate Emotions
IK	Indigenous Knowledge
IKS	Indigenous Knowledge Systems
IPCC	Intergovernmental Panel on Climate Change
NCCARF	National Climate Change Adaptation Research Facility
SEWB	Social and Emotional Wellbeing
TEK	Traditional Ecological Knowledges
UN	United Nations
UNDRIP	United Nation Declaration of the Rights of Indigenous People
WALFA	Western Arnhem Land Fire Abatement
WHO	World Health Organisation

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Glossary

biodiversity: biological diversity; the variety of life in an area, including animals, plants, fungi and microorganisms.

carbon sequestration: the absorption or capture and control efforts to reduce the amount of carbon dioxide in the atmosphere by.

climate change: changes in the climate which are caused by direct and indirect human activity that release greenhouse gasses into the atmosphere.

climate change adaptation: efforts to adjust to the impacts of climate change now and in the future.

climate change mitigation: efforts to reduce the emission of carbon dioxide and other greenhouse gasses.

Country: a term used by First Nations peoples to refer to their deep spiritual and cultural connections to the environment, which include kinship responsibilities for flora and fauna.

Dreamtime: a Western term often used to refer to the complex and diverse spiritual and philosophical belief systems of First Nations peoples.

First Nations peoples: Aboriginal and Torres Strait Islanders; people who are Indigenous to Australia and other places such as Canada, America and New Zealand.

energy poverty: a cost of energy which negatively impacts on health and wellbeing (for example energy bills which require sacrificing other necessities of life); an inability to pay energy bills.

food insecurity: a lack of regular access to nutritious food necessary for development and health.

housing insecurity: poor quality and unsafe housing; unaffordable rent or mortgage; homelessness; frequent moving because of unaffordable or safe housing.

kinship relations with Country: cultural obligations towards totems and broad environmental custodial ethics.

longitudinal study: the continuous study of a particular population over a long period of time often using a variety of measures.

neurological imbalances: these include seizures; loss of balance and/or coordination; paralysis; muscle weakness; pain; numbness; and altered states of consciousness such as confusion.

psychotropic medication: these include antipsychotics, antidepressants, anti-anxiety and mood-stabilising medications.

sacred places/sacred sites: areas of the landscape that have important historical, cultural and spiritual meaning to First Nations peoples.

scientific and traditional (two-way) knowledge: generally understood as a blend of Western scientific and First Nations knowledges.

subclinical disease: a disease which is not classifiable using standard clinical detection.

totems: a part of nature, for example, a crow, that First Nations people have particular kinship obligations to care for.

water insecurity: lack of regular water required for drinking, hygiene, health care, and food preparation and growing.

zoonotic disease: an infectious disease which is spread between animals and humans.

There is strong evidence that climate change and global warming is a significant and growing determinant of mental health. This paper reviews the literature on climate change and the social and emotional wellbeing of First Nations people.

AIHW

Stronger evidence,
better decisions,
improved health and welfare